



Lifting productivity at Australia's container ports: between water, wharf and warehouse

Draft report

This is a draft report prepared for further public consultation and input. The Commission will finalise its report after these processes have taken place.

The Productivity Commission acknowledges the Traditional Owners of Country throughout Australia and their continuing connection to land, waters and community. We pay our respects to their Cultures, Country and Elders past and present.

The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

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Opportunity for comment

The Commission thanks all participants for their contribution to the inquiry and now seeks additional input for the final report.

You are invited to examine this draft report and comment on it by written submission to the Productivity Commission, preferably in electronic format, by mid-October.

Further information on how to provide a submission is included on the inquiry website: www.pc.gov.au/inquiries/current/maritime-logistics.

The Commission will prepare the final report after further submissions have been received and it will hold further discussions with participants. Public hearings will be held in early November. Further details on registering for hearings and making submissions can be found on the inquiry website

Commissioners

For the purposes of this inquiry and draft report, in accordance with section 40 of the *Productivity Commission Act 1998* the powers of the Productivity Commission have been exercised by:

Dr Stephen King

Presiding Commissioner

Ms Julie Abramson

Commissioner

Terms of reference

I, Hon Josh Frydenberg MP, Treasurer, pursuant to Parts 2 and 3 of the *Productivity Commission Act 1998*, hereby request that the Productivity Commission undertake an inquiry into the long-term productivity of Australia's maritime logistics system.

Background

The long-term productivity of the maritime logistics sector is vital for supporting Australian businesses and communities to access and supply global markets at competitive rates. COVID-19 has stretched ports and shipping to their limits around the world. While there are limited steps the Australian Government can take to address short to medium term global supply and demand pressures, we can examine the readiness of Australia's maritime logistics sector — including ports and the workforces and infrastructure that connect them — to address the challenges of the future. Identifying the constraints and opportunities facing the maritime logistics sector will help improve the sector's resilience and support Australia's productivity.

Scope of the inquiry

The purpose of this inquiry is to understand any long-term trends, structural changes, and impediments that impact the efficiency and dependability of Australia's maritime logistics system and connected supply chains. As part of this, the inquiry should have regard to operational cost drivers including industrial relations, infrastructure constraints, data sharing and technology uptake in Australia's ports and related transportation networks in order to assess the overall competitiveness of Australia's ports. The inquiry should also identify any mechanisms available to address identified issues.

In undertaking the inquiry, the Commission should:

1. Examine the long-term trends, structural changes, and impediments that impact the efficiency and dependability of the maritime logistics system, including developing a framework of performance measures to determine port performance and benchmarking Australian ports internationally.
2. Determine the broader economic impact of the maritime logistics sector, and assess the sectors' operating model and any structural impediments, on consumers, business, and industry. This should include examining costs of curfews imposed at some ports, impacts of urban encroachment on ports and connections to ports, and adequacy of development planning and land protection. It should also look at the economic impact of delays; uncertainty and the capacity for logistics chains to respond; and increased freight costs (including fees and charges in the sector) and cancellations of sailings, including on importers, exporters, and supply chains.
3. Examine workforce issues, including industrial relations, labour supply and skills, and any structural shifts in the nature and type of work in the maritime logistics sector.
4. Assess infrastructure needs and constraints, including options to enhance the efficiency of ports and connected landside supply chains and the interactions between decisions of different levels of government. This should include reviewing rail access at container ports; any imbalance between the types of containers for imports versus exports; the suitability of container storage facilities; and costs and benefits of investing in new port and shipping infrastructure or enhancements to existing

infrastructure to enable the use of larger ships. This should also identify the role of Governments and the private sector in meeting current and future infrastructure challenges in the sector.

5. Research mechanisms to help improve the sector's resilience and efficiency. This should include examination of technology uptake, innovation, data capture and sharing across international freight networks compared to Australia; examples of areas where Australia does well; identification of technologies that offer the greatest productivity gains in the Australian circumstances; and identification of any barriers to greater uptake of technology and innovation.
6. Have regard to the interlinkages and dependencies between the maritime logistics sector and other logistics systems, such as air freight and landside supply chains. For example, the impact of the resumption of air freight on ports, the preparedness of ports for disruptions in these supply chains and the role of ports for landside supply chains.
7. Have regard to the ACCC's container stevedoring monitoring report; the Productivity Commission study into vulnerable supply chains; the National Freight and Supply Chain Strategy agreed by Commonwealth, state and territory governments; and the Government's in-principle acceptance of the Harper Review's recommendation to repeal Part X of the *Competition and Consumer Act 2010*.

Process

The Commission is to undertake an appropriate public consultation process including holding hearings, inviting public submissions and releasing a draft report to the public. The Commission should consult broadly, including with Commonwealth, state and territory governments. The Commission should also consult with Infrastructure Australia, relevant state and territory infrastructure bodies, the ACCC and industry stakeholders, such as ports, unions, importers, exporters and shipping lines. The final report should be provided by the end of August 2022.

The Hon Josh Frydenberg MP

Treasurer

[Received 10 December 2021]

Disclosure of interests

The *Productivity Commission Act 1998* specifies that where Commissioners have or acquire interests, pecuniary or otherwise, that could conflict with the proper performance of their functions they must disclose those interests.

The Commissioners working on this report have no interests requiring disclosure.

Acknowledgments

The Commission has used a range of information sources in preparing the report. The Commission is grateful for the contributions made by inquiry participants through their submissions and brief comments, and their participation in meetings.

The Commissioners express their appreciation to the staff who worked on the inquiry report — Assistant Commissioner Lou Will, who managed the inquiry, and other team members including: Melisa Bubonya, Owen Gabbitas, Robert Janissen, Frances Lamb, Jessica Nugent, Michael Preston, Anuraag Roy, Nicholas Sladden, Phil Smith, Scott Welsford and Michael Youren. Our thanks are also extended to Athena Wicks for administrative and project support.

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An accompanying technical paper to this report, *Container port productivity*, is available online at: www.pc.gov.au/inquiries/current/maritime-logistics/draft.

Overview

Key points

* Higher productivity at Australia's container ports is achievable and would deliver significant benefits.

- Considerable variation in performance both within and across Australia's container terminal operators points to potential productivity gains from more consistent (high) performance.
- Inefficiencies at Australia's major container ports directly cost the Australian economy an estimated \$605 million a year. Ports also have large indirect impacts on Australian businesses and consumers, so that any sustained disruptions to imports or exports magnify these costs across the economy.
- Australia's major container ports rank poorly in international work that looks at ship turnaround times. Slower turnaround times in Australia mainly reflect the use of fewer cranes to handle containers. Using more cranes would raise costs with unclear effects on efficiency. Faster turnaround times are good, but not at any cost.

* Lack of competition in some parts of the maritime logistics system means consumers pay too much.

- Transport operators have no choice about which terminal they use when picking up or dropping off a container, so must pay whatever price a terminal operator sets. Recent rapid increases in terminal access charges (TACs) have flowed through to cargo owners (and consumers). Terminal operators should only be able to levy fixed charges, like TACs, on shipping lines, who can choose which terminal to use.
- Transport operators and cargo owners are paying fees to shipping lines for the late return of containers even where the delay is because empty container parks are full. The exemption for shipping contracts, which means that these fees fall outside the scope of the Australian consumer law, should be removed.

* Workplace arrangements lower productivity — incremental changes to the Fair Work Act are needed.

- Disruptions during recent enterprise bargaining imposed large costs on businesses dependent on maritime freight. More effective remedies are needed to limit unreasonably protracted bargaining and industrial action.
- Limits should be placed on clauses in container terminal operators' enterprise agreements that are highly restrictive and constrain the ways that workers and equipment can be deployed.

* Infrastructure needs in the maritime logistics system are being addressed.

- Container port operators and other parts of the maritime logistics system are investing to accommodate bigger ships. There is no need for government intervention to encourage the use of bigger ships.
- Plans are in place to increase the share of freight moving to and from most major container ports by rail over the coming decades. Any further government investment needs clear cost–benefit analysis.
- All state governments have freight and transport strategies that cover future port infrastructure needs. Evidence does not suggest that more plans are required or existing plans will not be implemented.

* The adoption of technology at Australia's container ports is broadly in line with international practice.

* Concerns about domestic shipping capacity and training may be better resolved by means other than a strategic fleet.

- Capacity could be acquired as needed from the international market without the costs involved in supporting a national strategic fleet.
- Australian-flagged vessels are not a prerequisite to meeting maritime skill requirements. Cadetships and skilled migration appear to be working well in meeting needs for blue-water experience.

International trade underpins Australia's economy (box 1), and most goods move by sea. This translates into significant maritime freight activity, and steady growth in total freight volumes over the past decade is forecast to continue.

Any issues in the maritime logistics system — the many services involved in getting goods off ships and into the domestic distribution chain (and vice versa) — have the potential to echo through the economy.

Box 1 – Some key maritime trade facts

Some key facts about Australia's international goods trade.

- Imported goods account for about 16 per cent of GDP; exports make up about 20 per cent.
- Shipping accounts for 95 per cent of Australian international goods trade by volume.
- In 2018-19:
 - just over 6000 cargo ships made about 34 000 calls to Australia
 - ports handled 1.7 billion tonnes of freight including 5.1 million containers
 - cargo moved was worth close to \$573 billion.
- By 2050 the containerised freight task is forecast to more than triple at the Port of Brisbane, nearly triple at the Port of Melbourne and increase by two and a half times at Port Botany.

Recent events have put pressure on the maritime logistics system

The COVID-19 pandemic had different impacts on different types of cargo. Some Australian bulk commodities, such as iron ore, gas and grain faced port and shipping disruptions during initial lockdowns. However, these supply chains quickly recovered, in some cases moving record export volumes.

In contrast, cargo owners who were reliant on containerised shipping services faced major problems.

On the demand side, an increase in consumer spending on household goods (for example, desks and computing equipment), and online shopping, along with the loss of air freight capacity on passenger flights, pushed up demand for in-bound services. On the supply side, COVID induced port shutdowns around the world and congestion at ports significantly disrupted global container shipping services.

The combination of increased demand and disrupted supply led to a substantial increase in the price of container shipping services, disrupted shipping schedules and extended shipping times. At some Australian ports, these broader disruptions were reinforced by protected industrial action during enterprise bargaining that impeded container terminal operations and, in some cases, led to ships by-passing ports.

These pandemic-induced disruptions highlighted a range of long-term performance issues in the Australian maritime logistics system, particularly for the movement of containerised freight.

For example: a May 2021 release of a World Bank report ranked the efficiency of most of Australia's container ports in the bottom 20 per cent of 351 international ports; a November 2021 report from the Australian Competition and Consumer Commission (ACCC) described significant performance issues at Australia's container ports; and a report by Victoria's Essential Services Commission raised issues of market power at the Port of Melbourne.

In December 2021, the Government asked the Productivity Commission to examine long-term factors affecting the productivity, efficiency and dependability of the Australian maritime logistics system and to identify mechanisms to address any issues found. This report summarises the Commission's draft advice against its terms of reference.

Where is the inquiry focusing?

Cargos fall into three broad types — containerised, bulk and break bulk (figure 1).

Figure 1 – Cargo types handled within the maritime logistics system

Shipment type	Sub-type	Typical commodities
Containerised	General	General
	Refrigerated	Produce / frozen goods
	Food grade	Milk powder / grains
	CWO (B grade)	Scrap / timber / hides
	Hazardous	Chemicals
	Tank	Wine
	Out of gauge	Earthmoving tyres
Non-containerised	Bulk	Dry bulk
		Iron ore
		Coal
		Grains and legumes
	Liquid bulk	Cement
		Refined petroleum
		Crude oil
	Break bulk	Chemicals
		Roll On Roll Off (RORO)
		Cars / machinery
		Project cargo
	General	Wind turbines
		Any non bulk or non containerised cargo
		Break bulk and containers (Islander trades)
	Multi purpose	

Each cargo type involves different commodities, types of vessel and port infrastructure, and stevedoring and transport services. Containerised shipping, for example, mostly carries cargoes that can be boxed up. Vessels

are purpose built with holds divided into 'cells' to keep containers fast. In port, quay cranes move containers between ships and shore; straddle carriers or stacking cranes move them between the dock and trucks and trains. In contrast, dry bulk cargos are loaded directly into bulk carriers' holds using conveyors connected to silos or stockpiles, while liquid bulk cargos are shipped in tankers, pumped out of holds into storage tanks and piped or trucked via tanker out of ports.

The biggest problems overwhelmingly relate to containerised shipping. Consequently, that is where the inquiry has focused, and maritime logistics chains incorporating the five largest container ports — Brisbane, Sydney (Botany), Melbourne, Adelaide and Fremantle — have received most attention. Ports that handle very small container volumes including Townsville, Darwin and Bell Bay are not a focus. Broader issues associated with the domestic distribution of freight are outside scope and have not been considered.

An overview of the maritime logistics system

The system is bounded by the point where a vessel enters or departs Australian territorial waters and the point where its cargo is transferred to or from the domestic logistics system.

Cargo progresses through three principal fields of activity (figure 2) — marineside, quayside and landside operations. Import and export cargo flows mirror each other, except for border control practices.

A range of parties provides services (figure 3). Some are engaged to handle cargo. Focusing on containerised imports for brevity, shipping lines carry containers and stevedores at container terminals unload vessels. Australian Government border protection and biosecurity officers monitor cargos. Containers are transferred to landside transport operators (road or rail) who move them to their final destinations or to warehouses for unpacking and cargo distribution.

A number of other parties do not directly handle cargo but are also integral to service provision. For example, port operators provide infrastructure like channels and wharfs, and pilots board vessels when they arrive in port waters and steer them through local shipping channels towards berths. Tugs move vessels into position and linesmen secure them to wharves. Unpacked containers are stored in empty container parks (ECPs).

Underpinning these services is a range of industry and government institutions and frameworks which govern how the parties interact and the industry is regulated. For example, state governments own the major container ports and, apart from Fremantle, lease them to private operators. And the Australian Government is responsible, for example, for workplace relations regulation.

Demand for container logistics is driven by the decisions of an estimated 200 000 Australian cargo owners. These decisions are enacted through a chain of contracts agreements and international conventions that lay out commitments between cargo buyers and sellers and transportation providers.

Negotiating and documenting these commitments requires specialist expertise. Many cargo owners employ forwarding and customs agents to act on their behalf. These agents also deliver economies of scale by consolidating the requirements of multiple cargo owners.

Figure 2 – Cargos move through three fields of operations

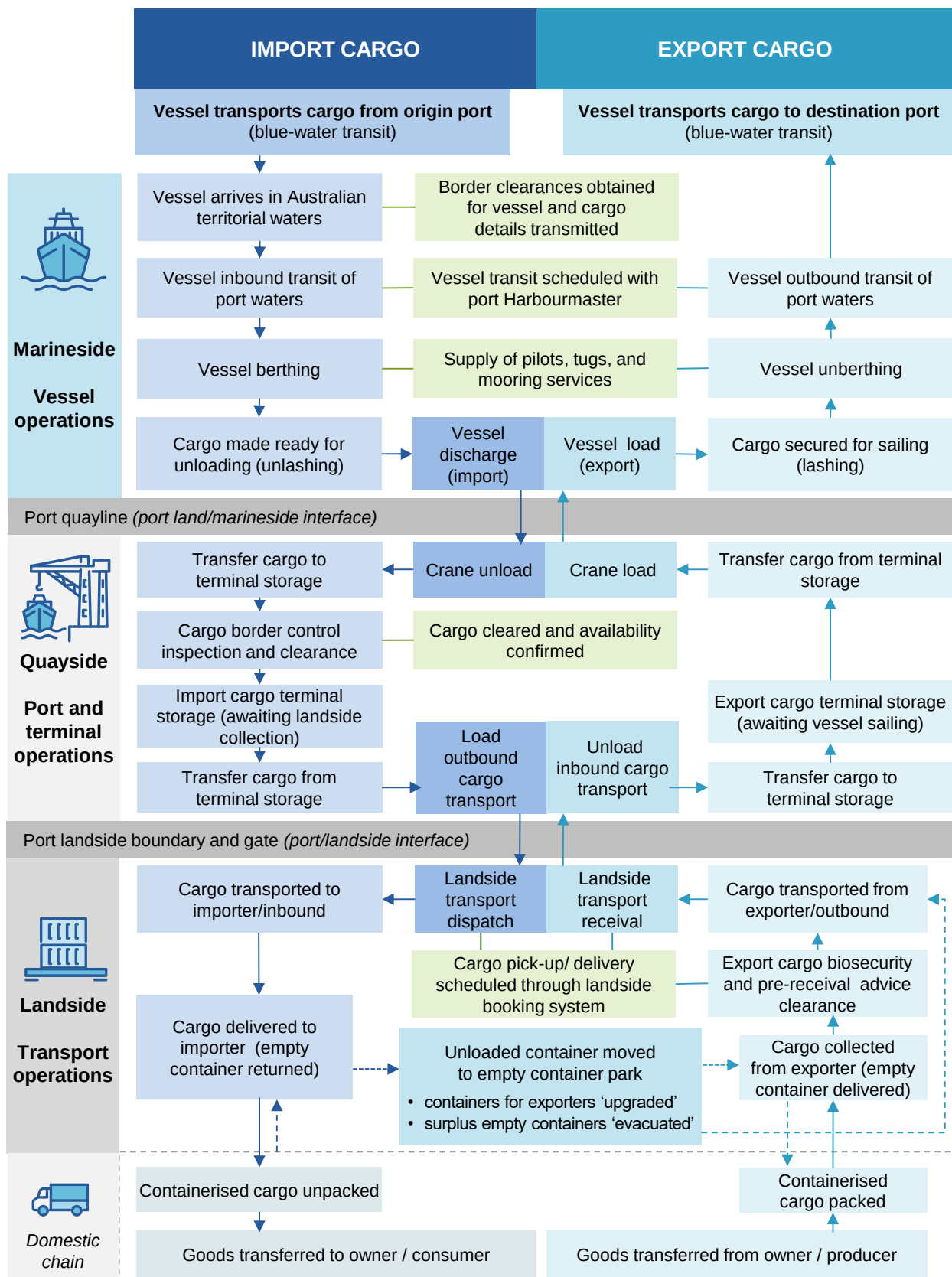
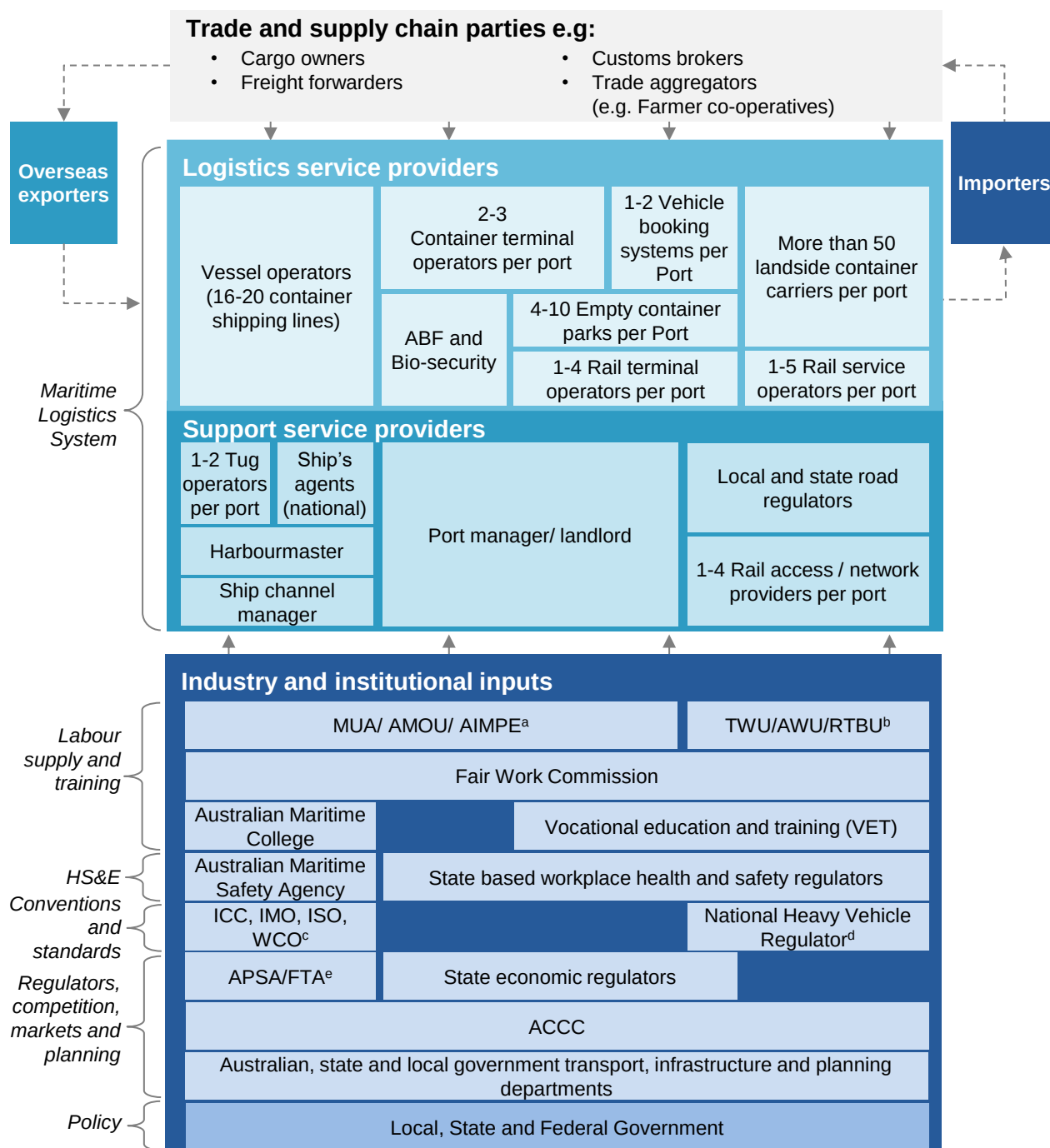


Figure 3 – Many parties make up Australia's maritime logistics system

a. Maritime unions: MUA (Maritime Union of Australia), AMOU (Australian Maritime Officers Union), AIMPE (Australian Institute of Marine and Power Engineers) **b.** Domestic logistics industry unions: TWU (Transport Workers Union), AWU (Australian Workers Union), RTBU (Rail, Tram and Bus Union) **c.** International standards and policy organisations: IMO (International Maritime Organisation), ISO (International Standards Organisation), WCO (World Customs Organisation) **d.** Road vehicle regulation — encompassing licencing, compliance and performance based standards for heavy vehicles. **e.** Peak cargo industry bodies: APSA (Australian Peak Shippers Association), FTA (Freight Trade Alliance).

Why productivity, efficiency and dependability?

Productivity growth has been one of the primary drivers of increasing living standards for Australians. Put simply, the more goods and services a society can produce with a given set of inputs, the greater will be its material standard of living.

But just producing more with a given set of inputs will not make Australians as well off as they could be if the outputs could be either produced with a less costly input mix or are not the things that the community values most highly or if innovation is unnecessarily impeded. For example, restrictions on how workers are deployed by a business might mean that the costs of producing a service are higher than needs be. Constraints on competition might mean that businesses produce products that could be better supplied by rivals. And limitations on automation might mean that a company settles on an input mix that is higher cost than needs be. In other words, overall economic efficiency also matters.

Moreover, when businesses enter contracts and plan production accordingly, they do so based on expectations about the future availability and prices of the inputs they will need. If unanticipated disruptions or shocks within input markets mean those expectations are not met (that is, markets are not dependable or reliable), businesses will likely face higher costs and lower profitability than expected. Ultimately the broader community bears these costs — through price rises or temporary shortages of supply. A resilient and dependable system can plan for and minimise the costs of disruptions, benefiting both producers and consumers.

What drives productivity, efficiency and dependability?

Many factors contribute to productivity growth including:

- change at a business level — for example, the creation or adoption of new technologies or improvements in management practices and work arrangements
- economic factors that condition business decisions — for example, competition within a market can spur businesses to innovate
- policy and institutional settings — for example, government policies that influence investments in skills and infrastructure.

Efficiency gains are driven by initiatives that enable resources to flow to their highest value (or highest net benefit) uses. Examples include the: sharing of data to enable participants in a supply chain to better plan their operations; removal of practices that create 'closed shops' for workers or cartels for businesses; and development of single window portals that remove duplication in business reporting to government.

Clearly, the decisions of private businesses are central to productivity and efficiency performance. They are key agents in what is produced with an economy's resources and how. Innovation on their part spurs productivity growth and efficiency improvements.

But governments can also foster productivity growth and efficiency in a host of ways, for example, via: working to ensure government services are provided as efficiently as possible; regulating to promote competitive outcomes (or limit harm where parties hold market power); implementing labour relations laws that balance employer and employee interests; investing in essential infrastructure; and using taxpayer funds only on projects that deliver the highest net benefits to the community.

Dependability or resilience can be enhanced by actions like:

- requiring suppliers to give advance warning of price changes, to enable customer businesses to factor them into their planning and future contracts

- limiting disruptions to service provision where possible
- planning and provisioning to cope with shocks.

Again, the actions of private parties are integral to service dependability, but governments can also play important roles.

Consistent with these drivers of productivity, efficiency and dependability, this report examines:

- what is happening at a business level (focusing on use of new technologies and workplace arrangements)
- the state of competition across the system
- skills and infrastructure needs and constraints.

Discussion of ways in which governments might support improvements in productivity, efficiency and dependability cuts across the report. Before heading into that analysis though, the report looks at how well Australia's container ports are performing.

How well are Australia's container ports performing?

Well-functioning container ports enable goods to enter Australia faster than otherwise and reduce the cost of these imports. Similarly, they enable Australian exporters to compete more effectively on global markets.

Efficient ports minimise the time taken for containers to pass through the port and the time that ships and land transport spend within the port, while ensuring that inputs are used as effectively as possible. Ports that move containers more quickly, reliably and in a cost-effective manner are better performers than those that do not.

Data gaps limit assessment

A comprehensive framework for measuring port performance would include data on the time taken to move containers through each of the steps involved in marineside, quayside and landside operations (figure 2). Comparison of these time-based metrics across ports would then reveal where operations in a port are relatively inefficient. Other performance measures could then be used to understand *why* these relative inefficiencies exist. For example, analysis of the rates at which cranes move containers can shed light on quayside operation times: more productive cranes should result in faster container movement times.

Current Australian data collections do not support comprehensive analysis of this type. Data are missing for a number of areas of port performance, including, for example, labour inputs (the number and type of workers and the hours they work), cargo operation times (the time spent loading and unloading a ship while it is at berth), and container dwell times (the time containers spend in port after being discharged from a ship until loading onto land transport, in the case of imports).

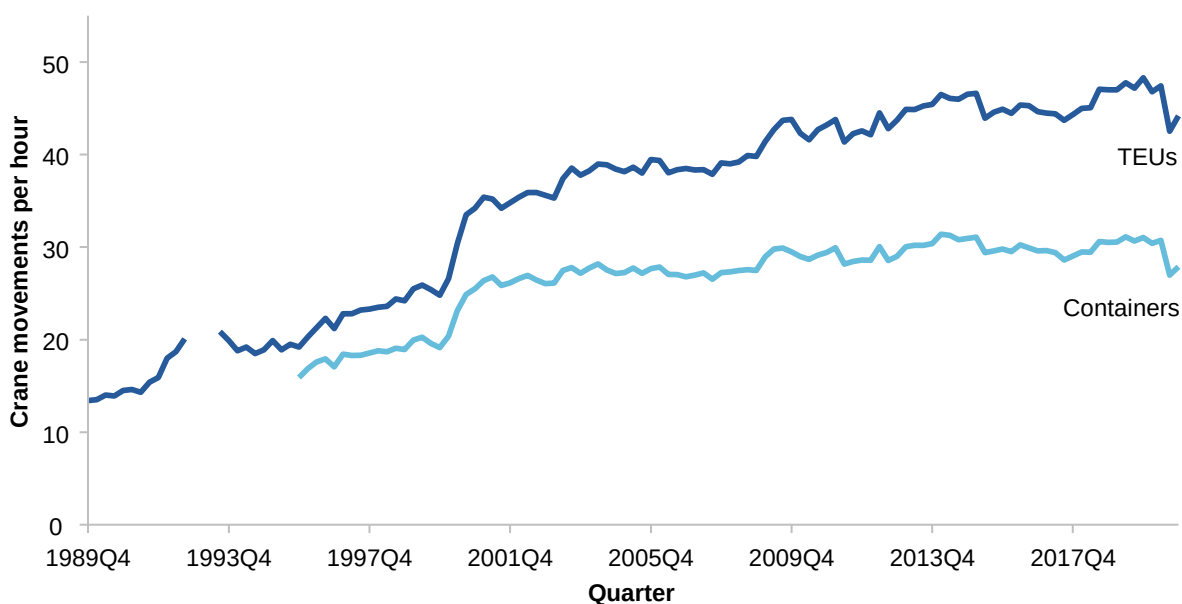
While performance information could be improved by linking existing data collections and, potentially, augmenting them, collecting, cleaning and maintaining data is not costless. Richer data would support richer insights into port performance, but it is unclear if the associated benefits would outweigh the potential costs inherent in extending existing collections. The Commission is seeking feedback on this question.

The Commission has used Australian collections and IHS Markit's Port Performance Program to benchmark Australia ports' operations and to unpack the determinants of relative performance as far as the data permit. Lengthy time series are scant. Most of the analysis, therefore, focuses on recent performance. Given the disruptions to international and Australian container shipping markets wrought by the COVID-19 pandemic, data from the 2019 calendar year are the primary source — this was a more representative year. Moreover, given data gaps, performance is assessed using a range of metrics.

Data suggests productivity has risen over the long term

Measured by net crane rates (container movements per crane per hour of operation), productivity at Australia's container ports rose strongly in the 1990s following significant waterfront reforms, and continued to grow at a slow pace over the following two decades prior to onset of the COVID-19 pandemic (figure 4). Growth measured in 20-foot equivalent units (TEUs) was stronger than for containers per se, because of the increasing share of 40-foot containers used in trade (which equate to two 20-foot equivalent units). The fact that ports are handling larger containers and the crane rate has not declined also points to productivity improvements in terms of the quantity of goods being moved.

Figure 4 – Long-term productivity has risen in Australia's ports



Australian ports do not compare well against international peers

A recent World Bank study benchmarked performance of 351 ports. Australia's major container ports with the exception of Brisbane ranked among the worst performing 20 per cent of ports, and Brisbane ranked in the bottom 30 per cent. The Commission used the data underlying this work to look at why Australian ports apparently perform so poorly.

The World Bank analysis focused on time taken to turn ships around. Australia's major container ports tend to be considerably slower on this metric than the average international port, particularly for medium and larger-sized vessels (those with a capacity of more than 5000 TEUs) (figure 5).

Most of the difference reflects longer operating times — Australian ports take longer to load and unload ships. Two factors are key to this outcome:

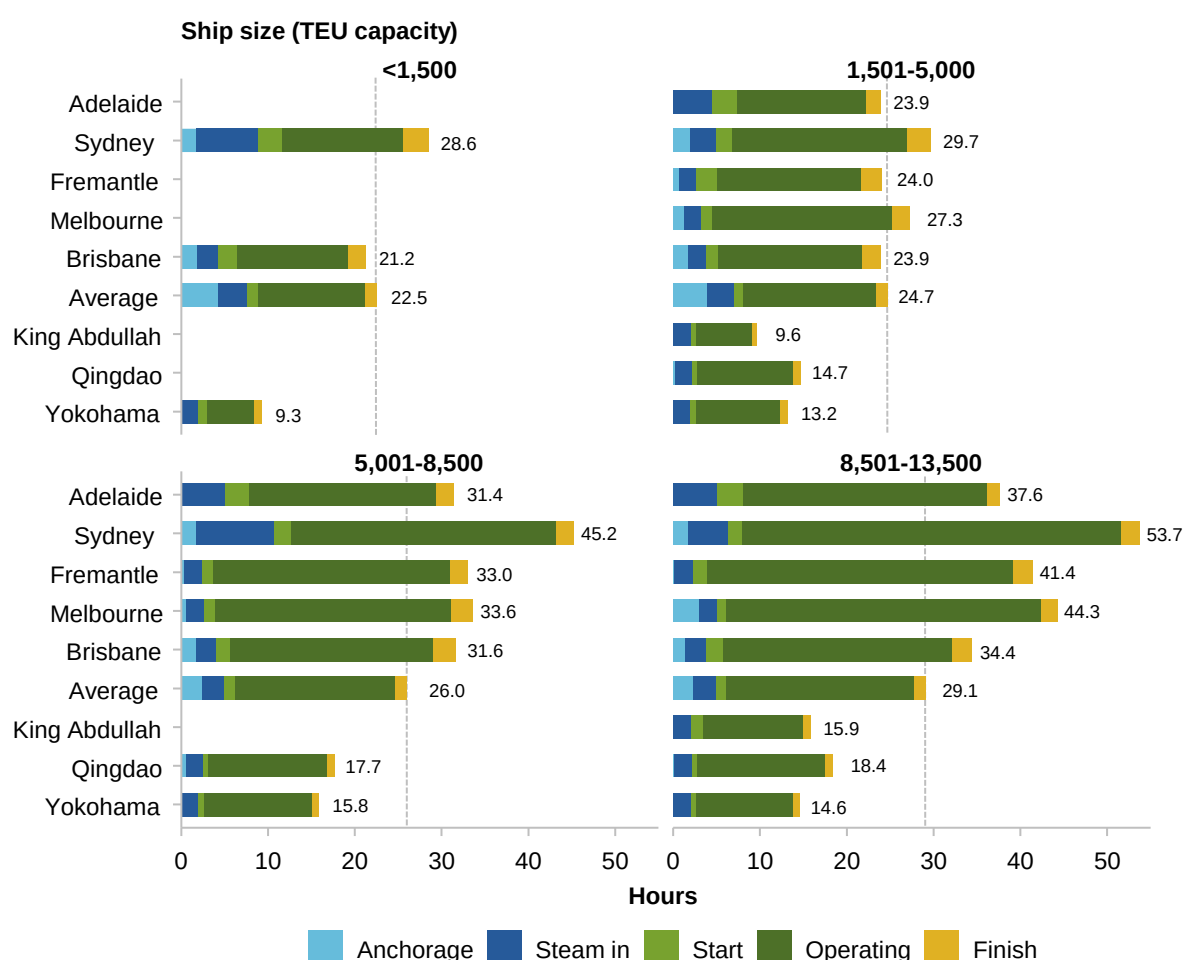
- the number of cranes deployed (crane intensity)
- the productivity of those cranes (gross crane rates).

On average, Australian cranes were just as productive as the international average (figure 6). A key explanation for Australian ports' underperformance is that they used fewer cranes to service ships than the average international port (figure 7).

At first glance, faster turnaround times look like a good thing. Longer times in port can lead to delays to shipments and disruption to supply chains, higher sailing speeds, meaning increased fuel consumption, emissions and costs, or the omission of a port or ports from a trip. So longer port times imply higher costs (for shippers, shipping liners, container terminal operators and other participants in maritime supply chains).

But the World Bank's analysis did not account for the fact that some ports can turn ships around faster because they use more inputs. And higher turnaround times will not be a good thing if they rely on inefficient use of inputs.

Figure 5 – Turnaround times at Australian ports are above international averages^{a,b}
Port hours by ship size and component, selected ports and global average, 2019-20

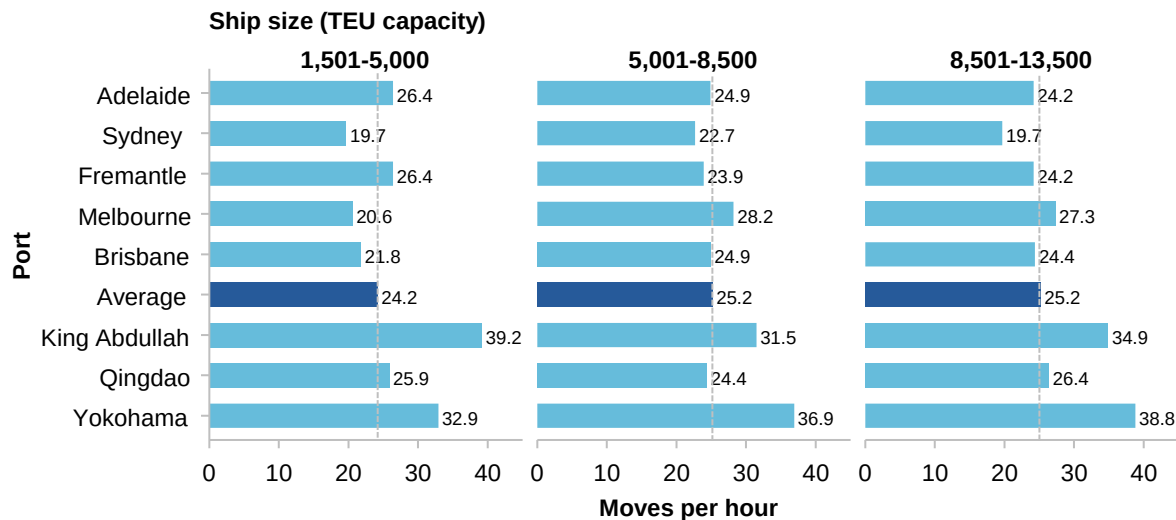


a. Gaps indicate that a port did not receive at least ten visits in the period. **b.** King Abdullah, Qingdao and Yokohama were the top performers in the World Bank's 2021 study of 351 ports.

The Commission also used IHS data on port characteristics to analyse port efficiency. A subset of ports with broadly similar characteristics (throughput levels and origin–destination cargo patterns) to Australia's major container ports was selected. Unfortunately, data constraints confined the analysis to capital inputs, for example, terminals, berths and cranes. Many of these variables are effectively fixed in the short to medium term, meaning the analysis can primarily only provide guidance on the potential to improve efficiency in the long term.

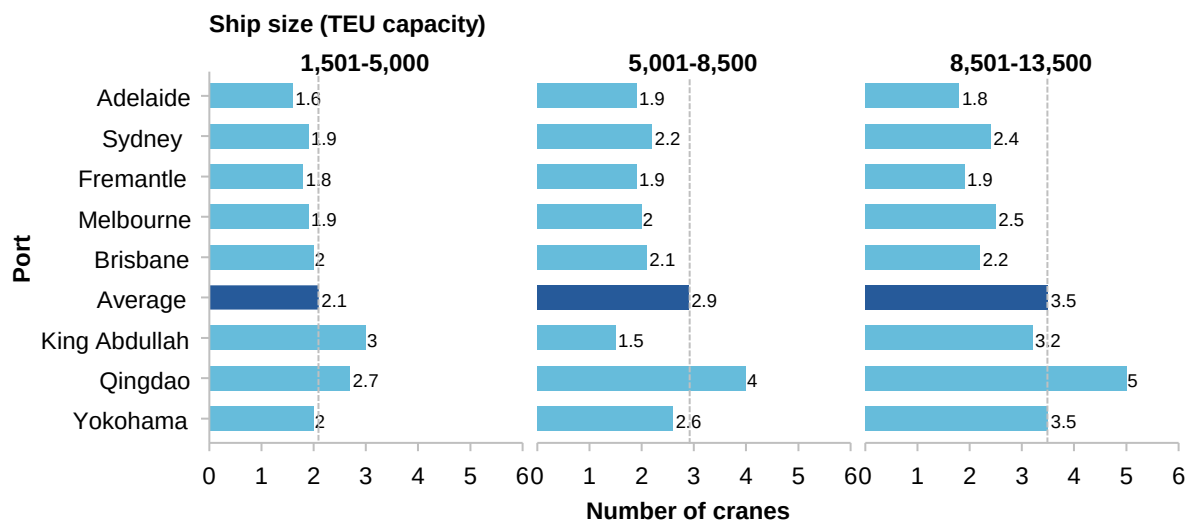
This work identified a 'best practice' set of ports — those that were using their inputs most efficiently. Apart from Adelaide, Australian ports were not operating at this 'efficient frontier'; they could handle an increase in throughput by using their capital inputs more efficiently.

Figure 6 – Australian crane productivity is roughly similar to the global average^{a,b}
Gross crane rates by ship size, selected ports and global average, 2019-20



a. Ships with capacity less than 1500 TEUs are excluded because of missing gross crane hours data for Australian ports.
b. King Abdullah, Qingdao and Yokohama were the top performers in the World Bank's 2021 study of 351 ports.

Figure 7 – Australian ports typically use fewer cranes to handle ships^{a,b}
Crane intensity by ship size, selected ports and global average, 2019-20



a. Crane intensity is calculated as gross crane hours divided by operating hours. Ships with capacity less than 1500 TEUs are excluded because of missing gross crane hours data for Australian ports. b. King Abdullah, Qingdao and Yokohama were the top performers in the World Bank's 2021 study of 351 ports.

But the analysis also revealed the importance of considering port inputs. The port of Yokohama, for example, topped the World Bank rankings. Yokohama had similar throughput to Melbourne and Sydney, but had more inputs. Yokohama had five container terminals, about 5.5 km of berths and about 40 quay cranes. In contrast, Melbourne and Sydney each had three terminals, about 2.5 to 3.6 km of berths and about 20 quay cranes. Yokohama did have higher gross crane rates than the Australian ports, but its capital utilisation rates were much lower (and its capital costs per lift presumably much higher). Yokohama turned vessels around more quickly, but was less efficient than all five of Australia's major container ports in its use of inputs.

Faster turnaround times are a good thing, but not at any cost.

Performance variations point to significant scope to lift productivity

Evidence of considerable variations in gross crane rates for each terminal operator over time, and between terminal operators requires further consideration. The data suggest that Australian terminal operators have significant scope to improve ship turnaround times without making any changes to crane intensity.

Between 2017 and 2019, for example, the average number of containers moved per crane at Patrick's terminal in Melbourne, ranged between a high of 38 per operating hour and a low of 27 (figure 8). And Patrick's cranes averaged 10 more moves in an hour than cranes at DP World's terminal (figure 9) (with similar levels of automation at the two terminals).

Reasons for these variations in performance are not clear, but restrictive work practices (discussed below) that make it less likely that each job in a container terminal is filled by the most appropriate person, are a clear candidate.

Figure 8 – Variation in performance points to scope for improvement

Average monthly gross crane rates, 2017–2019

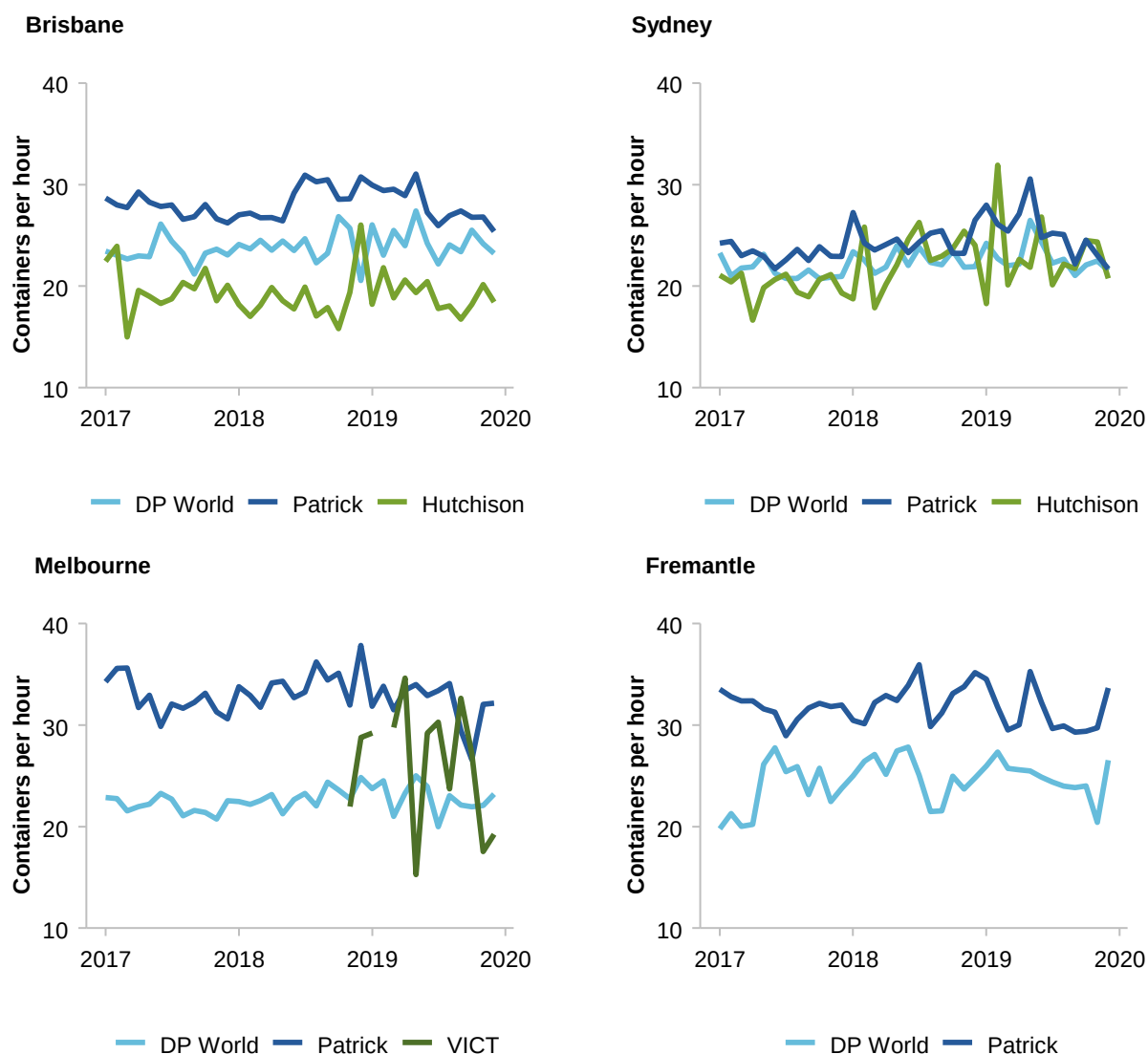
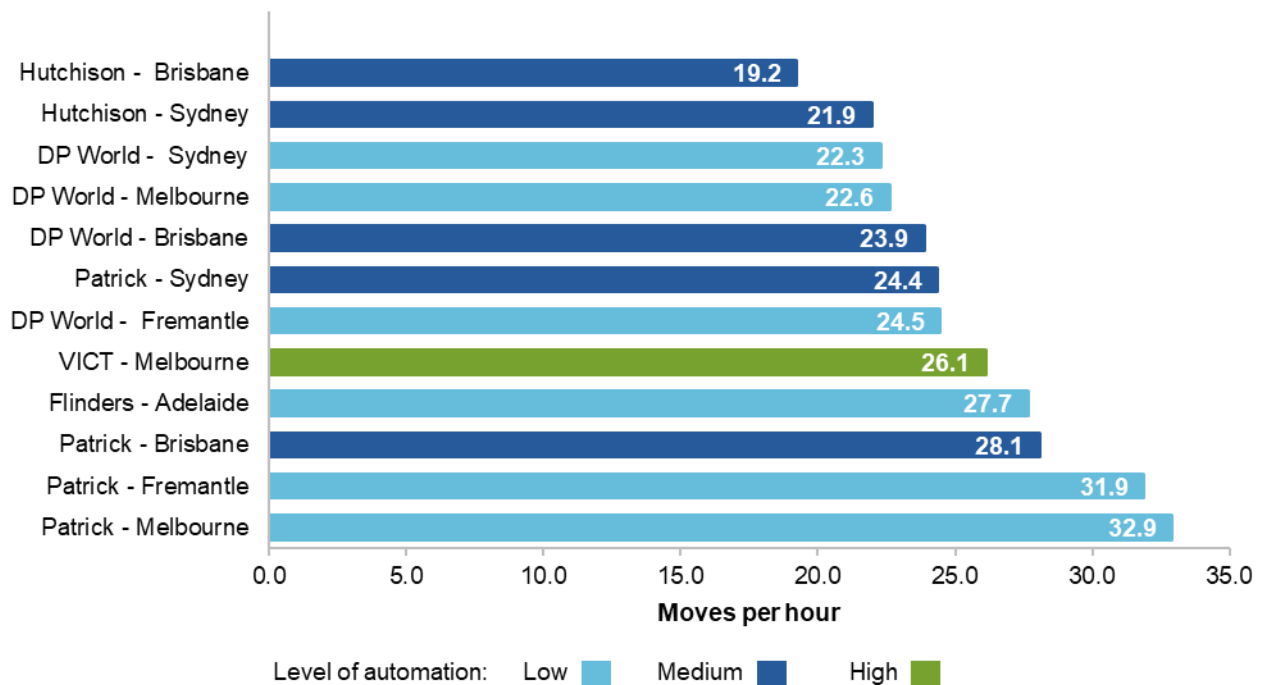


Figure 9 — Average monthly gross crane rate by terminal operator, 2017–2019

Potential gains from improving container port productivity

If all five of Australia's major container ports achieved turnaround times in line with the global average, and passed the resulting cost savings through, Australia's importers and exporters combined could save an estimated \$605 million a year. Although these estimated direct benefits are small relative to the size of the entire Australian economy, they are significant.

Aside from the costs that port inefficiency imposes on importers and exporters, ports also play an essential role in the maritime supply chain and have large indirect impacts on Australian businesses, consumers and the economy. Any sustained disruption to imports or exports has the potential to cause substantially larger economic impacts than the direct cost estimates suggest. For example, disruptions to imports of goods that are critical to local production (such as the chemicals used in water treatment and personal protective equipment used in health care) or to exports that provide a significant share of national income and employment, could jeopardise the economy and the wellbeing of all Australians.

Well-functioning, efficient container ports help to ensure the reliability of the maritime supply chain and logistics systems more broadly.

Is market power impeding system performance?

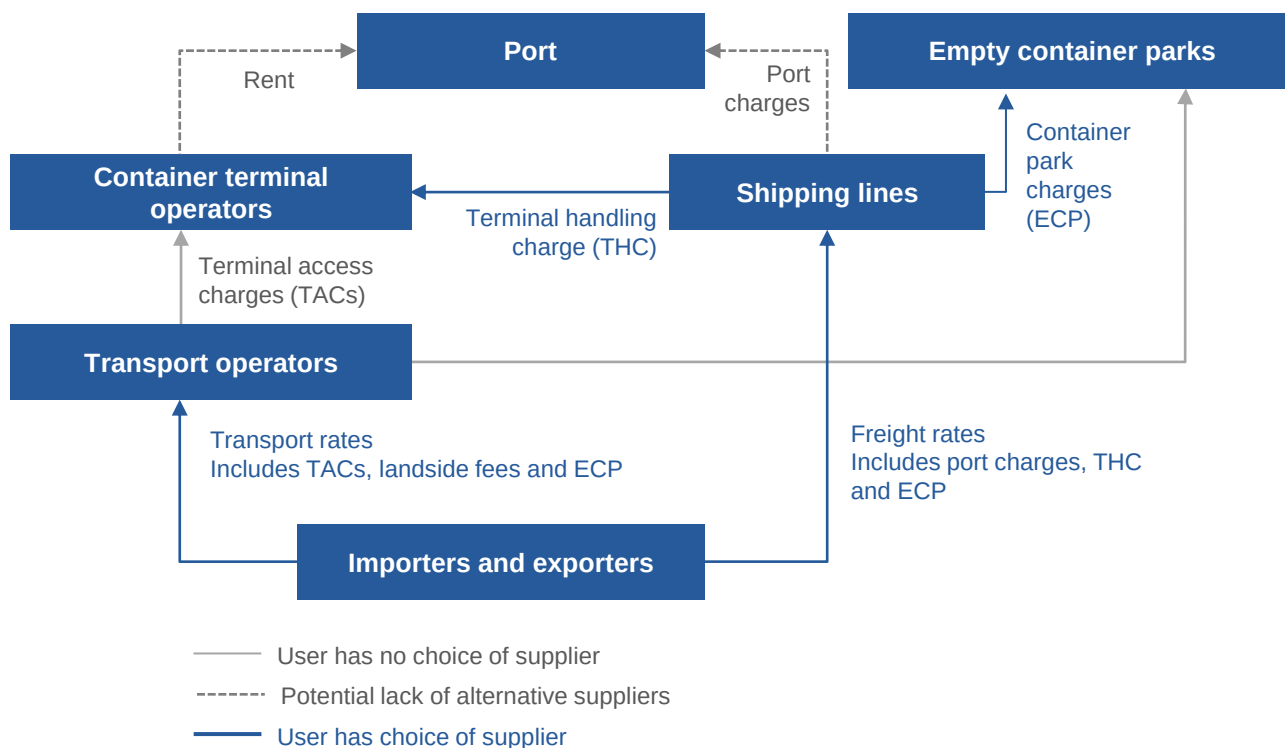
The maritime logistics chain involves a wide range of services (figure 10). For example, ports supply anchorage and berth services to shipping lines; container terminal operators supply terminal services to transport operators.

Customers for some of these services have little or no choice of supplier, raising the possibility that some suppliers in the maritime supply system are not constrained by competition and are potentially exercising

market power. This could lead to higher prices for customers, cost complacency by operators and lower levels of innovation in port services.

Figure 10 – Port decisions affect the entire system

A simplified depiction of the maritime logistics value chain



Ports have some market power but further regulation is not needed

While demand for a port's end product (movement of freight) is driven by importers and exporters, port operators' main interface with the system is via contracts with shipping lines and container terminal operators.

Each of the five large container ports has (but are not necessarily exercising) market power in their relationships with shipping lines. If a shipping line wants to engage with cargo owners in a particular part of Australia, then it must operate through the 'local' port and there is little if any scope for shipping lines to substitute between container ports. Import cargo destinations are overwhelmingly local to each port and landside transport costs mean that moving cargo between cities to access an alternative port would be uneconomic. Shipping lines cannot credibly threaten to move their business elsewhere.

Port privatisation processes have entrenched this power in Sydney by combining the ownership of Port Botany and Port Kembla and penalising any development of container capacity at the Port of Newcastle.

In contrast, container ports enter long-term contracts with container terminal operators and both parties bring considerable heft to the negotiating table. That said, there remain some risks that ports can exercise market power in their relationships with terminal operators. Container terminals operate significant infrastructure as tenants of the ports, have large setup costs and large sunk assets that can be held captive by a port in the event of expiry or renegotiation of a lease. And all long-term lease contracts are incomplete — it is impossible for them to cover every possible future contingency. Where material changes in market conditions, such as changes in port ownership, are not reflected in a contract, they may enable a port to

behave opportunistically towards a terminal operator tenant. Moreover, post-privatisation rents have increased significantly for container terminal operators at Melbourne, Sydney and Brisbane.

However, the Commission has not seen evidence consistent with the ports exercising significant and sustained market power over individual container terminal operators.

Regulatory settings appear to be adequate

The major container ports face regulation for both their interactions with shipping lines and with tenants, such as terminal operators.

In the case of shipping lines, prices for services provided by ports are typically monitored (or face the threat of further regulation). The Commission received few complaints about port pricing to shipping lines, consistent with this regulation acting as a constraint on the ability of each port to exercise market power over the shipping lines.

For landside tenants, container ports in Brisbane, Sydney, Adelaide and Fremantle operate under light-touch regulatory regimes and these jurisdictions have reserved the right to impose more comprehensive economic regulation. The Commission discovered little by way of complaint from tenants about the conduct of these ports. This does not mean issues do not exist, however, as aggrieved parties may simply lack an avenue for complaints to be aired.

In contrast, the Port of Melbourne is both the most heavily regulated and most commonly complained about container port. Investigation by the Victorian Essential Services Commission found that the port has been exercising its market power over tenants in the setting of rents and in breach of its pricing order.

Given that only the Port of Melbourne has been found to be exercising market power over tenants there is no case for tighter regulation on all ports. The threat of further regulation appears to be constraining the conduct of ports in Brisbane, Sydney, Adelaide and Fremantle. For the Port of Melbourne, the current arrangement for a 2025 review of the Port's adherence to a voluntary Tenancy Customer Charter (implemented in response to the Essential Services Commission investigation and providing additional dispute rights to current and prospective tenants), appears to be a next logical step in addressing issues around the Port's exercise of market power over tenants.

Issues in other markets need attention

Excluding ports, the maritime logistics system for containers has three main markets: shipping lines' provision of shipping services to cargo owners; container terminal operators' provision of loading/unloading services to shipping lines; and landside transport operators' provision of services to cargo owners via container movements.

Repeal of Part X of the Competition and Consumer Act is recommended

Competition is robust in the market for shipping lines' services. While lines have been consolidating over the past three decades, multiple providers service Australia and cargo owners can easily switch between them. Before the COVID-19 pandemic, competition between lines resulted in declining prices. Recent steep increases in blue-water charges reflect market responses to pandemic-related pressures and evidence on trade volumes (steady growth) and orders for new ships suggest that rates will fall as markets normalise.

That said, lines are permitted to cooperate on ship use, schedules (timetables), containers, use of terminals and freight rates through agreements registered with the Registrar of Liner Shipping. For example, three lines might agree to run one service a week between Australia and Singapore. At a 42-day round trip, the service requires six vessels. The lines will agree on how many vessels each will contribute and on how much

capacity each gets per vessel. Unused capacity can be sold to competitors that are not party to the agreement. (The Commission understands that none of the current agreements include price cooperation.)

While agreements enable shipping lines to achieve economies of scale, the law permitting them (Part X of the Competition and Consumer Act) does not require shipping lines to show that their arrangements provide a net public benefit to Australia — a requirement faced by similar industries. Putting shipping lines onto the same footing as other industries would ensure that any anticompetitive avenues for price cooperation are only available to shipping lines when the cost of reduced competition is outweighed by other public benefits.

More active regulation of terminal access charges is recommended

Container terminal operators compete vigorously to provide services to shipping lines. Together with an increase in lines' bargaining power via consolidations and increasing port rents and labour costs, this has contributed to declines in operators' profits over the past decade.

On the other hand, container terminal operators have market power over landside transport operators who have no choice about where they pick up a container because shipping lines choose which terminal to use for a shipment.

Over recent years, container terminal operators have increased existing fees or levied new fees on transport operators.

Some of these charges are incentive based and, if set at an appropriate level, could improve efficiency. For example, no-show fees are charged when a landside operator fails to collect or drop off a container on time. Containers must be prepared prior to the landside operator arriving, and a truck missing its time slot costs the terminal operator. These fees are avoidable as long as the truck arrives on time, and they ensure that containers are picked up and dropped off efficiently.

Other fees, most notably terminal access charges (TACs), are not based on incentives but simply represent a fixed charge levied by a container terminal operator to receive a container from, or deliver a container to, transport operators. Inquiry participants have raised concerns about what they see as the lack of justification for increases in TACs and transport operators' inability to push back on them.

TACs have increased markedly at all capital city ports over the last five years. For example, between January 2017 and January 2021, the three operators in Melbourne increased their TACs from close to zero to over \$120 per container. These steep increases may reflect terminal operators 'rebalancing' their revenue streams as payments from shipping lines have declined, and are consistent with terminal operators exercising their market power.

In the short term, transport operators bear the brunt of any fee increases or new fees. In the longer term, they pass those costs to cargo owners.

Container terminal operators are subject to a range of fees regulation. The ACCC monitors their prices, costs and profits. New South Wales requires notification of fee increases to their transport department. And Victoria has acted to make fees more transparent through a voluntary protocol that sees complying operators provide advance notice of fee increases to transport operators and restrict fee increases to once a year. The National Transport Commission is developing similar voluntary national guidelines. There are, however, limitations to these approaches. New South Wales does not require notifications to industry. And uptake of a voluntary approach is neither guaranteed nor will container terminal operators that do take part necessarily strictly adhere to a protocol.

Rapid increases in TACs, coupled with transport operators' lack of countervailing power in their relationships with terminal operators, suggest these regulatory settings are inadequate.

One response would see governments regulate fees, but this has costs: the direct costs of any scheme for terminal operators and regulators, plus the risk of distortions — for example, fees that incentivise efficient behaviour might be set too low.

The Commission's preferred option would prevent container terminal operators from charging fixed fees, such as terminal access charges, to transport operators. All fixed charges associated with container collection should be shifted to shipping lines, precluding terminal operators from exercising their market power over transport operators. Incentive fees could be charged to transport operators subject to monitoring.

Unfair contract terms should be addressed, particularly detention fees

Under Australian Consumer Law (ACL), in certain circumstances, application can be made to a court or tribunal to render void contract terms that are deemed to be unfair. The law only applies to 'standard form' contracts (contracts which are typically prepared by a single party to the transaction and offered on a 'take it or leave it' basis), involving at least one small business (one with fewer than 20 employees) and where the upfront price is no more than \$300 000, or \$1 million if the contract is for more than 12 months.

A term in a qualifying contract is unfair if it:

- causes a significant imbalance in the parties' rights and obligations
- is not reasonably necessary to protect the legitimate interests of the party advantaged by the term
- causes detriment (financial or otherwise) to a small business if it were to be applied or relied upon.

There is evidence of unfair contract terms being used in the maritime logistics system. In 2019, DP World, Hutchison and Victoria International Container Terminal (VICT) agreed to remove or amend terms in their standard form contracts for land transport operators which the ACCC concluded were likely to be considered unfair. The ACCC also entered into a court enforceable undertaking with Hutchison. As part of this process, Hutchison acknowledged that two clauses contained within its Terminal Carrier Access Agreement may contravene the small business unfair contract terms provision of the ACL. And in 2021, GrainCorp (a company that provides export, storage and port terminal services) agreed to amend 19 terms in the grain warehousing agreement it used for small business grain growers.

Concerns raised by inquiry participants suggest detention fees might be a further example of unfair terms.

Part of the contract between shipping lines and cargo owners covers container hiring. Shipping lines usually own containers and hire them to cargo owners. That hire usually includes 7–10 'free' days (sometimes less, sometimes more) for cargo owners to unpack a container once it has been unloaded from the ship (discharged) and return it either to the specified port terminal or an ECP for de-hire. Shipping lines charge detention fees when containers are returned outside their free days window.

Transport operators play a key role in this process. Cargo owners pay transport operators to pick up their containers from the ship and to drop them off at an ECP once unpacked. Transport operators typically take responsibility for the container only after it has been unloaded and gone through customs / biosecurity checks. Therefore, cargo owners pay detention fees stemming from a delay in customs clearing a container. Once the container has been picked up, however, the contract for service between the transport operator and the cargo owner comes into play. Transport operators may bear responsibility for getting a container de-hired on time, depending on what they have agreed to in their contracts. As a result, if detention fees accrue because a transport operator cannot deliver a container at the agreed time, the operator may have to compensate the cargo owner for those fees.

Issues raised in this inquiry about detention fees include:

- full ECPs turning empty containers away, leading to detention fees for cargo owners

- customs / biosecurity delaying when the container can be picked up
- free day allocations including weekend days and public holidays, but ECPs not being open on those days
- shipping lines providing fewer de-hire days.

The potential remedies for these issues would be costly for a small transport operator or cargo owner to pursue.

Shipping contracts are exempt from the ACL's unfair contract provisions, meaning detention fees fall outside the scope of Australian law. International law covers contractual terms in a maritime context, but accessing justice via this avenue could be prohibitively expensive.

An alternative option would see remedy sought on the grounds that detention fees constitute unconscionable conduct. However, for conduct to be judged unconscionable, it must be more than simply unfair. It has to be against conscience as judged against the norms of society — a high threshold to meet.

Detention fees exist to incentivise the timely return of containers. But if fees are levied, for example, when empty containers cannot be returned because parks are full, the incentive regime becomes moot.

Faced with similar issues, the US Federal Maritime Commission issued a rule noting that they will consider the reasonableness of the conditions attached to fees in interpreting the relevant law.

The Commission considers that shipping contracts should not be exempt from the unfair terms provisions in the ACL and that this exemption should be removed. Moreover, the Commission is seeking feedback on whether unfair contract terms are an issue in any other part of the maritime logistics system.

Infrastructure needs are being addressed

Larger vessels will be accommodated

Container ships calling at Australian ports are small by global standards, prompting some to worry that Australian shippers may be missing out on the potential benefits of larger ships.

- The biggest ships that visit Australia can carry 10 500 TEU, which is the median ship size in the global fleet. While operators at the world's largest ports are contemplating the investments needed to accommodate 24 000 TEU ultra large vessels, Australian port operators are planning to accommodate 14 000 TEU ships.
- Bigger ships promise lower blue-water rates and fewer emissions, but they increase costs in the rest of the maritime logistics system. They may need deeper and wider channels, higher bridges and bigger and more cranes. And they make the landside freight task 'lumpier', with peaks requiring more flexible labour and potentially adding to urban congestion.

Australian container port operators and other parts of the maritime logistics system have invested to accommodate bigger ships and continue to prepare for further investment. There is no clear need for government intervention to fund or otherwise coordinate investment to encourage the use of bigger ships.

More rail will require significant (possibly uneconomic) investment

Rail's share in container movements at Australia's ports is low (ranging from below 2 per cent at the Port of Brisbane to about 18 per cent at the Port of Fremantle).

This is not surprising. With some exceptions, transporting containers to and from Australian ports by train is more expensive than using trucks, and rail services are inherently limited in where they can deliver or pick up goods. For rail to be cost competitive, services need to run at a high frequency or cover large distances, but most

imported containers are delivered within about 50 kilometres of ports. And freight typically competes with passengers for access to rail corridors, with passengers prioritised and slots for freight limited. Costs encountered when changing mode at intermodal terminals further influence whether and when rail is competitive.

Within and outside the maritime logistics system, the case is frequently made for increasing the rail mode share. Rail brings a range of nonmarket benefits — reduced road congestion, carbon emissions and other pollutants, noise and accidents. And forecasts of substantial growth in Australia's freight task over the coming decades have contributed to most port authorities planning to substantially increase their rail mode share to slow the growth in road congestion. However, mode share targets have been set by state governments and not met in the past.

Increased use of rail is only likely to be achieved with significant (and possibly uneconomic) investment in dedicated rail lines and intermodal terminals. Taxpayer contributions to those projects is potentially justified by the nonmarket benefits associated with rail, but any contribution has to be considered on its merits. Careful business case development will be needed, including consideration of the likely demand for passenger rail services and the potential for developments like electric vehicles and new road investments to reduce the nonmarket costs of road transport. Changing current road transport regulations (for example, curfews) would retain flexibility around future transport options and lead to a more efficient land transport system for containers without the cost and inflexibility of rail investment.

Empty container management will improve as pressures recede

Australia imports more containers than it exports, by a wide margin. And differences in the types of containers used for exports (primarily agricultural goods and raw materials) and imports (primarily manufactured goods) exacerbate this surplus. ECPs store containers before they are exported. Exports of containers occur on both regular container vessel services and on purpose specific 'sweeper' services.

The surge in global demand for consumer products during the COVID-19 pandemic, and a consequent repurposing of sweeper vessels to carry full containers, led to ECP congestion, particularly in Sydney (which had less capacity than other cities). With some ECPs at or near capacity, transport operators trying to return empty containers were sometimes turned away, contributing to the detention fees discussed above.

Temporary responses to congestion in Sydney have included an easing of restrictions on the height to which containers can be stacked in some ECPs and a subsidy scheme that encourages ships to collect more empty containers. While the scheme appears to have increased collection of empties, there is a risk it will reduce exporters' access to relatively scarce 20-foot food grade containers because the incentive structure does not distinguish between empty container types.

Overall, it is expected that many of the ECP pressures are transitory and will reduce as pandemic pressures recede. Not least, pressures on berth access are likely to lift as disruptions ease, making both loading empty containers onto regular services and chartering sweeper vessel services more feasible. Reduced traffic and greater availability of ships has already meant that sweeper vessels were able to be scheduled in 2021.

Longer term, increasing use of 40-foot containers for imports could mean that exporters who need 20-foot containers struggle to access capacity. Many agricultural products are dense and too heavy to ship in full 40-foot containers, and partially filling a 40-foot container would create safety risks if the contents moved. Potential remedies include technological solutions to contain loose cargos inside 40-foot containers and exporters acquiring their own containers so that they no longer rely on shipping company container pools. But finding solutions for this issue is a task for industry, not government.

Long-term planning appears to be adequate

Urban encroachment affects all major Australian container ports except Brisbane. Industrial land around some ports is gradually being redeveloped for higher value commercial and residential uses and this can create conflict with some port users. Planning decisions should support the highest value land use (which factors in nonmarket costs and benefits of alternative uses) — and this may involve rezoning and moving future terminal developments to sites where land use is less contested. Existing planning tools can be used to balance competing community demands.

Accommodating the expected growth in container freight in the coming decade requires effective long-term planning. While ports plan and invest in infrastructure to move goods between ports and the landside logistics system, governments have the primary responsibility for planning and investment in infrastructure beyond the port gate. And, given maritime logistics systems are often spread across multiple local government areas, they are subject to both state and local government planning controls and decision making. State governments have the lead planning role; local government planning needs to align with higher-level schemes and coordination between different levels of government is central to efficient outcomes.

All state governments have released freight and transport strategies that include consideration of port infrastructure needs into the future. Compelling evidence has not been presented that more plans are required or that these plans will not be implemented.

Workplace arrangements lower productivity

Workplace arrangements are critical to the operation of a business and are fundamental to employees' livelihoods and wellbeing.

These arrangements are shaped by Australia's workplace relations system — a complex array of laws, regulations and institutions, with the *Fair Work Act 2009* (Cth) (FW Act) and the institutions that administer it at the centre. The Fair Work Commission (FWC) plays a key role. Among other things, its functions include approving enterprise agreements (EAs), dealing with matters about bargaining and industrial action, and issuing orders to stop unprotected industrial action. The FWC can deal with disputes between employers and employees through conciliation, mediation and (where permitted under the FW Act) arbitration.

Key elements of workplace arrangements on Australia's container ports (for example, hiring and promotion protocols, remuneration and rostering rules) are set out in EAs negotiated between employers and employees who are usually represented by one or more of the three unions that operate in the sector: the Maritime Union of Australia (MUA), the Australian Maritime Officers Union and the Australian Institute of Marine and Power Engineers.

Workplace arrangements are a significant concern for many inquiry participants

There are compelling arguments that workplace arrangements in Australian ports have adversely affected productivity. This has been recognised by many parties (box 2). Notably, the ACCC remarked that:

... systemic industrial relations issues across the entire container freight supply chain have played a pivotal role in inhibiting productivity and efficiency gains at Australian ports. While this has been a challenging area for some time, restrictive work practices and industrial actions have escalated in recent years.

The broader economic ramifications of disruptions to port operations during EA negotiations are also a major concern (box 3). In contrast, the MUA argued strongly that container terminal workers and the EAs under which they are employed are not responsible for supply chain issues or poor productivity of container terminal operations.

Box 2 – Many inquiry participants think workplace arrangements lower productivity

Many inquiry participants stated that workplace arrangements are having significant negative effects on the performance of Australia's container ports.

DP World (sub. 49, p. 51) submitted that 'flaws in DP World's industrial framework impose the most urgent and significant drag on competition and productivity within Australian ports.

QUBE (sub. 64, p. 7) observed that:

The strong bargaining position of the union and its ability to cause significant damage to customers in particular makes the achievement of improved productivity and efficiency extremely difficult.

Ai Group (sub. 60, p. 12) stated that:

... industrial relations practices in the maritime and ports sector are hampering productivity and increasing costs for both operators and users of ports and shipping. There is a clear case for further Government intervention.

Several submissions (HIA, sub. 40, pp. 3–4; IFCBAA, sub. 34, p. 9; NatRoad, sub. 8, pp. 8–9) agreed with the ACCC's 2021 findings that:

Restrictive work practices and industrial actions have escalated over the past decade. This has contributed to the relatively poor performance of Australian [container] ports and has caused ongoing disruptions to the entire supply chain. (ACCC 2021, p. viii)

Employee representatives, on the other hand, argued that workplace relations at container terminal operators are not driving poor productivity on the ports.

The MUA (sub. 59, pp. 6, 30, 40–43) MUA stated that 'the significant improvement in labour productivity has been the main contributor to overall container terminal productivity improvement over the last 22 years. In fact, the overall improvement in container terminal productivity appears to be almost entirely due to the increase in labour productivity'. The MUA also pointed out that workers in terminal operations have no role in many of the tasks which drive some measures of performance like berth hours. These are driven by other workers including pilots, mooring line workers, towage workers and regulators like harbourmasters.

Both the process of bargaining to reach new agreements and the content of EAs have the potential to affect port performance. These are considered in turn.

The Commission investigated Australia's *Workplace Relations Framework* in 2015. Where relevant the Commission has repeated recommendations from that inquiry in this report — primarily in the area of the conduct and regulation of protected industrial action. The Commission's view remains that these recommendations should be applied across the economy, as was recommended in 2015. For draft recommendations being made for the first time in this inquiry (in the areas of length of bargaining, content of EAs and role of the FWC), the Commission has only considered evidence from the operation of workplace

relations on the ports and, therefore, is not in a position to recommend economy-wide changes. It will be for future work to evaluate whether these draft recommendations should be applied more broadly.

Box 3 – Industrial action can have significant effects on third parties — particularly industries dependent on maritime freight

Submissions detailed the impact of protected industrial action on participants in the supply chain. For example:

Industrial strike action at shipping ports has led to significant anxiety and stress for business operators in the food and grocery sector. Industrial dispute action has led to a delay in container movement and warehousing backlogs impacting local businesses and the consumer. This has significant implications for the [fast moving consumer goods] sector where inputs, ingredients and finished goods have limited shelf-life and are prone to infestation ... The [Australian Food and Grocery Council] has received consistent feedback of missed shipping windows and significant cost implications leading to a loss of business and product wastage. (AFGC, sub. 21, pp. 8–9).

... farm machinery destined for the Port of Fremantle was instead diverted to Port Melbourne, creating millions of dollars in additional costs to freight the machinery back to Fremantle via land, and weeks of delay. (NFF, sub. 14, p. 10)

At least five iron ore and gold mining companies in Western Australia were impacted by industrial disruption at the Port of Fremantle resulting in delays to the receipt of mining equipment, including spare components, haul ruck, wheel loaders and dozers. (MCA, sub. 25, p. 5)

During the last bargaining period (2018 to 2020) DP World conservatively estimates that the value of goods disrupted in each day of industrial action was over \$200 million across DP World's four terminals. (DP World, pers. comm., 27 May 2022)

Protracted bargaining and protected industrial action merit reform

Container terminal employees have significant leverage in EA negotiations

The workplace relations system is designed to balance outcomes for employers and employees. Allowing employees to bargain collectively and to take industrial action while negotiating EAs are mechanisms designed to achieve this. Government also sets some minimum standards by regulating floors for wages and conditions.

However, a challenge for governments is to create a regulatory system where neither party has significantly more bargaining power than the other, so that outcomes are likely to represent a reasonably balanced compromise between employer and employee preferences. The system is not static and has been through a number of phases, influenced by political processes, and this in turn affects where this balance lies.

Conditions in container terminal operations confer significant — and unbalanced — bargaining power on employees. Terminal operators have strong incentives to maintain operations; disruptions are very costly to them. Terminals involve significant investments in plant and equipment that have little value in alternative uses and competition between operators is high. Shipping lines can easily shift their business between operators, and parties within vessel sharing arrangements negotiate as a collective, potentially giving them

leverage in contract discussions. Operating profit margins for container terminal operators at the ports in Brisbane, Sydney and Melbourne fell markedly over the decade or so before the onset of the COVID-19 pandemic. This gives greater leverage to unions to the extent that they can threaten actions that affect asset utilisation. This bargaining capacity is strengthened by the dominance of one union, the MUA, and its high membership density in the workforce. The risk of conflict also has an historical dimension, with long-standing adversarial relationships between employers and employees.

Recent negotiations were protracted and industrial action hit productivity

Bargaining periods across container terminal operators extended substantially in the most recent round of EA negotiations (figure 11). The average time to reach agreement was about 525 days (compared with about 295 days for negotiations before 2018). And there was significant overlap in bargaining activity. For at least 900 days, two or more operators were bargaining at the same time, and for about 130 of those days, negotiations overlapped for four of the five operators.

The MUA noted that the COVID-19 pandemic was particularly disruptive for EA negotiations with the three largest container terminal operators — DP World, Hutchison and Patrick Terminals. Other inquiry participants contended that bargaining is not conducted efficiently and consumed significant resources.

One consequence of protracted bargaining is that it translates into an extended period during which employees can take protected industrial action and, once authorised, a wide range of actions can be pursued. Working with a non-dominant hand, for example, is permitted. Disruption can be created at little, if any, cost to employees by the MUA notifying a work stoppage then cancelling the action just before it is due to commence. As a result, workflows are disrupted and contingencies may have been planned, but union members are paid because the shift goes ahead. Employer response options to protected industrial action are limited to lockouts of the workforce.

Evidence suggests that protected industrial action negatively affected container terminal performance during the recent round of EA negotiations:

In late 2020, during the most recent round of enterprise bargaining, a detailed assessment undertaken by DP World showed that productivity was being impacted between 22–34% in any given 24-hour period and that DP World lost between 16 hours and 50 hours of productive work each day. Collectively ... over 60,000 individual working hours was lost to protected and unprotected industrial action during the last DP World bargaining round. (DP World, pers. comm., 27 May 2022)

Close to 35,000 productive hours were lost [between] commencement of bargaining in September 2020 and November 2021, causing significant business interruption across the supply chain. Patrick concluded negotiations in March 2022. (Patrick Terminals, pers. comm., 9 June 2022)

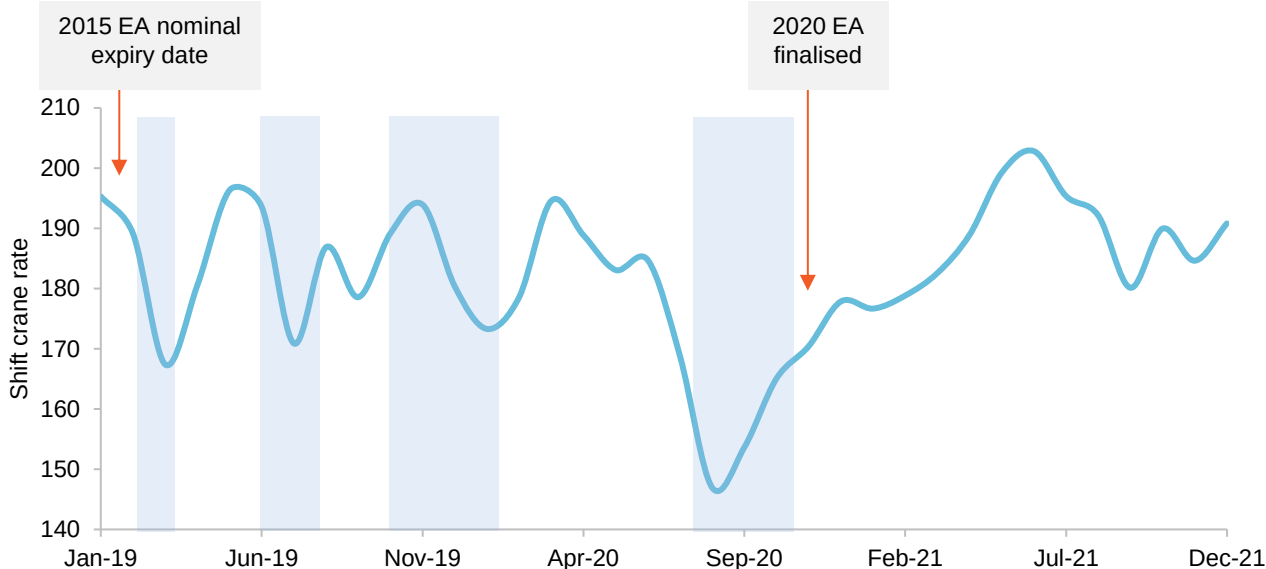
Impacts on productivity were evident in crane rates (figure 12). And there were significant effects on industries dependent on maritime freight (box 3).

Figure 11 – Reaching agreement was particularly time consuming in the recent round
Length of lines represent time spent bargaining for a new EA



Figure 12 – Periods of protected industrial action correlated with a lower crane rate at DP World's Port Botany terminal

Blue shading represents periods of protected industrial action



Another consequence of the lengthy recent round is that four of the five container terminal operators' EAs expire between March and December 2025. Overlap in bargaining activity is likely to be more common in the next round, bringing with it a number of risks:

- container terminal operators may be subject to simultaneous protected industrial action:
 - this would confer substantial leverage to the MUA, even if chooses not to exercise it, through the ability to shut down or heavily limit operations across an entire port

- it may also prevent container terminal operators from subcontracting work to other operators — a common practice to manage disruptions
- a higher load on union resources, which may lead to longer negotiating periods.

Effective remedies for protracted bargaining and industrial action with economy-wide costs appear limited

Under the FW Act, bargaining parties can apply to have the FWC deal with a dispute during the bargaining process, and an applicant can specify the level of intervention sought, from help in resolving a single issue to more extensive involvement. The FWC can deal with the dispute through conciliation or mediation, making a recommendation or, if the parties agree, arbitration. However, uncertainty about the outcomes of any intervention (in some instances linked to perceived variability in the approach taken by individual FWC members), and concerns about having conditions imposed upon them, may mean bargaining parties are reluctant to approach the FWC.

While parties initiated FWC intervention during recent negotiations, protracted bargaining suggests that additional mechanisms to support parties in reaching agreement would have value.

Parties can also apply to the FWC to terminate an agreement once it has nominally expired, and there are no restrictions on when or why they might do so. In practice, however, the factors that the FWC has to take into account in considering such applications (including the public interest and circumstances of the employer, employees and union covered by the agreement) mean terminations are rarely granted.

If a termination is granted, it results in workplace arrangements reverting to the underlying modern award. This is a potentially costly outcome for employees if EA terms and conditions are substantially more attractive than award provisions and for employers if, for example, EAs deliver work arrangements that better reflect their operational requirements.

Three employers in the ports (Patrick Terminals, Smit Lamnalco and Svitzer) applied to terminate their agreements in late 2021/early 2022. Termination is a serious step, and the fact it was pursued three times in recent negotiations is further evidence in support of the need for additional mechanisms to help parties reach agreement.

The FWC has the option of suspending or terminating protected industrial action on the grounds that it is causing significant economic harm to the employer and employees engaged in bargaining or to the national economy (or an important part of it). But the FW Act does not define 'significant' and FWC decisions have set a high bar.¹ The Australian Government Minister for Employment and Workplace Relations also has discretion to intervene on the basis of significant economic harm. Again, this sort of intervention is rare, but the threat of intervention may contribute to the resolution of industrial disputes. For example, in October 2021, the MUA's decision to suspend an 11-week period of rolling strikes coincided with a threat by the Minister to apply to the FWC to terminate the industrial action on the basis that it was damaging the Western Australian economy.

On balance, the Commission considers that incremental reforms to the FW Act would support effective bargaining and reduce overly harmful industrial action.

¹ Significant' has been interpreted as 'exceptional in its character or magnitude when viewed against the sort of harm that might ordinarily be expected to flow from industrial action in a similar context'.

FW Act amendments and improved operation of the FWC are recommended

In line with its 2015 report *Workplace Relations Framework*, the Commission recommends that the FW Act is amended to:

- clarify that 'significant' should be interpreted as 'important or of consequence'
- allow the FWC to suspend or terminate protected industrial action when it is causing, or threatening to cause, significant economic harm to one party under the EA rather than both (as is currently the case)
- include options other than lockouts for employer protected industrial action
- enable employers who have implemented a contingency plan for protected industrial action that does not go ahead to stand down the relevant employees without pay for the duration of the contingency response if they choose to do so.
- enable employers to choose either to deduct wages or continue to pay employees for protected industrial action which lasts for less than 15 minutes.

Further, port-specific amendments are recommended to:

- widen the range of third parties who can make applications to terminate protected industrial action, for example, to include entities with an interest but who may find it difficult to show they are directly affected, such as employer or employee associations, or third parties like importers/exporters
- include a mandatory requirement for FWC intervention when certain thresholds in bargaining activity are reached (these could include time limits and/or thresholds linked to the number or scale of protected industrial actions).
- enable employers to better prepare for industrial action by lowering the threshold for applications to extend the mandatory three-day notice period for protected industrial action to up to seven days.

The Commission is seeking feedback on whether additional penalties for unlawful industrial action should be recommended.

With the aim of ensuring that approaching the FWC is attractive to bargaining parties, the Commission recommends that the FWC (supported by amendments to the FW Act where necessary):

- establishes a fast-track process for dealing with applications involving port employers and employees and their representatives
- enables more decision making by full benches to assist consistency of decision making
- makes arrangements to ensure FWC commissioners with industry knowledge and familiarity with parties are available.

Amendment of the FW Act to allow input from employers and employee representatives in the selection of FWC members dealing with port matters, with the objective of identifying nominees who have the confidence of both employers and employees, is also recommended.

Prohibition of some agreement content is recommended

Some clauses in terminal operators' EAs constrain productivity and efficiency

A number of the clauses found in container terminal operators' EAs are highly restrictive and constrain the ways that workers and equipment can be deployed.² For example, there are clauses that limit:

- merit based hiring, promotion and training (recruitment is limited to entry level roles in some operators and movement up the career ladder is strongly linked to tenure with that operator)

² Clauses vary from agreement to agreement, but many terms have a similar effect.

- who can fill a role or backfill a position when another worker is not available
- automation.

Agreements also create a strong hierarchy of employment type by tenure. New hires begin as casuals (generally called supplementary employees on the ports) before moving to permanent guaranteed wage and then permanent full-time employment.³ This limits the flexibility (and diversity) of the workforce.

While it is not uncommon for agreements in the rest of the economy to include clauses dealing with at least some of the content listed above, container terminal EAs appear to put much stricter conditions in place than EAs in many other sectors.

Clauses that limit recruitment, promotion and training decisions combine to make it less likely that the most appropriate person for a job is the person in the role. As a result, terminal productivity may not be as high as it could be. These clauses also disadvantage both existing and potential container terminal workers. Existing workers may not be in roles most suited to their skill sets or preferences. And competent outsiders cannot get in — existing employees are shielded from merit-based competition.

Strict rules that dictate who is picked for a shift or cover an absence also limit terminal operators' ability to choose the most appropriate person for a job and can make it difficult to backfill a role. Combined with minimum staffing requirements for some types of equipment, challenges in filling a role can mean that a whole team is unable to work a shift — with clear implications for productivity and efficiency.

Under the FW Act, all EAs must include clauses requiring an employer to consult with their employees about major workplace change, like automation. But requirements in container terminal EAs set up lengthy and/or complex consultation processes and can require employee agreement to any change. These act as a brake on investment and mean that potential benefits, such as improvements in the safety and reliability of terminal operations, may be missed.

Ships arrive in port at all hours of the day and night and container terminal operators are under considerable pressure to have workers and equipment available when a ship berths. Delays in arrival times, for example, from bad weather, can mean workers are rostered on but not working. The extent to which rosters accommodate fluctuations in demand is contested. While operators called for more flexibility, the MUA argued that workers are very flexible and further flexibility is untenable. The Commission would appreciate evidence on how rostering rules in EAs enable or restrict the flexible allocation of workers to tasks.

Limits could be placed on agreement content

To lift productivity and efficiency, the FW Act could include a short list of content that cannot be included in EAs in the ports. The list should aim to prohibit excessive constraints on:

- merit-based hiring, promotion and training
- the number of casual workers and other workers with flexible rosters
- who employers can choose to backfill positions
- innovation and workplace change.

Some inquiry participants have argued for a ports code akin to the building code. If adopted, this could involve a longer and more prescriptive list of unlawful agreement content than proposed above. The

³ Permanent full-time employees have relatively fixed rosters. Guaranteed wage employees are permanent employees who usually have a much more flexible work arrangements than permanent full-time employees. They may be entitled to a minimum or average number of weekly shifts, or an equivalent payment.

Commission is seeking feedback to help it in reaching a conclusion about the merits or detriment of a ports code in the final report.

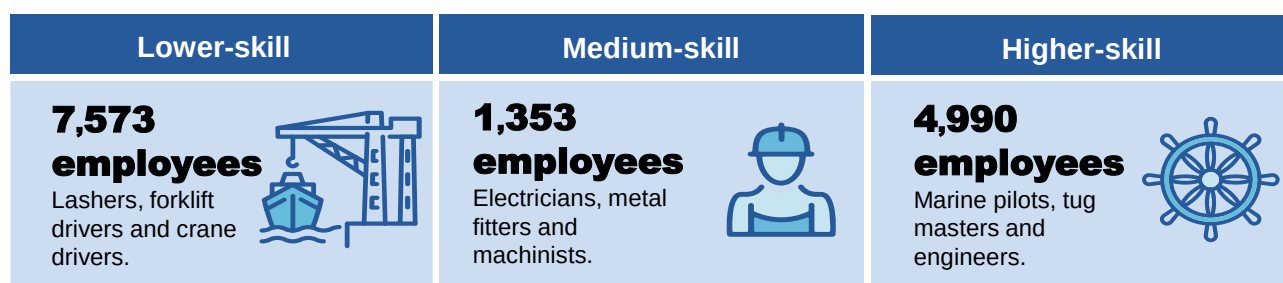
The Commission's recommended approach to workplace relations reform in ports involves a wide suite of measures that give the FWC an expanded role, impose limits on agreement content and address imbalances in bargaining power. Whether, if implemented, they strike the right balance or involve unforeseen complexities and inefficiencies could be the subject of independent evaluation once these interventions have been in force for five years.

Skills and training raise few productivity concerns

A variety of skills are required to move freight in or out of ports. The journey of a container through a port relies on many workers, from those that the National Skills Commission refers to as lower-skilled, who are usually employed in entry-level jobs such as lashing, to medium-skilled workers such as electricians, through to higher-skilled professionals such as marine pilots (figure 13). Local variations in conditions and technologies can mean that the exact skills needed for specific roles may vary between ports and even between different firms conducting the same task at the same port.

While container terminals rely more on onsite, unaccredited training (reflecting workplace relations arrangements and site-specific needs), professional on-water occupations like marine pilots, tug masters and engineers usually combine vocational education and training or higher education qualifications with extensive blue-water experience.

Figure 13 – Workers in many different roles are needed on Australia's ports



Inquiry participants have raised very few concerns about the system that delivers skills and training for port workers — the system largely appears to be functioning well. There is scope for improvement in some areas, but extensive redesign is not necessary.

- A lack of formal qualifications could be a barrier to labour mobility between container terminal operators if prior experience is not recognised at another company or port. However, workplace arrangements seem to be creating a larger barrier to labour mobility than either the absence of formal vocational education and training qualifications or any gaps in the mutual recognition of occupational licensing. Adoption of the workplace relations recommendations discussed above would help address this.
- Some participants have raised concerns about the potential for shortages of marine pilots. Access to the blue-water experience needed to qualify for marine pilot roles has become more difficult as Australia's coastal fleet has reduced, but it appears that this is being addressed through immigration and cadetship programs. Subsidising a strategic fleet (discussed further below) for training purposes would be costly and unnecessary.

Skills needs in parts of the industry are likely to change as automation and other technology is introduced. However, it is likely this adjustment will be gradual, as it has been in the past. Adjustments are already being made to vocational education and training courses to include future-focused content.

Australian ports are adopting technology where desirable

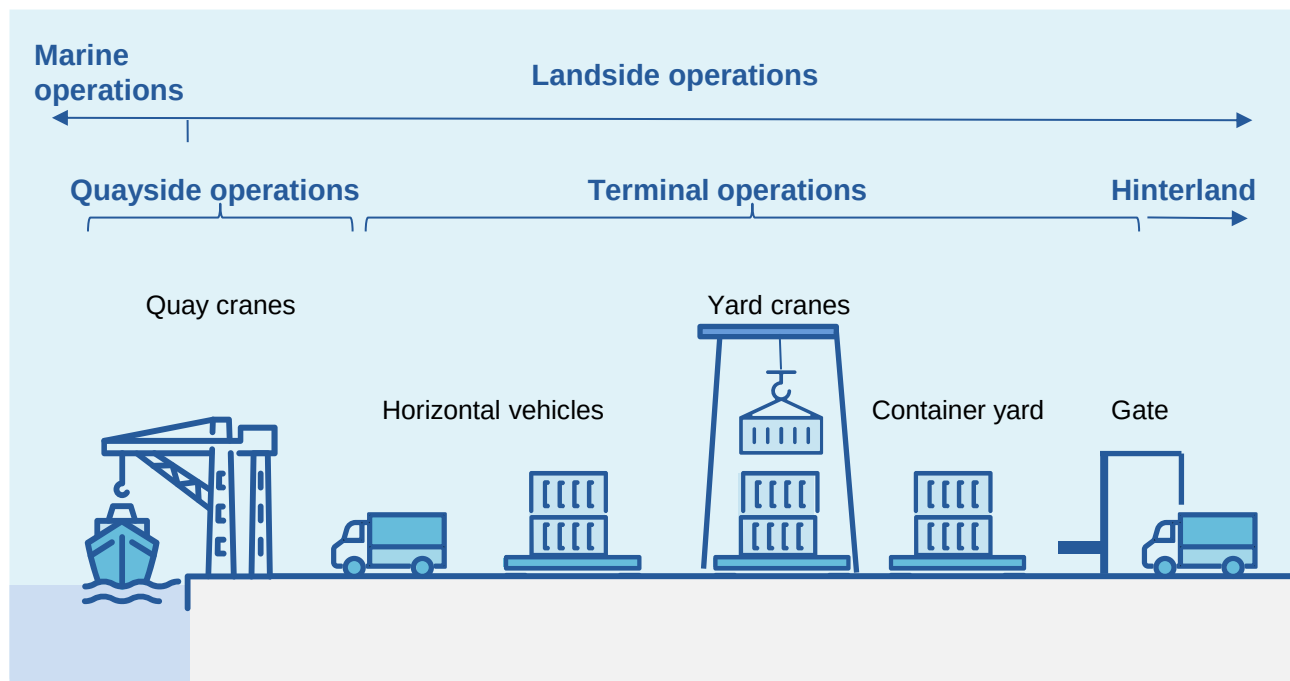
The adoption of technology at Australia's container ports is broadly in line with international practice.

In exploring current practice, the inquiry focused on three topics raised by inquiry participants — automation at container terminals, the availability and exchange of information and cargo clearance systems.

Automation may not increase crane rates but has other benefits

Increased automation can be used at all stages of the maritime logistics chain, and particularly in container terminal operations. All the key operations and hardware used in container terminals (figure 14) can be automated. Extensively automated systems are becoming standard for major greenfield developments. In contrast, existing container terminals typically choose to automate discrete parts of their operations over time, in order to minimise the cost and disruption of converting to fully automated systems.

Figure 14 – Key operations and hardware in container terminals



The level of automation differs substantially across Australia's container terminals. Fremantle is the least automated port — its terminal operators rely on manual yard operations and quay cranes. The Port of Brisbane has the highest overall level of automation, with all its terminal operators utilising automation in their terminal yards, but manual quay cranes. And VICT is Australia's most automated terminal, with automated yard operations and gates and remotely controlled quay cranes.

Despite this variation, Australia's major container ports appear to be well advanced in adopting automation relative to high performing global terminals.

Further, there are mixed views about how great an impact automation has had, or can bring about, on performance in Australia's maritime logistics chain. While terminal operators claim automation can lead to higher rates of cargo handling, the MUA claims it is neither as reliable nor productive as human labour.

Overall, it is not clear from examining gross crane rates at the major container terminals that there is any correlation with levels of automation (as illustrated by the data presented in figure 9). There is no simple argument that more automation moves more containers in an hour.

However, there are some clear benefits from automation that appear to be driving its steady adoption by Australia's container terminals. The use of technology has the potential to improve the safety, reliability and consistency of terminal operations and reduce labour costs. In particular:

- reducing the number of workers required in container yards by automating equipment can reduce or alleviate instances where humans would otherwise be put at physical risk
- the potential for automated equipment to run around the clock without interruption makes it reliable, predictable and easier for operators to plan around.

Data sharing technology and trends

Data is produced and used at all stages of Australia's maritime logistics system. For example, data is generated through interactions between stakeholders and contained in documents. Performance-based data is generated by business activities. Sensors on physical objects create shared electronic data (commonly referred to as the 'Internet of Things').

Data analysis has many potential benefits, such as: optimised freight routes and schedules (ensuring that more cargo can flow uninterrupted); key performance indicators (highlighting opportunities to improve efficiency); and visibility of cargo origins and destinations (supporting infrastructure planning).

Australian ports are implementing new data-based technologies. For example, Flinders Port Holdings has used analytics to optimise the allocation of straddles and positioning of containers, so that containers move through the port as efficiently as possible. And analysis of detailed data on channel conditions has enabled larger vessels to safely access the Port of Brisbane, reducing the need for channel deepening.

While data sharing has enabled innovation, it could provide additional value. The public sector has the potential to aid maritime data sharing by opening access to data held by government agencies, for example statistics on port and terminal performance (held by port authorities), the flow of goods into and out of Australia (Australian Bureau of Statistics and Australian Border Force) or freight and use of transport infrastructure (State and Commonwealth transport Departments). Benefit could also be provided through the creation and maintenance of systems through which stakeholders interact with government and access data insights. Improving national digital infrastructure could also indirectly assist in improving stakeholder digitalisation and data generation practices. However, each of these initiatives would involve significant costs, and would have to provide public benefit that outweigh these costs.

Federal and State Governments have commenced initiatives to increase access to private and public sector data while improving the processes by which this data is collected — the National Freight Data Hub being developed by the Australian Government is one example. Though nascent, these initiatives will complement existing sources of data and could drive future innovation.

Document exchange systems are well established

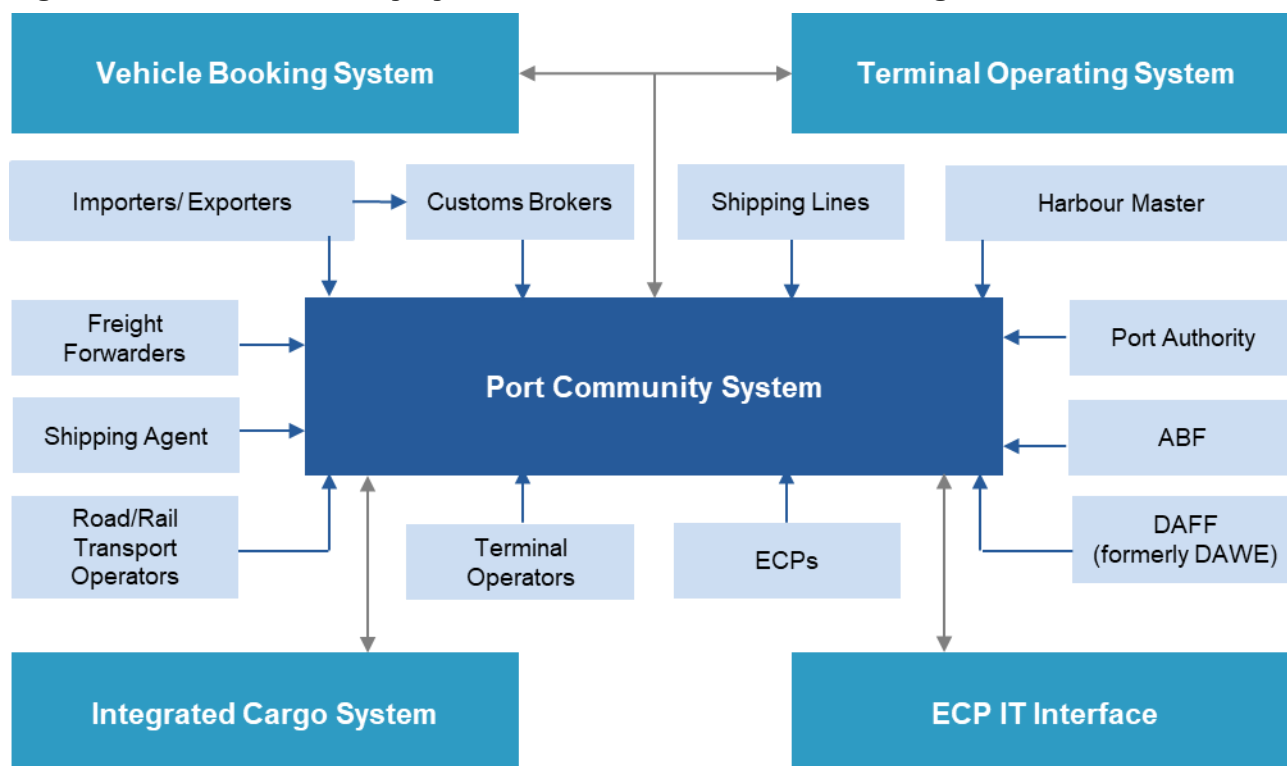
Document exchanges underpin the flow of cargo from sellers to buyers, certifying that cargo complies with regulations or has been received by a party within the logistics chain. Digitisation and digitalisation⁴ mean

⁴ Digitisation refers to the conversion of physically recorded information to electronically readable and transmittable formats. This is contained within digitalisation, which refers to the adoption of digital technologies which change how a business operates.

documents are now typically provided in electronic data interchange (EDI) formats and ICT systems can facilitate document exchanges — improving system efficiency.

Port community systems (PCS) enable public and private stakeholders to upload documents to a single online platform and share access with other supply chain participants (figure 15). A PCS can also host other ICT systems, such as a single window system (which allows a cargo owner or their customs agent to submit their documents for government agency approval to a web portal) and a vehicle booking system (which allows terminal operators to allocate slots for landside operators to book for un/loading cargo).

Figure 15 – Port community systems facilitate document sharing



a. ABF: Australian Border Force; DAFF: Department of Agriculture, Fisheries and Forests (formerly DAWE: Department of Agriculture, Water and the Environment); ECP: Empty Container Park.

Use of digitalisation in Australia's major ports appears to be broadly in line with other countries' initiatives.

While some inquiry participants suggested that government should coordinate a national PCS, a number of commercial document and information sharing options are offered around the world and used in Australia. These systems continue to be developed through the adoption of new technologies. Implementing a government-run PCS would risk simply adding further administrative costs for users in the maritime ICT landscape.

Cargo and vessel clearance systems are a work in progress

A range of regulatory requirements must be cleared before goods can enter or leave Australia to ensure vessels and cargo are compliant with Australia's biosecurity laws and customs regime.

While reviews over the years have led to some investments improving clearance systems, inquiry participants expressed frustration with some biosecurity and customs procedures. Issues raised included: extensive delays in inspection appointments and approvals; the paper-based process for booking biosecurity inspections and the administrative complexity; and duplication of information required by government departments.

Cargo and vessel clearance systems are convoluted and challenging for stakeholders to use, with repetition in data entry and outdated ICT systems. A taskforce established by the Australian Government is working to address these issues through a suite of reforms. To be successful, these reforms will require the elimination of duplicative application processes, adequate resourcing for the department's performing clearances and a stable 'single window' ICT platform that can integrate with port community systems.

National shipping concerns

Amendment of coastal shipping regulation is recommended

Carriage of domestic cargo between interstate ports by foreign flagged vessels (or cabotage) is regulated by the Australian Government with the aim of shielding Australian flagged (or registered) ships from competition from foreign vessels.

All vessels providing interstate cargo services are required to hold a licence. General licences (issued to Australian registered and crewed vessels) are issued for up to five years with no restrictions on coastal trading. In contrast, temporary licence holders (foreign-owned vessels or Australian-owned vessels operating with a mix of Australian and international crew) must undertake at least five voyages during the 12-month licence period and specify the details of each voyage when applying. General licence holders providing competing services can challenge approval of a temporary licence and the Minister for Infrastructure and Transport (or their delegate) must consider that challenge when deciding whether to grant the licence.

In 2018-19, over 75 per cent of interstate coastal freight (by weight) was carried under temporary licences.

Submissions to this inquiry suggest that the regulatory regime remains an issue. Most maintained that the inflexibility and cost imposed mean coastal shipping is uncompetitive with road, rail and international shipping. There was support for simplification of regulation to ease the administrative burden, remove impediments and increase options for supply chain resilience, with some suggesting that the uncompetitive position of domestic shipping has driven increased substitution of international products for Australian domestic production to the detriment of the Australian economy.

However, other submissions argued for a broadening of the regulatory regime to strengthen crewing and workplace relations compliance on vessels and to reduce the reliance on global suppliers for shipping services. While the proposals had a strong focus on safety and resilience, there was little discussion of how proposed measures would contribute to the global competitiveness of Australia's maritime logistics system or what economic costs and benefits regulatory protections provide to the broader Australian public.

In the Commission's view, there is a strong case for reform to allow greater competition from foreign vessels. This would provide more cost-effective shipping services for Australian users. The temporary licence system should be streamlined and general licence holders' ability to contest approval of temporary licences should be limited. Requirements that Australian labour laws apply for licence holders should be retained.

Concerns about capacity and training may be better resolved by means other than a strategic fleet

Recent pressures on global shipping capacity and transport challenges associated with natural disasters have highlighted the importance of international service suppliers to Australia and the limited number of Australian registered trading vessels. In response, there have been calls for greater government support for

Australian-flagged shipping capacity. Some have also called for this support to provide training berths as a remedy for potential blue-water skills shortages.

Both the Australian Government and now opposition have announced policy positions that include development of 'strategic' or 'sovereign' shipping capacity to secure ongoing access to essential imports and to provide vessels for use in times of national crisis or conflict (referred to as a 'strategic fleet').

These proposals involve increasing the number of privately-owned, commercially operated Australian-registered trading vessels, however, locally-registered ships would face significant disadvantages in international shipping markets. They would have to comply with Australian crewing requirements and labour law — giving them higher labour costs than many other vessels. And they would face the risk of having to break contracts if requisitioned by the Australian Defence Force to help in times of natural disaster or conflict. As a result, it is unlikely that they would be profitable in normal circumstances. Owners would need subsidies in order to compete globally on commercial terms and as compensation for the costs and risks associated with having to make their vessels available if requisitioned in times of need.

Further, a strategic fleet may not significantly mitigate any issues of shipping capacity that might arise in the future. First, disruptions can occur to different types of shipping at different times. A strategic fleet would be unlikely to cover all of these disruptions with sufficient capacity. Second, the strategic fleet would likely face the same disruptions as other commercial shipping operations. For example, an Australian strategic fleet would have faced the same congestion issues at international ports stemming from the COVID-19 pandemic as other commercial shipping. In this sense, an Australian strategic fleet would have provided little if any benefit during the recent disruptions to shipping.

Concerns raised about domestic shipping capacity and training may be better resolved by means other than a strategic fleet.

Capacity could be acquired as needed from the international market without the costs involved in supporting a strategic fleet. The shipping charter market provides access to a wide variety of vessels that could be used to address specialist case-by-case needs. And the Australian Government could access international resources — including the charter market — in response to natural disasters and emergencies. Exemptions to licencing requirements for international vessels that allowed carriage of domestic cargo in response to the flooding of the East–West rail line in 2022 illustrate one way in which international capacity can be accessed.

Alternatively, the Australian Government could use financial instruments to underpin capacity that could be drawn down in times of crisis. For example, the government could write options contracts with large cargo owners or with shipping lines to 'buy out' their capacity in times of great need.

Recent experience has also shown that the international shipping sector is responsive to changes in Australian demand. Since the COVID-19 pandemic began, the level of international containerised trade has grown to record levels, and container shipping lines have introduced new services to Australia despite ongoing high global demand for capacity. More generally, in a global market such as shipping, domestic resilience would be facilitated by removing unnecessary barriers to entry for international operators.

In the case of training, as noted above, cadetships and skilled migration (notwithstanding disruptions caused by the COVID-19 pandemic) appear to be working well in meeting needs for blue-water experience.

A strategic fleet requires further evaluation as on present evidence it is not the best remedy for concerns about domestic shipping capacity and training. The complex matters involved might be further evaluated and examined by the Taskforce proposed by the government in its policy position prior to the election.

Finally, issues of access to national shipping capacity to address national security and defence needs are clearly matters for the Australian Government rather than industry and should be considered independently of economic needs through appropriate national security policy settings.

Recommendations and findings

The performance of Australia's container ports



Draft finding 3.1

The elapsed labour rate is not a measure of labour productivity

The elapsed labour rate, which measures the number of containers handled per hour that stevedoring workers are on a ship, is often interpreted as a measure of labour productivity (output per worker or hour worked). However, the rate does not reflect either the number of workers or hours worked and is therefore not a measure of labour productivity.



Draft finding 3.2

Data gaps limit assessment of port performance

Publicly available data relating to port performance is fragmented, incomplete and inadequate. This constrains analysis. Data on labour inputs, for example, are not available, precluding analysis of labour productivity. Other data gaps mean that productivity during some key steps of a container's journey through a port is not visible.



Information request 3.1

The Commission is seeking data on the productivity of labour within ports. Measures could include the average number of 20-foot equivalent units handled per person-shift, per employee or per hour worked. Ideally, the data would enable benchmarking across Australian ports or assessment of productivity trends over time.



Information request 3.2

The Commission would appreciate data on container dwell times in Australian and international terminals or ports.



Draft finding 3.3

The framework for measuring Australian container port performance could be enhanced

A comprehensive framework for measuring port performance would include data on the time taken to move containers through each of the key steps between ship and port gate. Comparison of these time-based metrics across ports would reveal where operations in a port are relatively inefficient. Other performance measures could then be used to understand *why* these relative inefficiencies exist.



Information request 3.3

The Commission is seeking feedback on the costs and benefits of collecting and processing the richer data required to implement a comprehensive performance management framework. Insights into whether there would be any significant downsides to increased information availability, such as the possible facilitation of anticompetitive behaviour, would also be appreciated.



Draft finding 3.4

There is scope to improve crane rates

Crane rates can vary significantly across terminal operators within the same port and over time within the same terminal operator. More consistent attainment of high crane rates would lift productivity.



Draft finding 3.5

Container port productivity has increased in the last 30 years

Measured by crane rates (container movements per hour that cranes are operating), productivity at Australia's major container ports (Brisbane, Sydney, Melbourne, Adelaide and Fremantle) rose strongly in the late 1990s following significant waterfront reforms, and continued to grow at a slow pace over the following two decades.

**Draft finding 3.6****Each Australian container port has different strengths**

How well Australia's major container ports compare to their local peers depends on the performance metric considered. For example, in 2019 Melbourne moved more containers per hour than the other ports because it used more cranes per ship. Adelaide and Fremantle had the highest net crane rates — while they used fewer cranes on average, they worked them harder. Sydney, Brisbane and Adelaide recorded longer anchorage and steam-in times — potentially indicating port congestion and/or port inefficiency. And Sydney underperformed on truck utilisation rates and turnaround times.

**Draft finding 3.7****Australian container ports take longer to turn ships around than many international ports**

Australian ports do not compare well against international ports on measures of ship turnaround times. Their poor rankings in the World Bank's Container Port Performance Index reflect the fact that they take longer than many international ports to process ships (particularly medium to larger vessels — that is, those with a capacity of more than 5000 twenty-foot equivalent units). Slower turnaround times in Australia mainly reflect the use of fewer cranes to handle containers — Australian cranes are just as productive as those in the average international port.

**Draft finding 3.8****International evidence also suggests that Australian ports could lift their productivity**

Benchmarking analysis by the Commission identified a 'best practice' set of ports — those that were using their inputs most efficiently. Apart from Adelaide, Australian ports were not operating at this 'efficient frontier'; they could handle an increase in throughput by using their capital inputs more efficiently.

The Commission's work also revealed the importance of considering port inputs in performance analyses. Recent work by the World Bank did not account for the fact that some ports use relatively more inputs and can, therefore, turn ships around faster. Some ports have an excessive level of investment for their current level of throughput. This over investment in costly capital is inefficient even if it means that they can turn ships around quickly.

On balance, the empirical evidence from international comparisons of port performance suggests that there is scope for Australian container ports to improve their productivity.



Draft finding 3.9

Improving container port productivity would deliver significant benefits

Inefficiencies at Australia's major container ports are estimated to directly cost the Australian economy around \$605 million a year. While this impost is small relative to the value of imports and exports, it is significant. And it is rising with growth in container trade.

Ports also have large indirect impacts on Australian businesses, consumers and the economy. Any sustained disruption to imports or exports has the potential to cause substantially larger economic impacts than the direct cost estimates suggest.

Well-functioning, efficient container ports help to ensure the reliability of the maritime supply chain and logistics systems more broadly.



Information request 3.4

The Commission is seeking feedback on its proposed methodology for benchmarking Australia's ports. Would it be feasible and useful? Would alternative approaches have greater merit? If benchmarking is considered useful, who should undertake it? And how often should it be undertaken?

Australia's container ports have market power



Draft finding 5.1

Major container ports are currently regional monopolies

Major Australian container ports in the short to medium run may involve a natural monopoly technology, where a single port can best serve the relevant market. However, this situation may not hold over time as demand is increasing and space for expansion is constrained. Indeed, it is far from clear that it is economically efficient to have a single container port in some Australian cities including Melbourne and Sydney either today or in the near future.



Draft finding 5.2

Privatisation in New South Wales has impeded efficient outcomes

Privatisation processes in New South Wales have conferred protection on port lessees that are impeding economically efficient outcomes in the development of the state's ports system.

**Draft finding 5.3**
Ports face little countervailing power

There is little countervailing power from either shipping lines or container terminal operators constraining the use of market power by port operators at Australian container ports.

**Draft finding 5.4**
No case has been found for further regulation

In the case of shipping lines, prices for services provided by ports are typically monitored (or face the threat of further regulation). The Commission received few complaints about port pricing to shipping lines, consistent with this regulation acting as a constraint on the ability of each port to exercise market power over the shipping lines.

In the case of tenants, given only one container port has been found to be exercising market power there is no case for tighter regulation at this time on all ports. The threat of further regulation appears to be constraining the conduct of ports operating under 'light touch' regulatory regimes (Brisbane, Sydney and Adelaide). The mechanisms that exist in Queensland, New South Wales and South Australia that enable closer regulatory oversight if concerns arise about ports' use of their market power appear to be adequate. For the Port of Melbourne, the current arrangement of reviewing the Port's adherence to the Tenancy Customer Charter alongside land rents in 2025 appears to be a next logical step in addressing issues around the Port exercising its market power over tenants.

**Information request 5.1**

The Commission invites container terminal operators and other port tenants to respond (with evidence) if they think there is a market power issue with a port operator.

Competition issues in other markets need attention

**Draft finding 6.1**
Shipping lines compete in regional markets

There is not strong substitution between regions for cargo owners, and shipping lines will only transfer vessels between regions if there is a significant economic incentive.



Draft finding 6.2

Competition is a constraint in the shipping line market

There appears to be robust competition in the shipping line market. Multiple shipping lines service Australia and cargo owners can easily switch between them. Prior to the COVID-19 pandemic, terminal handling charges charged to cargo owners by shipping lines were not declining despite these charges to shipping lines from container terminal operators declining. But blue-water charges fell markedly, and these are a greater component of shipping costs than terminal handling charges.



Draft recommendation 6.1

Repeal Part X

The Australian Government should repeal Part X of the *Competition and Consumer Act 2010* (Cth) (CCA).

- No other industry has an exemption like Part X, even though there are industries with similar characteristics to the shipping industry.
- Shipping lines should show that their agreements provide a net public benefit.
- Either a class exemption or the existing provisions under Part VII of the CCA could deal with shipping line agreements under a net public benefit test once Part X is repealed.



Draft finding 6.3

Shipping lines have increasing bargaining power

Greater competition between container terminal operators and consolidation of shipping lines over the past decade have increased shipping lines' bargaining power relative to container terminal operators. This has contributed to declining quayside revenue for container terminal operators.



Information request 6.1

The Commission seeks information on why container terminal operators do not charge shipping lines fees for arriving outside their windows.

**Information request 6.2**

The Commission is seeking information on why landside fees charged by container terminal operators have increased substantially since 2017 and not earlier. Is the increase in fees:

- a competitive response to declining profitability and container terminal operators responding by increasing fees where they can?
- because declining profitability has reduced the regulatory threat and allowed container terminal operators to increase their fees?
- a combination of the factors above?
- because of another factor not included here?

**Draft recommendation 6.2**

Terminal access charges and other fixed fees for delivering or collecting a container from a terminal should be regulated so that they can only be charged to shipping lines and not to transport operators

Regulations should be established that prevent container terminal operators from charging transport operators any fixed fees associated with delivering or collecting a container. Container terminal operators would not be prevented from charging these fees to shipping lines. This reform should be complemented by state and territory government regulators being empowered to monitor flexible fees charged to transport operators by container terminal operators to ensure that these fees are being used to create efficient incentives for transport operators and are not being used to offset any lost revenue from fixed fees.

**Information request 6.3**

The Commission seeks further information on potentially unfair contracts within the maritime logistics system. Are there other terms to be concerned about that are not mentioned in this draft report? Are there other contracts that should be brought to the Commission's attention?

**Draft recommendation 6.3**

Remove exemption for shipping contracts

Shipping contracts should not be exempt from the unfair terms provisions in Australian Consumer Law. The Australian Government should remove this exemption.



Information request 6.4

The Commission invites feedback on draft recommendation 6.3, including any issues that might arise in relation to international treaty arrangements

Infrastructure needs are being addressed



Draft finding 7.1

Port expansions to accommodate bigger container ships do not need taxpayer funding

Australian container port operators and other parts of the maritime logistics system continue to prepare for bigger ships as needed and there is no need for government intervention to fund or otherwise coordinate investment or encourage the use of bigger ships.



Draft finding 7.2

Most container ports are planning substantial investments in rail infrastructure

Container port operators in Brisbane, Sydney, Melbourne and Fremantle plan to increase the share of freight travelling to and from those ports by rail over the coming decades. Any further government investment in rail to service container ports needs to be accompanied by a clear cost–benefit analysis, including analysis of the relevant externalities and including alternative scenarios for the development of truck technology, over the full economic life of the project.



Draft finding 7.3

Planning systems should allocate land around ports to highest value uses

Urban encroachment is an issue at all of Australia's major container ports except Brisbane. Industrial land around some ports is gradually being redeveloped for higher value commercial and residential uses and this can create conflict with some port users. Planning decisions should support the use of land in its highest value.



Draft finding 7.4

Long term planning appears to be adequate

All state governments have freight and transport strategies that include consideration of future port infrastructure needs. Compelling evidence has not been presented that more plans are required or that existing plans will not be implemented.

Workforce arrangements: framework



Information request 8.1

In addition to container ports and towage services, are there other sectors in Australian ports where workplace relations issues affect the efficiency or productivity of operations? For example, bulk ports, empty container park operations or pilot services.



Draft finding 8.1

Unions hold substantial bargaining power

Conditions in container terminal operations, together with the workplace relations framework, confer significant — and unbalanced — bargaining power on unions.

Workforce arrangements: issues



Information request 9.1

What role are modern awards playing in the ports? Given the prevalence of enterprise agreements in the sector, could changes to modern awards contribute to improved workplace relations or productivity? If so, in what way, and would there be benefit in the Fair Work Commission undertaking a review of the Stevedoring Award?



Information request 9.2

Is tenure the deciding factor on who receives training in container terminals because so much training happens within the workplace? That is, it makes sense to train someone who has the required points for promotion because they are better placed to use that training.



Draft finding 9.1

Restrictions on merit-based hiring and promotion harm workers and productivity

There are substantial restrictions on merit-based hiring, promotion and training within container terminal operations. These restrict fair and reasonable access for workers who are qualified, but not currently employed by the specific container terminal operator. They also harm existing terminal workers by precluding them from jobs that best fit their skills and preferences, and create undue hurdles for potential container terminal workers. Overall, the clauses act to constrain productivity.



Information request 9.3

The Commission is interested in further evidence on how container terminal enterprise agreements enable or restrict the flexible allocation of labour. To what extent do existing arrangements provide sufficient flexibility to employers to manage the allocation of labour given variable peaks and troughs in demand?



Draft finding 9.2

Limits to the number of workers with flexible rosters is inefficient

Limits on the number of casual workers and other workers with flexible rosters (permanent guaranteed wage employees) who can be employed in container terminals create barriers to the efficient allocation of labour, which will flow through to the productivity of container terminals.



Draft finding 9.3

'Order of pick' rules limit backfilling and restrict productivity

Strict rules determining the 'order of pick' which specify which workers can be engaged first for a task are limiting terminal operators' capacity to backfill positions. This impedes operators' ability to allocate labour to its most productive use and can mean one absence has an outsized effect on the productivity of a terminal.



Draft finding 9.4

Container terminal enterprise agreements distort operators' ability to automate

Container terminal enterprise agreements contain terms which substantially restrict or disincentivise operators from introducing further automation. These clauses, reflected in mandated consultation lengths and, for some operators, the requirement for employee or third party (such as an independent panel or Fair Work Commission) consent, appear to go beyond equivalent clauses in other industries or the model consultation term in the *Fair Work Act 2009* (Cth).

**Information request 9.4**

Do restrictions on subcontracting of labour in enterprise agreements in the ports limit competition in the labour market? And if so, what is the effect of this?

**Information request 9.5**

What might be the benefits and drawbacks of introducing a ports code (modelled on the previous Building Code)? If there is a code who should be responsible for its enforcement?

**Information request 9.6**

What would be the benefits and drawbacks of classifying the ports as an 'essential service' under the *Fair Work Act 2009* (Cth)? What rights and obligations should follow if the ports were classified in that way?

**Information request 9.7**

To what extent are side deals being used in the ports and how influential is their content? What would be the consequences if side deals were used more?

**Draft recommendation 9.1**

Prohibit enterprise agreement content that imposes excessive constraints on productivity in the ports and costs on the supply chain

The Australian Government should amend the *Fair Work Act 2009* (Cth) to introduce a short list of unlawful terms in enterprise agreements in the ports. The list should aim to prohibit excessive constraints on:

- merit-based hiring, promotion and training
- the number of casual workers and other workers with flexible rosters
- strict rules determining the 'order of pick'
- innovation and workplace change.



Information request 9.8

What content should be made unlawful in enterprise agreements in the ports?

How could the most restrictive content in enterprise agreements be curtailed without limiting the rights of workers to be consulted on issues including major workplace change?

How might draft recommendation 9.1 be practically implemented? What are the technical or legal issues which should be addressed and how should they be addressed?



Draft finding 9.5

Existing Fair Work Act mechanisms have not prevented lengthy bargaining in container terminals

Negotiations over recent agreements for container terminal operators involved lengthy and overlapping bargaining periods.

Mechanisms in the *Fair Work Act 2009* (Cth) do not appear to have offered a solution to protracted bargaining in Australia's ports. Recent applications to terminate agreements suggests other remedies to support the bargaining parties in resolving disputes were either lacking or not sufficiently effective.



Draft finding 9.6

Additional or improved mechanisms are needed to help address excessively lengthy bargaining and its costs in container terminals

Bargaining in container terminals is excessively lengthy, creating costs for participants and third parties.

Arrangements that explicitly target protracted bargaining, with appropriate weight given to duration, would more clearly signal the intent to address this issue and give parties and the Fair Work Commission greater flexibility to do so.



Draft recommendation 9.2

Improving bargaining practices in the ports

The Australian Government should amend the *Fair Work Act 2009* (Cth) to create a mandatory requirement for Fair Work Commission (FWC) intervention when certain thresholds in bargaining activity in the ports are reached (these could include time limits and/or thresholds linked to the number or scale of protected industrial actions).

The interventions should scale from FWC conciliation as a first step, to termination of bargaining and arbitration by the FWC for lengthy and intractable disputes.



Information request 9.9

The Commission invites feedback on draft recommendation 9.2, including options to supplement or enhance the effectiveness of the proposed reforms in addressing protracted bargaining. Feedback is also sought on the best approach to implementation, in particular:

- whether mechanisms to address protracted bargaining should apply only to some subsectors within the ports, such as container terminal operations
- the design of the thresholds
- any technical or legal issues.



Draft finding 9.7

Extensive protected industrial action in the ports during recent bargaining caused disruption and impacted productivity in container terminals

Disruption and, to some extent, reduced productivity are an expected consequence for bargaining parties of protected industrial action. But high levels of protected industrial action in the ports over an extended period during the recent bargaining round translated into markedly lower productivity at affected container terminal operators.



Draft finding 9.8

Protected industrial action in the ports caused substantial disruption and economic costs to third parties in the supply chain

The integration of container terminal operators in the supply chain means that protected industrial action in the ports has an outsized impact on importers, exporters and other third parties. The extent and seriousness of protected industrial action seen during recent bargaining in the ports resulted in substantial economic harm to these third parties.



Information request 9.10

Is the current level of penalties providing effective deterrence of unlawful or unprotected industrial action in the ports? If not, what level of penalties would achieve this outcome?



Information request 9.11

Part IV, division 2 of the Competition and Consumer Act 2010 (Cth) prohibits secondary boycotts, other than in prescribed circumstances. Are changes needed to these provisions, or supporting compliance and enforcement activities, to ensure secondary boycott conduct is appropriately regulated in the ports?



Draft recommendation 9.3

Add options for protected industrial action by employers to the Fair Work Act

The Australian Government should amend the *Fair Work Act 2009* (Cth) to allow employers to engage in more graduated forms of protected industrial action in response to employee industrial action. Forms of employer response action that should be permitted could include:

- instituting limits or bans on overtime (analogous to employee overtime bans)
- directing employees to only perform a particular subset of their normal work functions and adjusting their wages accordingly (analogous to employee partial work bans)
- reducing hours of work (analogous to employee work stoppages).

Employers should also be able to choose to either deduct wages or continue to pay employees for protected industrial action which lasts for less than 15 minutes.

Where an employer restricts employees' work duties or hours of work, employees should be permitted in response to refuse to perform any work (as is currently the case for employers with respect to employee partial work bans).

Graduated forms of protected industrial action by an employer would still count as employer response action and be subject to employee response action and potential suspension or termination by the Fair Work Commission.



Information request 9.12

Would the broader range of employer industrial action in draft recommendation 9.3 be practical for employers to use? Are there other approaches, including forms of employer response action other than those cited in draft recommendation 9.3 that should be considered?

**Draft recommendation 9.4****Increase disincentives for employees to notify and then abort protected industrial action**

The Australian Government should amend the *Fair Work Act 2009* (Cth) so that where a group of employees have withdrawn notice of industrial action, employers that have implemented a reasonable contingency plan in response to the notice of industrial action may stand down the relevant employees, without pay, for the duration of the employer's contingency response.

**Information request 9.13**

The Commission invites feedback on draft recommendation 9.4, including on the best approach to implementation and any technical or legal issues and how a reasonable contingency plan should be defined.

**Draft recommendation 9.5****Make it easier for employers in the ports to extend the notice period for protected industrial action**

The Australian Government should amend the *Fair Work Act 2009* (Cth) to lower the threshold for applications to extend the mandatory three-day notice period for protected industrial action to seven days for operators in the ports to enable employers to better prepare for industrial action.

**Information request 9.14**

The Commission invites feedback on draft recommendation 9.5, including on the best approach to implementation and any technical or legal issues and how any lower threshold should be defined.

**Draft recommendation 9.6****Make it possible to suspend or terminate industrial action that could cause 'important or consequential' economic harm**

The Australian Government should amend the *Fair Work Act 2009* (Cth) to clarify that when determining whether to suspend or terminate industrial action under s. 423, s. 424 or s. 426, the Fair Work Commission should interpret the word 'significant' as 'important or of consequence'.



Draft recommendation 9.7

Allow a broader range of third parties to apply to terminate protected industrial action occurring in the ports

The Australian Government should amend the *Fair Work Act 2009* (Cth) to widen the range of third parties who can make applications to suspend or terminate protected industrial action under the Act for operators in the ports, to include entities, for example, with an interest but who may find it difficult to show they are directly affected (such as employer associations, employee organisations or third parties like importers/exporters).



Information request 9.15

The Commission invites feedback on draft recommendation 9.7, including on the best approach to implementation and any technical or legal issues.



Draft recommendation 9.8

Enable protected industrial action to be suspended or terminated when it is causing harm to either party, rather than both

The Australian Government should amend s. 423(2) of the *Fair Work Act 2009* (Cth) such that the Fair Work Commission may suspend or terminate protected industrial action where it is causing, or threatening to cause, significant economic harm to the employer or the employees who will be covered by the agreement, rather than harm to both parties (as is currently the case).



Draft recommendation 9.9

Equip the Fair Work Commission for an extended role in the ports

To enable the Fair Work Commission to perform an enhanced role in supervising bargaining on the ports, it should (supported by amendments to the *Fair Work Act 2009* (Cth) where necessary):

- establish a fast-track process for dealing with applications involving port employers and employees and their representatives
- ensure members with requisite skills, experience and standing are available to deal with cases in the ports fast-track stream
- enable more decision-making by full benches to assist consistency of decision making
- be resourced appropriately to give effect to these draft recommendations.

The Fair Work Act should also be amended to allow input from employers and employee representatives in the selection of Fair Work Commission members dealing with port matters, with the objective of identifying nominees who have the confidence of employers and employees.

**Draft recommendation 9.10****Independent evaluation of changes to improve workplace relations in the ports**

If the draft recommendations in this chapter are introduced, the Australian Government should commission an independent evaluation of the state of workplace relations in Australian ports after five years of operation. The purpose of the evaluation would be to make an evidence-based assessment of productivity and efficiency outcomes following the introduction of the changes proposed to the workplace relations system.

Skills and training raise few productivity concerns

**Draft finding 10.1****Port workers appear to acquire the skills they need**

Inquiry participants have raised very few concerns about the system that delivers skills and training for port workers — the system largely appears to be functioning well.

**Draft finding 10.2****If they arise, skills shortages for seafarers can be solved through immigration and industry-led solutions such as cadetships**

There is no strong evidence of skills shortages in the maritime logistics system.

Skills shortages can, and have been, solved through targeted immigration and industry-led initiatives such as cadetships, without the need for a strategic fleet.

**Information request 10.1**

Are there any skills or labour supply issues in Australia's ports that are not identified in this chapter, and which should be addressed?

**Information request 10.2**

Do employers and employees in the ports receive the outcomes they are seeking from the VET system?



Information request 10.3

What are the costs and benefits of formalising qualifications and licensing for heavy equipment that is unique to ports? Are there health and safety grounds for doing so?



Information request 10.4

What is the mix of accredited, unaccredited and informal training at container terminals?

What are the costs and benefits of that mix?

What costs and benefits would be created by a greater reliance on formal training?

Does credit for recognised prior learning occur and, if so, in what context?



Information request 10.5

How does workplace relations influence training, including the content of training, who provides the training, who is trained and when they are trained in the maritime logistics system?



Information request 10.6

Would greater use of merit-based hiring and promotion in container terminal operations result in greater labour mobility?

Would recognition of prior learning, mutual recognition of occupational licencing and/or use of accredited training need to be expanded if there was a greater reliance on merit-based promotion systems?

Which occupational licences used in the ports are not mutually recognised across all states and territories? What are the costs to businesses and firms from these arrangements?

Is there more labour mobility in bulk and general stevedoring compared to container stevedoring?

Are there more standard qualifications for bulk equipment operators that foster mobility?

**Information request 10.7**

How has automation changed the skill profile of the workforce to date?

How well equipped is the skills system to deliver the skills which will be required in the future?

How well equipped is the licensing system to support the transition to automation?

What are the costs and benefits of using old licensing regimes to govern automated operations?

Australian ports are adopting technology where desirable

**Draft finding 11.1****Technology use at Australia's major container ports is in line with international practice**

There is no 'best' level of automation and ICT adoption for container terminal productivity and Australia's major container terminals have implemented varying degrees of both automation and ICT adoption, in line with internationally comparable ports.

However, automation can lead to a range of benefits including improved safety, reliability and consistency of terminal operations.

**Information request 11.1**

The Commission would appreciate data demonstrating the impact that automation has had on productivity (ideally, in terms of the total time taken for containers to move through each of the key steps from the ship to the hinterland), efficiency, safety and reliability where it has been implemented in Australian container terminals.

**Draft finding 11.2****There is no case for a government-run port community system**

Australia's maritime sector relies on a combination of private ICT systems that facilitate the sharing of documents and allow cargo to flow efficiently through the maritime logistics chain. These systems continue to be developed through the adoption of new technologies that increase their safety and usability. Implementing a government-run port community system would risk simply adding further administrative costs for users in the maritime ICT landscape without corresponding benefits.

The Australian Government should continue to work towards ensuring that its customs and biosecurity systems can seamlessly interface with private port community systems.



Draft finding 11.3

Government should continue to overhaul cargo clearance systems

The Australian Government's cargo and vessel clearance systems are currently convoluted and challenging for stakeholders to use, with repetition in data entry and outdated ICT systems. A government taskforce is working to address these issues. Successful reform will require the elimination of duplicative application processes, adequate resourcing for the departments performing clearances and a stable 'single window' ICT platform that can integrate with privately operated port community systems

Two national shipping concerns



Draft finding 12.1

Coastal shipping regulation impedes competition

There is a strong case for reform to coastal shipping regulation to allow greater competition from foreign vessels on domestic sea routes. This would result in more cost effective shipping services for Australian users. The temporary licence system should be streamlined and general licence holders' ability to contest approval of temporary licences should be limited. Requirements that Australian labour laws apply for licence holders should be retained.



Draft recommendation 12.1

Amend coastal shipping laws to increase competition

The Australian Government should amend coastal shipping laws to:

- streamline the temporary licence system to increase operational flexibility and reduce the administrative burden on licence applicants
- retain, but limit, the ability for Australian vessel operators to contest the granting of licences to foreign vessels
- maintain the current application of the *Fair Work Act 2009* (Cth) in coastal shipping
- review conditions for Australian registration of vessels to encourage increased international competition.



Draft finding 12.2

A strategic fleet requires further evaluation as on present evidence it is not the best remedy for concerns about domestic shipping capacity and training

A privately owned, Australian-registered strategic fleet would have limited ability to mitigate the types of issues that have recently affected Australia's international freight task. As commercial operations, vessels would not be immune to global market pressures. Moreover, owners would need subsidies in order to compete globally on commercial terms and as compensation for the costs and risks associated with having to make their vessels available if requisitioned in times of need.

**Draft finding 12.2**

A strategic fleet requires further evaluation as on present evidence it is not the best remedy for concerns about domestic shipping capacity and training

Capacity could be acquired as needed from the international market without the costs involved in supporting a strategic fleet. The shipping charter market provides access to a wide variety of vessels that could be used to address specialist case-by-case needs. And the Australian Government could access international resources — including the charter market — in times of natural disaster and emergencies.

Furthermore, Australian-flagged vessels are not a prerequisite to meeting maritime skill requirements. Cadetships and skilled migration appear to be working well in meeting needs for blue-water experience.

1. About this inquiry

In December 2021, the Australian Government asked the Productivity Commission to examine the long-term factors affecting the productivity, efficiency and dependability of Australia's maritime logistics system and to identify mechanisms to address issues raised through this work. This report summarises the Commission's draft advice against its terms of reference (summarised in section 1.2).

1.1 Context for the inquiry

Australia's maritime freight task is significant and growing

International trade underpins Australia's economy. In 2020-21, imported goods represented about 16 per cent of GDP, while exported goods represented about 20 per cent (ABS 2022c, 2022a). Other key statistics that give an idea of the scale of Australia's maritime logistics system are stated in box 1.1 below.

Box 1.1 – Key maritime trade facts

To illustrate the amount of maritime freight shipped to, from and around Australia, in 2018-19:

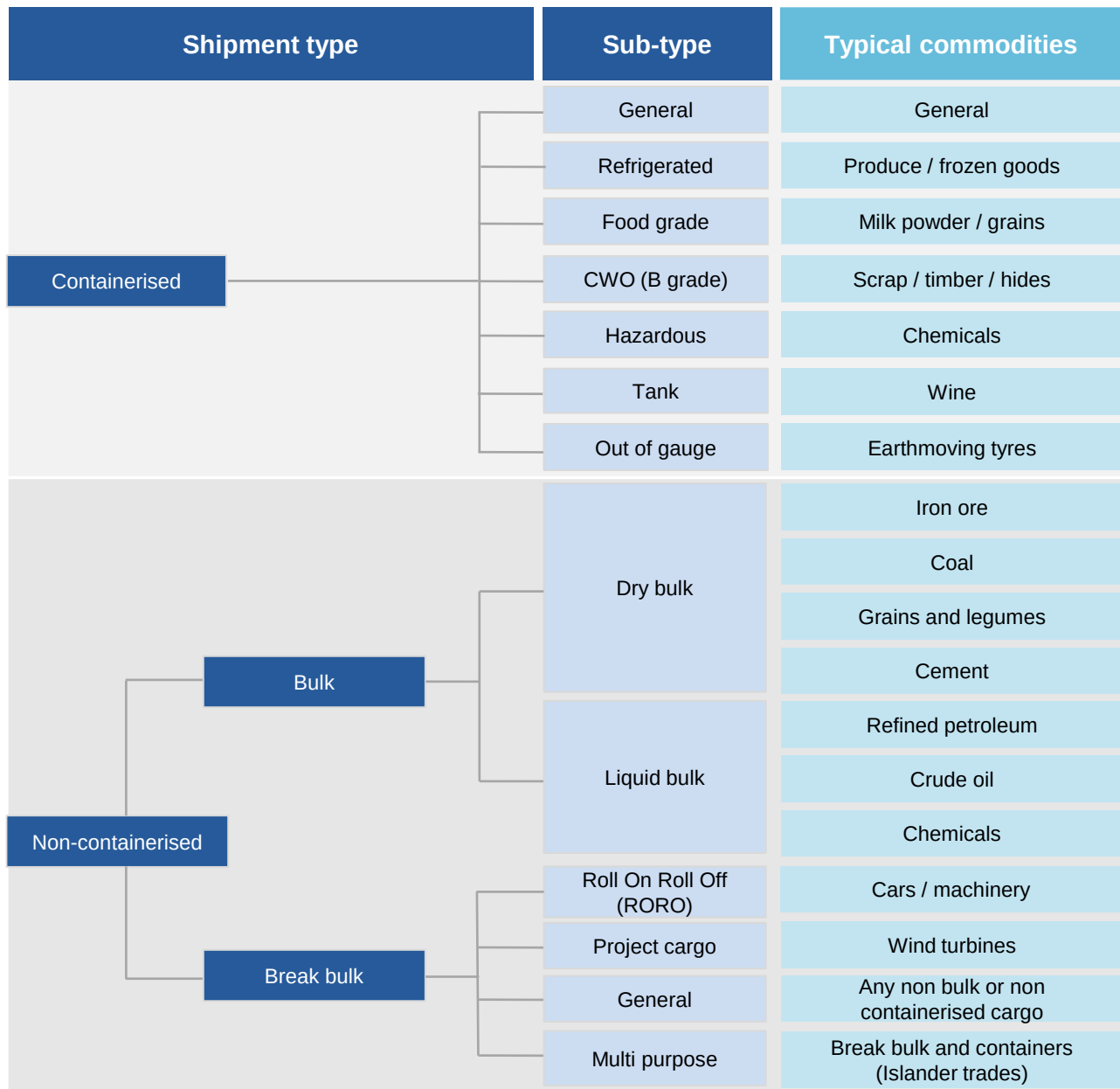
- 99 per cent of cargo by volume (1.7 billion tonnes) was moved by sea (BITRE 2021b, p. ii), compared with just 1.1 million tonnes by air (BITRE 2019, p. 8)
- just over 6000 cargo ships made about 34 000 calls to Australia (BITRE 2021b, p. iv)
- ports handled 5.1 million containers (ACCC 2019a, p. 5)
- cargo moved was worth close to \$573 billion (BITRE 2021b, p. ii).

Total freight volumes have grown steadily over the past decade, and this trend is forecast to continue. By 2050 the containerised freight task is forecast to more than triple at the Port of Brisbane, nearly triple at the Port of Melbourne and increase by two and a half times at Port Botany (KPMG 2019, p. 5; Port of Melbourne Operations Pty Ltd 2020, p. 23; Port of Brisbane, sub. 6, p. 4).

There are typically three ways of moving cargo by ship

Maritime freight movements are handled by the maritime logistics system — the services involved in getting goods off ships and into the distribution chain (and vice versa). For imports, the system is bounded by the arrival of a vessel in a port's waters and the point where its cargo is handed over to importers. The same set of activities occur in reverse for exports. The maritime logistics system is illustrated in detail in figure 2.1.

The system handles three broad cargo types — containerised, bulk and break bulk (figure 1.1).

Figure 1.1 – Cargo types handled within the maritime logistics system

Each cargo type involves different goods, types of vessels and port infrastructure, and stevedoring and transport services. Containerised shipping, for example, mostly carries cargos that can be boxed up. Vessels are purpose built with holds divided into 'cells' to keep containers fast. In port, gantry cranes move containers between ships and shore; straddle cranes move them between the dock and trucks and trains. In contrast, imported liquid bulk cargos are shipped in tankers, pumped out of holds into storage tanks and piped or trucked via tanker out of ports.

The volume of freight being moved through ports in Australia is typically dry bulk (about 83 per cent in 2018-19), with liquid bulk and containerised goods making up just under ten and five per cent of trade volume respectively (BITRE 2021b, p. 34). In 2020-21, 897 million tonnes of iron ore (DISER 2022, p. 42) and 171 million tonnes of coal were exported from Australia (DISER 2022, p. 54) which in 2018-19 would have accounted for nearly 60 per cent of total trade volumes.

Some ports handle multiple cargo types; others are more specialised

While about 100 ports are dotted around Australia's coast only 17 are classified as nationally significant, based on ship calls, throughput and international sea trade volumes. Some handle only bulk goods such as Thevenard in South Australia, which is focused on grain exports. Another example is Hay Point in Queensland, which is used primarily for the export of metallurgical coal. The bigger Australian ports tend to handle mixed cargos including containers, dry and liquid bulk. International container shipments move primarily through the five largest ports — Melbourne, Sydney (Botany), Brisbane, Adelaide and Fremantle.

Recent events have put pressure on the system

The COVID-19 pandemic had different impacts on Australian importers and exporters depending on their type of cargo. Cargo owners who were reliant on containerised shipping services faced significant issues. On the demand side, an increase in consumer spending on household goods (for example, desks and computing equipment), and in online shopping, pushed up demand for in-bound services. On the supply side, COVID-19 induced port shutdowns around the world and congestion at ports, along with the loss of air freight capacity on passenger flights, significantly disrupted global container shipping services. The combination of increased demand and disrupted supply led to a substantial increase in the price of container shipping services, disrupted shipping schedules and extended shipping times. At some ports, these broader disruptions were reinforced by protected industrial action during enterprise bargaining that impeded container terminal operations (ACCC 2021a, p. 62) and, in some cases, ships by-passing ports.

Despite these challenges, Australia's ports handled record container volumes over the past 18 months. And additional vessels and new services were added to Australian container trade routes.

In contrast, the pandemic had little reported impact on bulk or break-bulk cargos. These cargos largely avoided the challenges of port congestion and capacity constraints faced by container shipping, in part due to not experiencing the same demand surge as was seen for consumer goods. However, labour shortages have still impacted some parts of bulk export logistics chains (DISER 2022, p. 48).

The effects of the disruptions to container shipping are now easing as people revert to more traditional spending patterns, air freight capacity rebuilds and supply chains adjust to longer-term trends (such as online shopping) that were accelerated by the pandemic. However, the disruptions highlighted a range of performance issues already present in the Australian maritime logistics system, particularly for the movement of containerised freight. These concerns were reinforced with the May 2021 release of a World Bank report that ranked the efficiency of Australia's container ports in the bottom quintile of 351 global ports (The World Bank 2022). Further, a November 2021 report from the Australian Competition and Consumer Commission (ACCC 2021a) highlighted significant performance issues at Australia's container ports while a report by Victoria's Essential Services Commission raised issues of market power at the Port of Melbourne (ESC 2020).

In general, government policy responses in Australia can only play a limited role in alleviating short and medium-term global supply and demand pressures. However, government policy will underpin the readiness of Australia's maritime logistics system to address the challenges of the future.

1.2 The Commission's task

The terms of reference in summary

As part of assessing the long-term factors affecting the productivity, efficiency and dependability of Australia's maritime logistics system, the Australia Government asked the Commission to consider operational cost drivers, and specifically to examine:

- the performance of Australia's ports, including in comparison with ports internationally
- impacts of the maritime logistics system on Australian consumers, business and industries
- workforce issues in the system, covering industrial relations, labour supply and skills
- infrastructure challenges in ports and connected landside supply chains
- technology uptake, innovation and data capture and sharing within the system.

The Commission has also examined the level of competition in the system. Competition, therefore, is an important driver of costs and efficiency. A lack of competitive pressure at any step in the supply chain could see customers paying more for services than would otherwise be the case.

The scope of the inquiry

Containerised trade is the main focus

The vast majority of issues raised by inquiry participants relate to containerised shipping. Consequently, that is where the inquiry has focused, and logistics chains incorporating the five largest ports mentioned above have received most attention. While movements of containerised freight as part of international trade shares road and rail networks with domestic users, broader issues associated with the domestic distribution of freight have not been considered by this inquiry.

1.3 The Commission's approach

Definitions of productivity, efficiency and dependability

The purpose of this inquiry is to provide advice to the Australian Government on ways in which the productivity, efficiency and dependability or resilience of the maritime logistics system can be improved.

- **Productivity** is a measure of how much output of a good or service is produced per unit of input (for example, labour, capital or raw materials). Improvements in productivity come about if output is lifted without a change in the level of inputs or fewer inputs are used to produce an unchanged level of output.
- **Efficiency** has three key dimensions. Productive efficiency occurs when output is produced at the lowest possible cost for a given quantity or quality. At this point, output is as high as it can be given a community's resources. Allocative efficiency occurs when the mix of goods and services produced from a community's resources are those that the community values most highly. And dynamic efficiency means that investment decisions are in line with achieving productive and allocative efficiency over time. Overall economic efficiency is attained when individuals in society maximise their well-being, given the resources available in the economy (PC 2013).
- **Dependability or reliability** goes to how well a system functions when exposed to shocks or adapting to change; that is, to how reliable a system is in delivering against customers' expectations.

Why productivity, efficiency and dependability?

Productivity growth has been one of the primary drivers of increasing living standards for Australians. Put simply, the more goods and services a society can produce with a given set of inputs, the greater will be its material standard of living (PC 2021c).

But just producing more with a given set of inputs will not make Australians as well off as they could be if the outputs could be either produced with a less costly input mix or are not the things that the community values most highly; or if innovation is unnecessarily impeded. For example, constraints on how workers are deployed by a business might mean that the costs of producing a service are higher than needs be. Constraints on competition might mean that businesses produce products that could be better supplied by rivals. And constraints on automation might mean that a company settles on an input mix that is higher cost than needs be. In other words, efficiency also matters.

Moreover, when businesses enter into contracts and plan production accordingly, they do so based on expectations about the future availability and prices of the inputs they will need. If unanticipated disruptions or shocks within input markets mean those expectations are not met, businesses will likely face higher costs and lower profitability than expected. Inevitably, it is the broader community that will face these costs – through price rises, or temporary shortages of supply. A resilient and dependable system can plan for and minimise the costs of disruptions, benefiting both producers and consumers.

What drives productivity, efficiency and dependability?

Many factors contribute to productivity growth including:

- change at a business level — for example, the adoption of new technologies or improvements in management practices and work arrangements
- economic factors that condition business decisions — for example, competition within a market can spur businesses to innovate
- policy and institutional settings — for example, government policies that influence investments in skills and infrastructure.

Efficiency gains are driven by factors that enable resources to flow to their highest value (or highest net benefit) uses. Examples include the: sharing of data to enable participants in a supply chain to better plan their operations; removal of practices that create ‘closed shops’ for workers or cartels for businesses; and development of single window portals that remove duplication in business reporting to government.

Clearly, the decisions of private businesses are central to productivity and efficiency performance. They are key agents in what is produced with an economy’s resources and how. Innovation on their part spurs productivity growth and efficiency improvements.

But governments can also foster productivity growth and efficiency in a host of ways, for example, via: working to ensure government services are provided as efficiently as possible; regulating to promote competitive outcomes (or limit harm where parties hold market power); by labour relations laws which balance employer and employee interests investing in essential infrastructure; and using taxpayer funds only on projects that deliver the highest net benefits to a community.

Dependability is enhanced by factors that place the consequences of uncertainty on the parties that are best able to limit or deal with that uncertainty. Where uncertainty is unavoidable, it can be optimally shared, as we see occur through standard insurance, options and futures contracts. For example:

- requiring suppliers to give advance warning of change (for example, notification of intended price or scheduling changes) to enable customer businesses to factor them into their planning and future contracts

- providing incentives and alternatives to limit excessive disruptions to service provision (for example, by avoiding protracted negotiations around enterprise agreements which create long spells of protected industrial action)
- requiring governments to plan and provision for shocks (for example, ensuring there is a cost-effective back-up option for essential transport services).

Again, the actions of private parties are integral to service dependability, but governments can also play important roles.

Consistent with these drivers of productivity, efficiency and dependability, this report examines:

- what is happening at a business level (focusing on use of new technologies and workplace arrangements)
- the state of competition across the system
- skills and infrastructure needs and constraints.

Structure of the report

The report proper begins with an overview of the maritime logistics system and Australia's trade flows (chapter 2). An assessment of how well Australia's container ports are performing is then presented (chapter 3). The state of competition in the maritime logistics system is then examined, starting with a description of the analytical framework adopted in this work (chapter 4), followed by analysis of market power in port operations (chapter 5) and other parts of the system (chapter 6). Infrastructure needs and constraints in the system are then assessed (chapter 7). The focus then turns to the two key inputs into production, labour and capital, and on innovation. Issues relating to workplace relations, labour supply and skills (chapters 8 through 10), and technology, information and innovation (chapter 11), are canvassed. The report closes with consideration of two specific policy issues — coastal shipping and the pros and cons of a national fleet (chapter 12).

Discussion of ways in which government might contribute to improvements in productivity, efficiency and dependability cuts across the report.

Sources of evidence

In addressing its task, the Commission has drawn on inputs from inquiry participants (section 1.4), published reports and publicly available data. Where necessary, the Commission has purchased data (chapter 3).

1.4 Conduct of the inquiry

Terms of reference for the inquiry were received on 10 December 2021, and a call for submissions was released on 20 December 2021.

The Commission also consulted widely in preparing this draft report, and:

- received 78 submissions and 6 brief comments in response to the call for submissions
- held about 80 meetings with participants including importers and exporters, port operators, container terminal operators, transport companies, peak bodies and government agencies.

Submission authors and meeting attendees are listed in appendix C.

The Commission thanks all participants for their contributions to date. Submissions on this draft report will be sought by **mid-October 2022**.

2. Australia's maritime logistics system

Key points

- * Efficient operation of the maritime logistic system for containers relies on coordinated effort by many different parties.
- * In 2020-21, the Australian maritime logistics system handled over 9.4 million 20-foot equivalent units of containers, of which over 90 per cent represented international trade that moved through ports in five capital cities (Brisbane, Sydney, Melbourne, Adelaide and Fremantle).
- * The past decade has seen ongoing growth in demand for container services, despite the COVID-19 pandemic. International container trade grew by 33 per cent across the five capital city ports over the ten years to 2020-21. Following a dip at the start of the COVID-19 pandemic, volumes rebounded significantly and reached record levels in 2020-21.
- * An increasing share of international freight moves in 40-foot containers. The number of 40-foot containers handled by Australian ports has grown over 50 per cent over the past decade while the use of 20-foot containers has declined in recent years.
- * Full import containers have grown faster than full export containers over the last ten years, with an accompanying increase in empty export containers.
- * Australia is served by twenty-one container shipping lines operating around fifty regularly scheduled liner services. Around 60 per cent of these services provide an estimated 90 per cent of container shipping capacity in the Australian market using vessels ranging in capacity from 2500 to 9 500 20-foot equivalent units.
- * Mergers between global shipping lines and restructuring of networks with larger vessels entering service has led to consolidation of liner services but increased capacity and global connectivity.
- * Shipping lines have the option of either buying or chartering their vessels. About 50 per cent of the global container shipping fleet is chartered.

This chapter overviews Australia's maritime logistics system (section 2.1), reviews trade flows (section 2.2) and describes key system actors (section 2.3).

Reflecting the scope of the inquiry (chapter 1), discussion relates primarily to the containerised segment of Australia's freight task.

2.1 What is the maritime logistics system?

The maritime logistics system is one part of the longer logistics chains that link producers and consumers of goods (chapter 1). It is bounded by the point where a vessel enters or departs from Australian territorial waters and the point where its cargo is transferred to or from the domestic logistics system.

Cargo progresses through three principal fields of activity while in the system — vessel (marineside), port and terminal (quayside), and landside related operations (figure 2.1). Import and export cargo flows mirror each other, with the notable exception of border control practices.

A range of parties provide services within the system (figure 2.2). Some are engaged to handle cargo. Focusing on imports for brevity, shipping lines carry containers on Australian trade routes and stevedores at container terminal operators unload vessels. Containers are transferred to landside transport operators (road or rail) who move them to their final destinations or to warehouses for unpacking and cargo distribution. Several other parties are also integral to service provision but do not directly handle cargo. For example, when vessels arrive in port waters, they are boarded by pilots who steer them through local shipping channels towards berths. Tugs move them into position and linesmen secure them to wharves. Once cargo has been unpacked by the cargo owner, empty containers are stored in empty container parks.

Underpinning these services is a range of industry and government institutions and frameworks which govern how the parties interact and the industry is regulated. These institutions and frameworks can have a material effect on logistics services — for example, workplace relations institutions appear to have had an impact on the design of terminal work practices independent of supply chain demands (chapter 7).

Demand for the services provided by parties is driven by the decisions of an estimated 200 000 cargo owners. These decisions are enacted through a chain of contracts and standard international trade agreements that lay out commitments between cargo buyers and sellers and transportation providers (box 2.1).

Negotiating and documenting these commitments requires specialist expertise. Many cargo owners therefore employ freight forwarders and customs agents to act on their behalf. These agents can also deliver economies of scale by acting for multiple cargo owners. Contractual arrangements between cargo owners and service suppliers, particularly for containerised cargo, are typically of 12 months to 3 years in duration, but there remains a significant 'spot market' for services as importers and exporters respond to variations in consumer demand.

In contrast with some other parts of the economy, there are relatively few examples of firms in the container segment of the maritime logistics system providing services across multiple parts of the supply chain (or vertical integration). For example, shipping lines do not own container terminal operators in Australia (as they do in other countries). There is some integration with empty container parks, with some shipping companies and landside transport companies owning their own facilities, alongside independent empty container parks operators. The many interfaces between parties in the system create significant scope for friction and potential inefficiency.

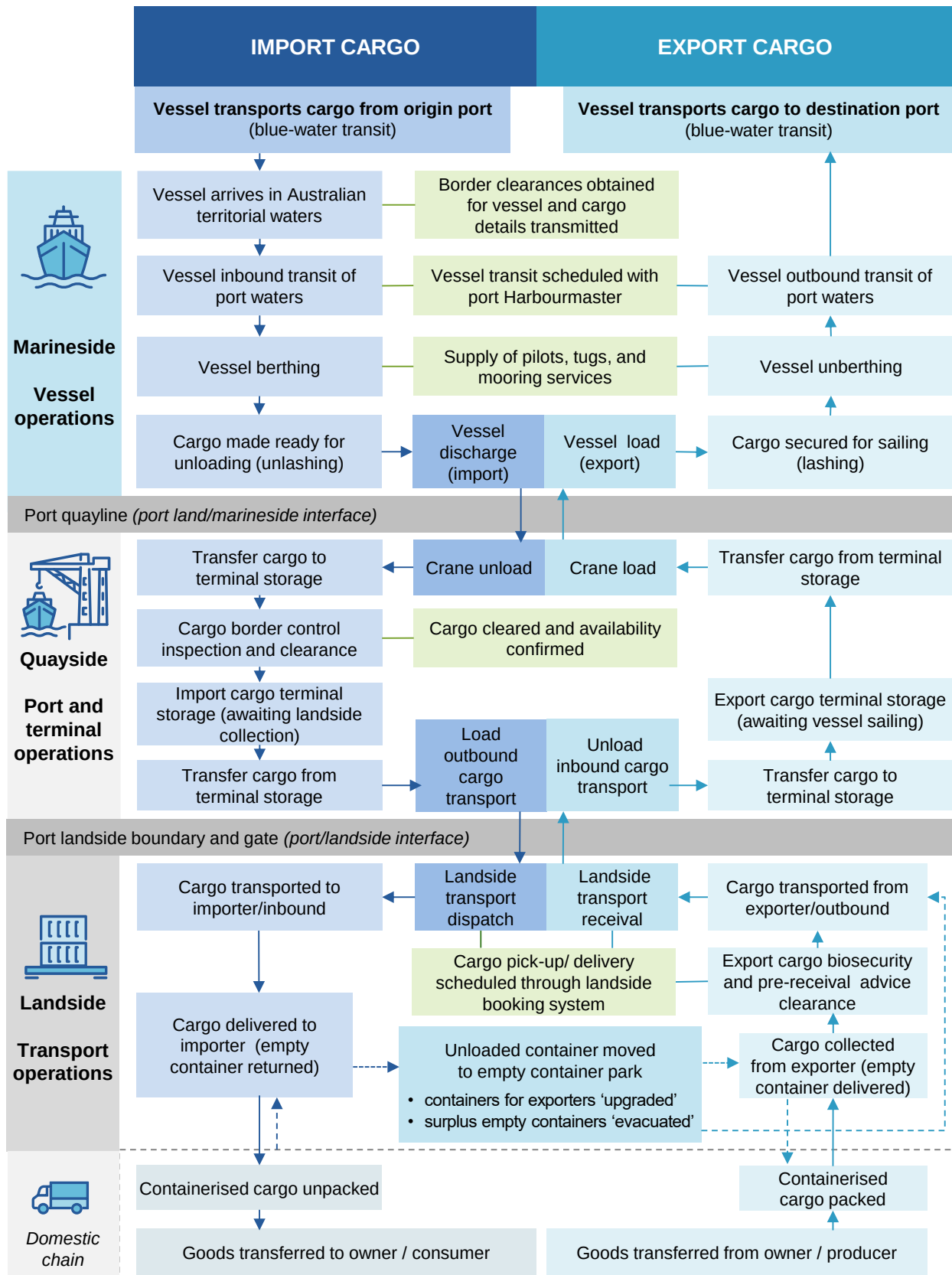
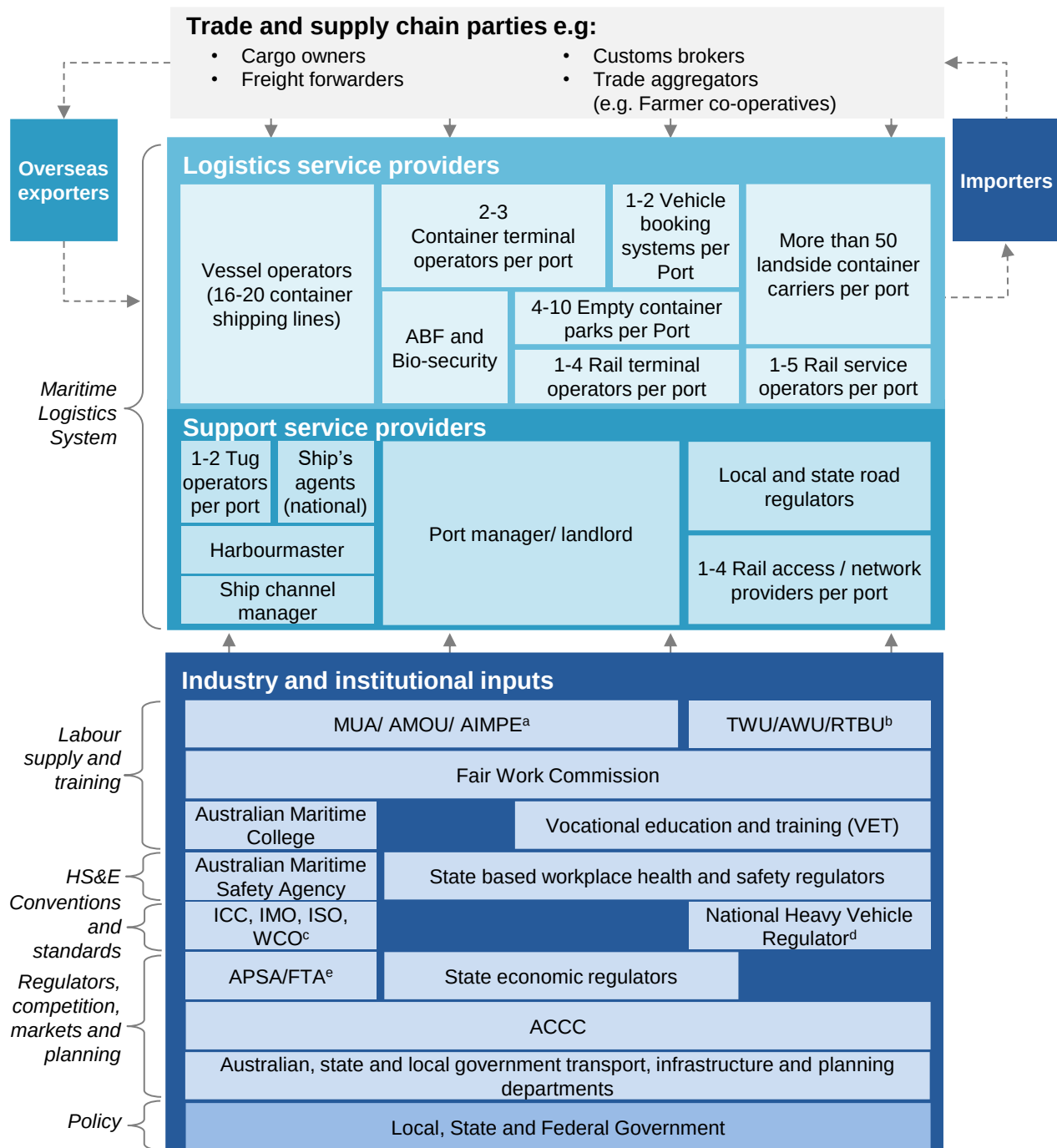
Figure 2.1 – The chain links imports and export across three fields of operations

Figure 2.2 – The maritime logistics system responds to supply chain demands and governance settings^{a,b,c,d,e}



a. Principal maritime unions – Maritime Union of Australia (MUA), Australian Maritime Officers Union (AMOU), Australian Institute of Marine and Power Engineers (AIMPE). **b.** Principal transport and warehousing unions – Transport Workers Union (TWU), Australian Workers Union (AWU), Rail, Tram and Bus Union (RTBU). **c.** International governance and standards bodies – International Chamber of Commerce (ICC), International Standards Organisation (ISO), International Maritime Organization (IMO), World Customs Organisation (WCO). **d.** Road vehicle regulation - encompassing licencing, compliance and performance based standards for heavy vehicles. **e.** Principal cargo owner representative – Australian Peak Shippers Association (APSA), Freight and Trade Alliance (FTA).

Box 2.1 – Contract arrangements for international trade

Key contracts and documents required to effect trade between buyers and sellers who are shipping goods internationally include:

- a commercial agreement between the importer and exporter including price, quantity and description of goods, the time frame(s) for delivery and the international commercial terms (INCO terms) for allocation of transportation costs, based on standards set by the International Chamber of Commerce. Examples of INCO terms are Free On Board (FOB) where the exporter pays all charges up to loading on the ship and the importer pays sea freight, customs duties and all import charges (such as wharfage, duties, and inspection), and Cost Insurance and Freight (CIF) where the exporter pays all costs to the port of unloading and the importer pays the remainder
- a Bill of Lading — issued by the shipping line to the exporter on receipt of goods onboard the vessel. The Bill of Lading details the date of loading, vessel name, port of loading, unloading port, INCO terms (freight due or freight paid), and the description and quantity of goods. Once issued, the shipping line assumes liability for delivery of goods to the agreed unloading port and triggers the release of payment for the goods to the exporter. At port of unloading, transfer of the Bill of Lading by the shipping line to the importer transfers title to the importer. The Bill of Lading therefore serves as a document of title, a contract of carriage, and a receipt of goods
- a letter of credit — a bank guarantee to ensure payment for goods to the exporter based on receipt of a Bill of Lading issued by the shipping line
- cargo insurance, including coverage for goods in transit
- pre-receival advice documentation — exporters must provide Bill of Lading details and evidence to the shipping line that cargo is approved to be shipped and will be accepted by the destination port before the cargo will be accepted at the terminal or loaded on-board a vessel
- documentation required to meet other jurisdictional trade compliance requirements — particularly customs declarations, bio-security certifications, and other trade and tariff documentation for both the country of origin, destination country and, potentially, for intermediate handling locations.

Logistics providers handling cargo must also provide their own business documentation, such as cargo manifests for each voyage, for customs, biosecurity and insurance purposes.

Service providers make large investments in infrastructure

The system requires large, costly investments in infrastructure. Infrastructure elements include; channels, wharves and quays, roads, rail sidings and utilities, which are largely provided by port authorities; and plant and equipment such as vessels, container cranes and cargo handling equipment provided by transport and logistics businesses. Most of these infrastructure assets are relatively long-lived, with economic lives of fifteen to twenty years for most equipment and an indefinite life for channels and wharves, provided they are regularly maintained.

Investments in new vessels are typically significant; a vessel with capacity for 1800 20-foot equivalent units (TEUs) can cost around US\$30 million, while a vessel with a capacity of 13 000 TEU costs around \$130 million (Alphaliner 2021, p. 8). The ability to travel globally to source customers provides some ability to ensure vessels are effectively utilised. Shipping lines can also manage investment through a combination of owning and chartering vessels (section 2.3).

2.2 Container trade handled by the maritime system?

Development of containers with standard dimensions and capable of carrying a wide range of products (box 2.2) has contributed to steady growth in container trade in recent decades.

Box 2.2 – International shipping containers

Containers are standardised units designed to transport a wide variety of goods between cargo owners' premises safely and securely without any need for any intermediate cargo handling — container logistics service providers have no access to containers' contents during transportation.

International shipping containers must comply with International Standards Organization (ISO) design criteria. ISO containers have a uniform footprint with locking points (castings) at each corner. ISO containers are either 20 foot (6.1 meters) long (described as a 20-foot equivalent unit, or TEU) or 40 foot (12.2 meters) long (2 TEU). They have a standard width of 8 foot (2.4 meters) and standard heights of 8 foot 6 inches (2.6 meters) or 'hi-cube' 9 foot 6 inches (2.9 meters). Twistlocks and lashing bars are connected to the locking points to secure containers onboard container vessels.

Every ISO container has a unique container number registered by the Bureau International des Containers et du Transport Intermodal (BIC). ISO containers must also carry a Container Safety Compliance (CSC) plate to indicate they are approved for maritime service and carriage of goods under customs seal.

Similar design standards have been adopted by road, rail, and container handling equipment (such as cranes, straddle carriers, forklifts and reach stackers), allowing the intermodal transport of containers. However, many containers used for domestic rail and road transport do not comply with all international standards and cannot be used in international shipping.

Most containers are general purpose, designed for the carriage of dry, packaged durable goods. These containers can also be fitted with liners or bladders to carry goods such as plastic pellets or bulk wine. A wide variety of specialised container designs accommodate different commodity demands (for example, refrigerated, open top, flat rack or tank containers).

Containers are also graded for quality based on condition, age and hygiene standard. Food grade is the highest common standard, while containers used for tyres, skins and hides, or scrap metal may be lower grade due to container condition or product 'taint'.

Shipping lines manage their own global inventory of containers to balance the geographic variation in demand from cargo owners. Around half of shipping line containers are leased. Shipping lines do not share containers they control with other lines, as the ability to provide the right empty container at the right time and place for an exporter is used as a competitive advantage. The shipping line will hire its container to the cargo owner who has a set number of days to pack and unpack the container before it must be returned to the shipping line.

Empty containers are de-hired at empty container parks operated on behalf of shipping lines, where they can be stored until they are needed by exporters or shipped back overseas. The empty container park may also provide container maintenance, inspection and upgrade services for container re-use for exports.

Construction of new containers has focused increasingly on 40-foot dry hi-cube containers (Drewry 2018). It is estimated there were over 40 million TEU of ISO containers in global circulation in 2020 (Drewry 2020, p. 2).

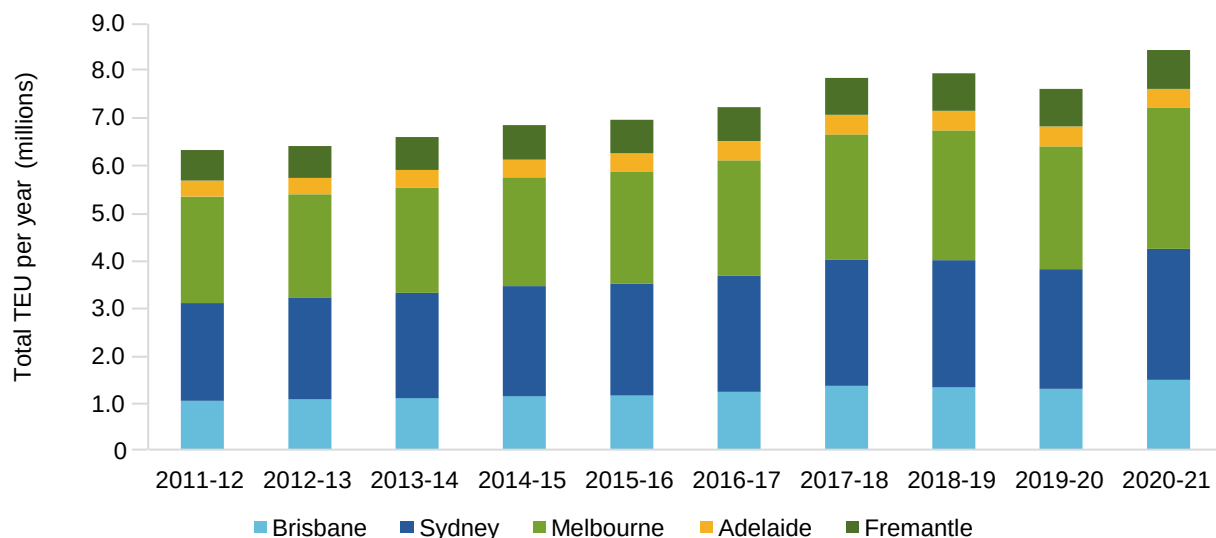
Containers have come to dominate international trade in consumer goods, as well as being a vital means of moving some raw materials and processed goods through global manufacturing processes.

In 2020, maritime trade carried an estimated 149 million full TEUs equating to approximately \$8.1 trillion in containerised cargo (Notteboom, Pallis and Rodrigue 2022a).

In 2020-21, the Australian maritime logistics system handled over 9.4 million TEUs, most of which (92 per cent) moved through ports in five cities (Brisbane, Sydney, Melbourne, Adelaide and Fremantle). Other Australian ports with material levels of international container trade are Townsville (around 30 000 TEUs), Bell Bay (around 20 000 TEUs), and Darwin (around 12 000 TEUs), with some regional ports handling smaller quantities. The remaining containerised cargo was associated primarily with the domestic Bass Strait trade discussed further in chapter 12.

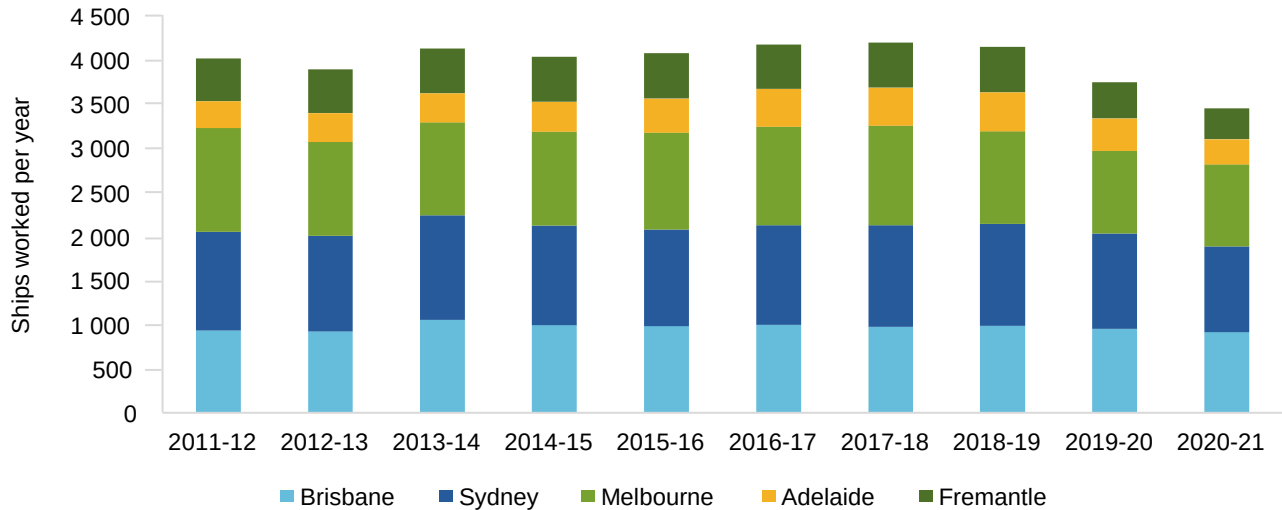
International container trade has grown strongly across the five capital city ports, with volumes increasing by 33 per cent over the ten years to 2020-21 (figure 2.3), although the number of ship calls has decreased over the same period (figure 2.4). As a result, average volume per ship visit has seen a steady increase over the period (figure 2.5). Following a dip driven by the global shut down in trade with the onset of the COVID-19 pandemic in early 2019, total TEU volume have rebounded to record levels in 2020-21.

Figure 2.3 – Container volumes have grown across all five ports
Five capital city ports total 20-foot equivalent units 2011-12 to 2020-21



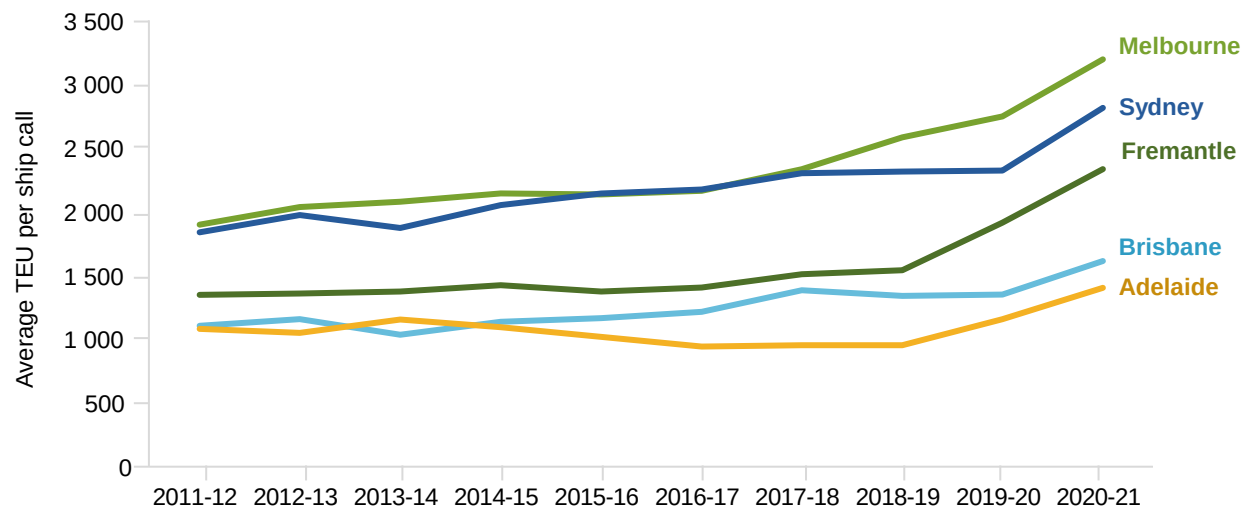
Source: BITRE *Waterline* (various editions).

Figure 2.4 – Container ship calls have declined over the past ten years
Five capital city ports total container terminal vessel calls 2011-12 to 2020-21



Source: BITRE *Waterline* (various editions).

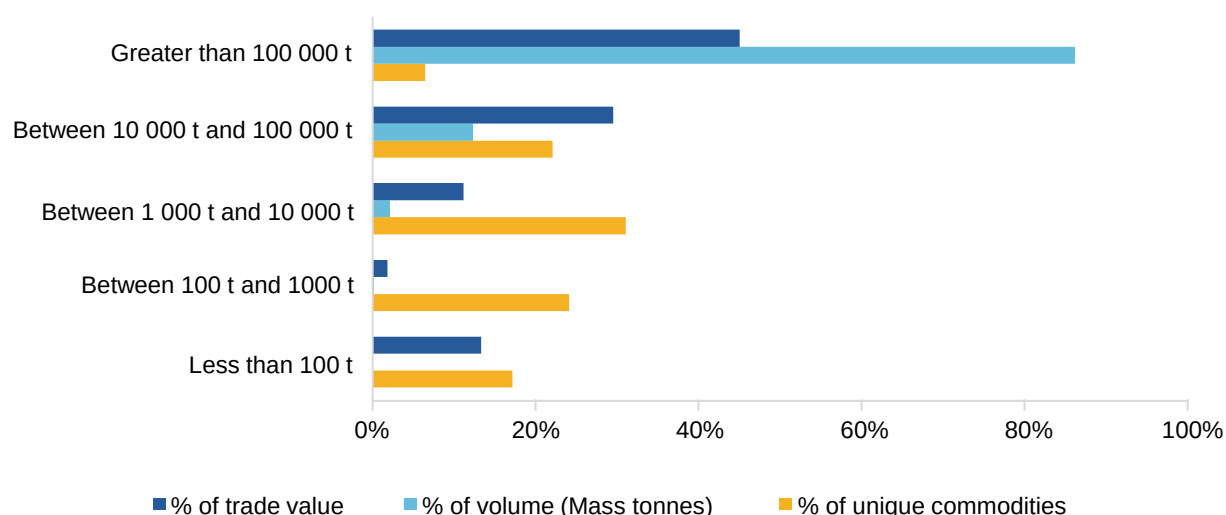
Figure 2.5 – The volume per vessel visit is increasing
Five capital city ports average 20-foot equivalent units exchanged per vessel call 2011-12 to 2020-21



Source: BITRE *Waterline* (various editions).

The system moves a large variety of commodities — many in relatively low volumes. Australia's cargo flows consist of nearly 3000 uniquely identifiable commodities.¹ Over 40 per cent involve less than 1000 tonnes of cargo per year (the equivalent of less than 70 average container loads) (figure 2.6). Owners of these small cargos rely on services shared with other trade flows across ports, terminals and shipping to support their efficient inventory management and economic cost of services.

Figure 2.6 – A high proportion of imports and exports move in relatively low quantities
Distribution of commodities^a by 2020-21 total mass tonnes (excluding major resource exports^b)



a. Commodities analysed included nearly three thousand individual commodities representing 166 million tonnes (11 per cent) and \$380 million value (68 per cent) of total international trade handled via shipping. **b.** Excluded major resources encompass 30 commodities covering mineral ores, coal, crude oil and natural gas which represent nearly 90 per cent of total mass tonnes and 32 per cent of the value of international trade handled via ship.

Source: ABS (*International Trade in Goods and Services, Australia, June 2021*, unpublished volume data).

Growth in containerised trade is accompanied by other changes

The characteristics of containers handled in Australia has changed as volumes have grown. Full import containers have grown faster than full export containers over the last ten years (making up around 48 per cent of total TEUs in 2020-21), with an accompanying increase in empty exports (figure 2.7)². The size of containers has also changed, with the number of 40-foot containers handled growing over 50 per cent over the past decade, while the use of 20-foot containers has declined in recent years (figure 2.8).

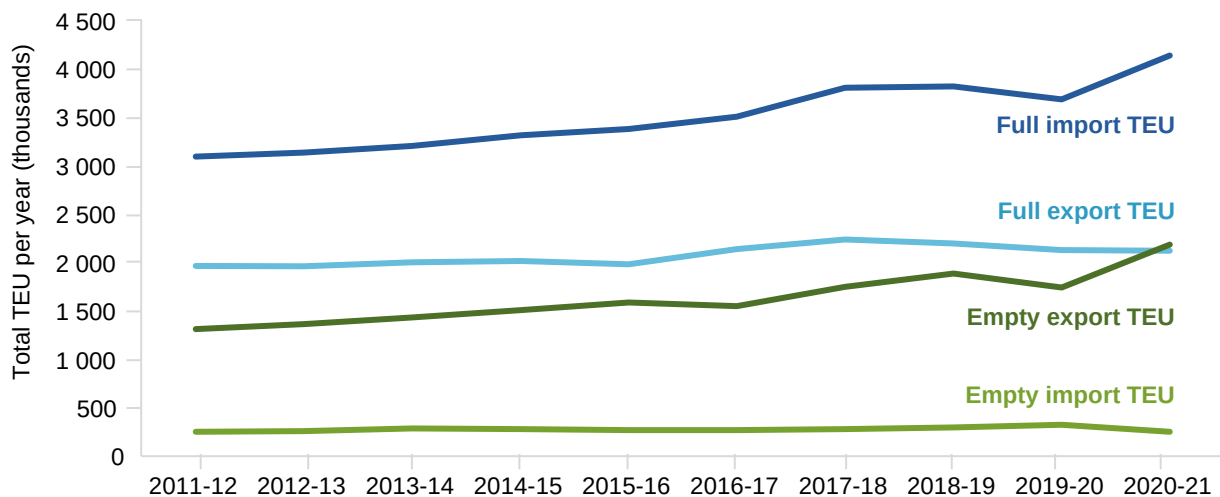
Seasonal cycles in demand mean maritime system operations and capacity is configured to cope with peaks in volumes. Peak season for container shipping in Australia occurs in September–November as cargo owner inventories are built up prior to Christmas and New Year sales. Low season occurs through January to

¹ Commodities are identified using the Harmonized System (HS) administered by the World Customs Organization for customs purposes, and the Standard International Trade Code (SITC) administered by the UN for global trade statistics. These codes aggregate commodities across a range of individual products e.g., SITC 69410 identifies nails made of steel – which at a product level may be packaged with different brands, pack sizes, quantities etc. Particularly for consumer goods, these commodity groupings can represent potentially thousands of unique variations in 'stock-keeping units', the inventories of which importers and exporter are managing through their supply chains.

² Other movements for 2020-21 were: full exports 24 per cent; empty exports 25 per cent; and empty imports 3 per cent.

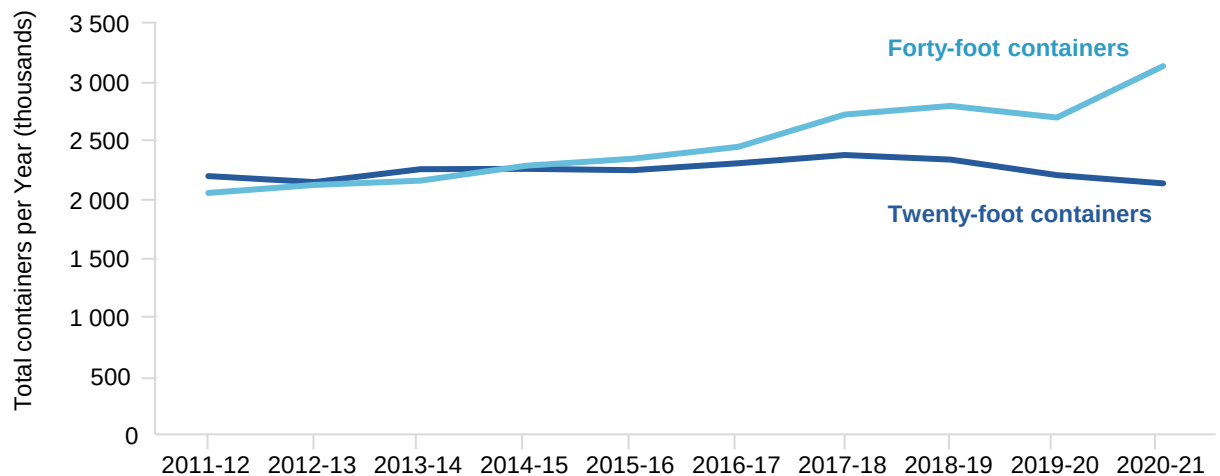
March and is impacted by Chinese New Year which sees a fall in the supply of consumer goods due to holiday factory shutdowns (figure 2.9).

Figure 2.7 – Full import container volume is leading overall container growth
Five capital city ports total 20-foot equivalent units 2011-12 to 2020-21



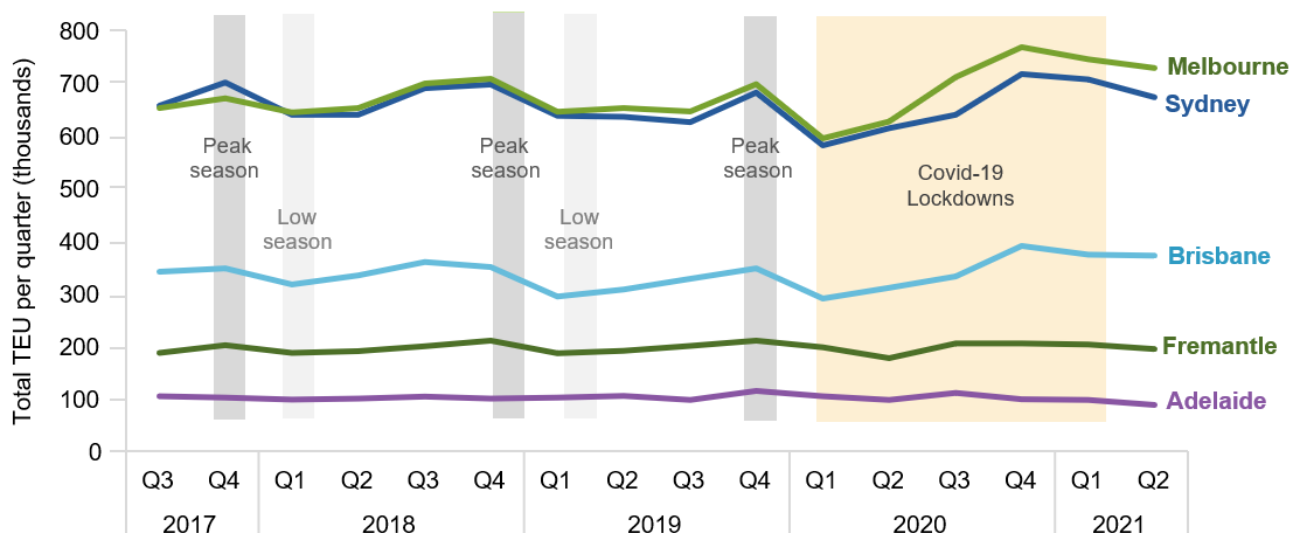
Source: BITRE *Waterline* (various editions).

Figure 2.8 – The use of 40-foot containers is growing faster than 20-foot containers
Five capital city ports total containers 2011-12 to 2020-21



Source: BITRE *Waterline* (various editions).

Figure 2.9 – Seasonality requires capacity be incorporated for peak volumes
Five capital city ports total 20-foot equivalent units by quarter 2017-18 to 2020-21



Source: BITRE *Waterline* (various editions).

The changes in container trade characteristics and the rebound in trade as COVID-19 pandemic related pressures abated have impacted the handling of empty containers. Over a normal cycle, 'low season' has provided an opportunity for shipping lines to evacuate empty containers built-up over the peak importing period. However, the COVID related shutdowns following the 2019 peak season and sharp rebound in imports from early 2020 meant excess vessel capacity normally used to evacuate empty containers was not available.

2.3 What are the main parts of the system?

Ports

Ports reflect geography, history, and economic activity

Natural locations for ports are comparatively rare as ports require a confluence of deep-water access and safe harbours for shipping, as well as adjacent land suitable for cargo handling and connectivity to landside transport networks.

Most of Australia's long-established ports, including the coastal capital city ports and the Port of Newcastle, were established along river estuaries where the natural geographic conditions were readily met without the need for major investments in port infrastructures such as deep channels or extensive sea walls to provide a protective harbour. The connectivity to sea transport at these locations made them natural sites for early settlement. Capital city ports have subsequently found themselves close to city centres. Ongoing economic development has created clusters of supporting maritime service industries around the ports, and connectivity provided by landside networks radiating from the capital cities have allowed these ports to efficiently access progressively larger hinterlands.³ This has allowed the capital city ports to develop significant trade catchments for a wide variety of goods.

³ The port hinterland is the geographic catchment area where the port has a dominant lowest transportation cost and/or best service level advantage for moving cargo between inland locations and the port.

Growth in trade volume and engineering developments allowing increased size and scale of equipment (including the use of larger vessels), as well as development pressures for alternative uses of inner-city port land, have seen capital city port operations migrate 'downstream' from the original established port areas, particularly following the advent of containerisation. Container port facilities were developed in Melbourne (Swanson Dock) in 1969, Port Adelaide Outer Harbour in 1972 and Sydney (Port Botany) in 1979 following the initial handling of containers at Darling Harbour. The Port of Brisbane has been progressively relocated from the riverside Brisbane suburb of Hamilton to reclaimed land at Fisherman's Island since 1977, with its first container terminals opening in 1981 and its third in 2014. Remaining container operations in Sydney harbour ceased in 2007 while break-bulk operations were relocated to Port Kembla the same year. Australia's most recent container terminal was opened at Webb Dock on the mouth of the Yarra River in Melbourne in 2017. The Port of Fremantle is currently investigating potential alternative port sites to facilitate port growth while the Future of Fremantle Project is looking at potential redevelopment of the existing port inner harbour area (Department of Planning, Lands and Heritage 2022).

Most port relocations were undertaken on an incremental, staged basis, due not only to the challenges of finding suitable new sites, but also to the difficulty faced with transplanting the agglomeration of activities around the existing port and the benefits they embed in the existing port logistic system locations for containers. Resistance to wholesale relocation of port activity from the capital cities also encompasses the various import focused bulk and break-bulk commodities (including roll-on, roll-off vehicle trades⁴).

Container liner services

Container lines provide standardised access to global networks

Containerised cargo is handled almost exclusively by container liner shipping companies. These companies operate services for the transport of goods, provide ISO containers to importers and exporters and usually operate fleets of container vessels⁵. Many of the larger global operators also have interests in container terminal operations and landside logistics (although, as noted above, this is less common in Australia).

The shipping lines provide common carriers⁶ liner services (box 2.3). Most services run to fixed schedules so cargo owners can plan and book space to transport their goods. Shipments from multiple cargo owners are then carried on each voyage. Each liner service may use several vessels, which call at ports at a regular frequency — fixed day, weekly calls are most common. The number of vessels required to support each liner service depends on the time to complete a 'round trip' visiting each of the ports on the service schedule.⁷

⁴ The Federal Chamber of Automotive Industries noted relocation of automotive and general terminals from Glebe Island in Sydney to Port Kembla at the end of 2007 was of considerable concern in regard to its impact on costs and landside transport capability (FCAI 2005). Patrick as a terminal operator at Darling Harbour and Glebe Island also note the need to manage the transition in a way that was contingent with maintaining commercially viable volumes as part of the transition and relocation (Patrick Terminals 2003, pp. 11–13).

⁵ Some firms operate as Non-Vessel Operating Common Carriers and hire transport capacity from other shipping lines.

⁶ Shipping services are considered 'common carriers' if they promote 'fee-for-service' ocean transportation to cargo owners (usually through the advanced publication of sailing schedules to predefined ports), do not refuse to carry cargo (unless on reasonable grounds), and assume responsibility for the cargo through issuing a Bill of Lading. This distinguishes them from 'contract carriers' who provide services to cargo owners privately and exclusively. Common carriers are subject to varying legal definitions under different regulatory regimes (Britannica nd; FMC nd).

⁷ For example, a 42 day roundtrip providing weekly service at each port will require six ships (42 days per vessel roundtrip divided by seven days per week equals six ships).

Box 2.3 – Container line service terminology

Liner service — regularly scheduled, common -carrier container shipping service provided by a container shipping line. Liner services are usually named by the shipping company, for example, ANL's liner service between Australia and Singapore is called the Australia Asia Express (AAX). Different liner shipping companies may use different names for the same service, for example, Maersk, a partner on the above ANL service, refers to it as the Komodo/Cobra service.

Container trade lane (or 'trade') — the geographic origin/destination regions which liner services connect, for example, China–Europe or Australia–Singapore. Multiple competing liner services may operate within a trade. Trades may serve intermediate regions while travelling between the origin and destination ports.

Port rotation — the liner service schedule between ports and the order in which they are visited in each round-trip, for example ANL's AAX1 service rotation is Singapore–Port Klang–Tanjung Pelepas–Brisbane–Sydney–Melbourne–Adelaide–Fremantle–Singapore. The port rotation dictates the transit time for cargo between ports. If ports are congested or a service delayed a vessel may change rotation or skip ports to return to its planned schedule.

Voyage — a vessel's unique journey between ports in a port rotation. The voyage is identified by a unique voyage number (for example, 206North and 206South) against which the cargo owner can make a booking for carriage of goods. The voyage number will be connected to the name of the vessel making the port call, which will be used in import/export documentation including the Bill of Lading.

Consortia and vessel sharing agreements — agreements between shipping lines for the joint provision of a liner service. These determine port calls and schedules (built around cargo owner demand, sailing times and availability of berths at port container terminals), and set out rules for sharing of resources — primarily capacity allocation and the number of vessels contributed by each partner to the service. Agreements between shipping lines are discussed further in chapter 6.

The standardisation of container equipment and regular schedules makes it commercially viable to transfer cargo between liner services by transshipment of containers, meaning shipping companies can provide access to a global network of ports through connections at key hub ports such as Singapore.⁸

Charter agreements provide flexible capacity

Shipping lines have the option of either buying or chartering their vessels. About 50 per cent of the global container fleets is chartered, although some lines have a much higher proportion of chartering (Alphaliner 2022)⁹. Shipping lines can access the charter market as a means of flexing their capacity over time, and continually turnover charter vessels to try and balance overall fleet ownership costs with market demand for shipping services.

There are global charter markets for almost all types of trading vessels. Terms vary from bareboat charter (hull only, requiring operator fit out), to fully equipped charters including crew. Charters can vary in length

⁸ The port of Singapore is the second largest port in the world, handling over 36.8 million TEU of containers in 2020, and is the world largest transshipment hub (Lloyd's List 2021, p. 26).

⁹ Operation as a 'shipping line' does not require ownership of the vessel or containers (both of which can be leased) but does require compliance with all regulatory requirements and assumption of risks and liabilities associated with the carriage of international sea cargo.

from a single trip to a period of years. There appear to be few constraints to accessing vessels through charter agreements, and shipping service operators and even cargo owners can utilise professional third-party ship brokers or agents to charter vessels and crews on their behalf.

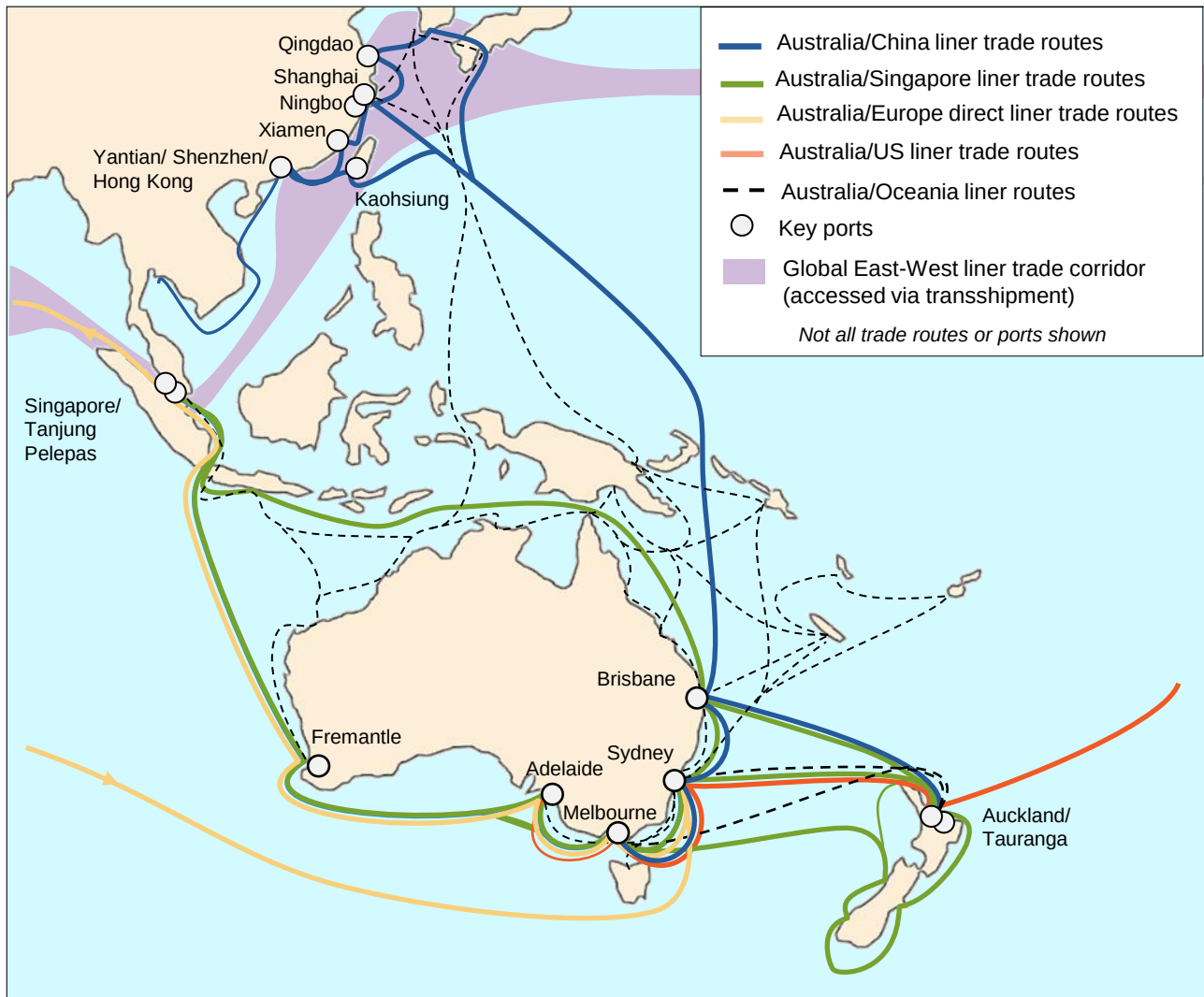
Charter market pricing is, however, highly responsive to changes in global supply and demand for vessel capacity which can lead to rapid changes in chartering rates — choosing when to strike a deal to hire a ship can be critical to an operator's cost base.

Australia is serviced by several container shipping line trade routes

Australia is served by twenty-one container shipping lines operating around fifty regularly scheduled liner services. Around sixty per cent of these services serve the five principal capital city ports and provide an estimated ninety per cent of container shipping capacity in the Australian market using vessels ranging in capacity from 2500 to 9500 TEU. The remainder of services are mostly connected with trade in the far north of Australia, Papua New Guinea or the Pacific Islands using vessels under 1500 TEU capacity.

The major liner services operating to Australia are focused on two primary trade lanes (figure 2.10). The Australia–China trade provides direct access from Australia's east coast to the China and East Asian markets and is dominated by imported consumer goods. The Australia–Singapore market services a much broader range of import and export markets through transshipment connections in Singapore to southern Asia and Europe. Less services intensive trade lanes also offer direct connections with Europe and North America. There are also numerous services connecting with New Zealand. Most of these services serve the three east coast capital ports at Brisbane, Sydney and Melbourne, while Adelaide and Fremantle are primarily served as part of the Singapore trade lane. There are also several regular shuttles operating between Fremantle and Singapore as this lane is more competitive for sourcing many goods than from the east coast of Australia.

Shipping lines serving Australia include the top global liner shipping companies (table 2.1). Most services are delivered through shipping consortia involving between two to six lines. For example, the largest service between China and Australia is a shipping consortium of ANL(CMA-CGM) and COSCO, while competing services are offered by Maersk/ONE/MSC, Hapag Lloyd/TS Line/Evergreen/Yang Ming/Sinotrans and HMM/Hapag Lloyd/ONE/Evergreen. Consortia of COSCO/PIL, ANL(CMA-CGM)/Maersk/ONE/Hapag Lloyd and COSCO/Hapag Lloyd provide services on Singapore trades. The direct service from Europe is a consortium of CMA-CGM and MSC. MSC, Maersk and ZIM also operate a number of services without partners, while some smaller lines provide independent regional services.

Figure 2.10 – Principal container liner trade routes serving Australia

Source: Compiled from service information from shipping line websites.

Sydney and Melbourne are the largest markets for international trade. While they have similar overall container volumes, Melbourne's full import and export volumes are more balanced (figure 2.11). The level of trade means these two ports are 'must call' destinations for intercontinental liner services. Infrastructure standards and constraints for these two ports therefore tend to dictate requirements at other container ports. This is particularly relevant to discussions about increases in vessel size (chapter 7). There are also vessel restrictions limiting vessel drafts to 12.5 meters through Torres Strait (Torres Pilots 2022) which means larger vessels may not be fully utilised via this route and services may instead travel south via the Great Australian Bight.

Changes in the service patterns and the size of vessels operating services into Australia have seen a reduction in the number of ship visits to the five capital city ports, even as volumes have continued to grow (figure 2.12).

Table 2.1 Top global container lines all serve Australia**Details of major container shipping lines serving Australia, March 2021**

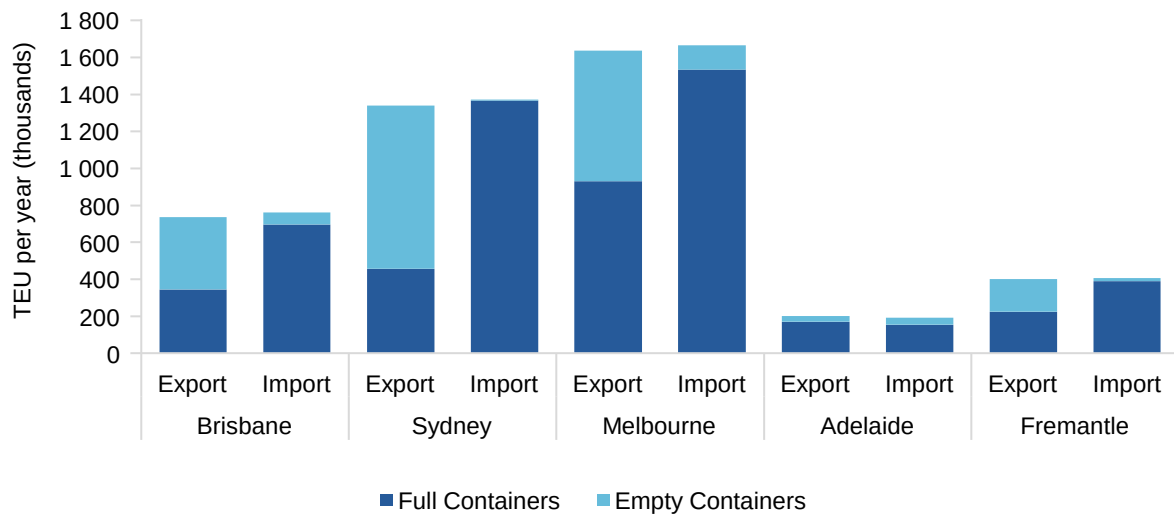
Shipping Company	Liner Service Brands	Global Rank ^a	Number of Ships	% chartered	Total TEU capacity operated	Ships on order (TEU capacity)
Mediterranean Shipping Company	MSC	1	663	51%	4 339 852	82 (1 203 394)
AP Moller Maersk	Maersk Hamburg Süd Safmarine	2	737	54%	4 277 878	29 (319 100)
CMA-CGM Group	CMA-CGM ANL APL	3	578	66%	3 261 052	55 (452 523)
COSCO Group	COSCO OOCL	4	474	63%	2 927 413	34 (586 672)
Hapag Lloyd	Hapag Lloyd	5	247	54%	1 742 598	22 (415 588)
Ocean Network Express	ONE	6	207	56%	1 515 708	24 (326 642)
Evergreen Corporation	Evergreen	7	200	39%	1 504 564	63 (623 228)
Hyundai Merchant Marine	HMM	8	76	54%	820 520	12 (161 088)
Yang Ming Transportation Corp.	YML	9	93	46%	666 164	5 (59 300)
ZIM Integrated Shipping	ZIM	10	127	94%	463 277	46 (393 634)
Pacific International Lines	PIL Mariana Express	12	89	25%	284 370	4 (56 000)
TS Lines	TS Lines	18	53	51%	108 860	25 (78 857)
Sea Lead Shipping	Sealead	22	23	100%	87 180	
China Navigation Company	Swire Shipping	30	25	20%	47 248	
Sinotrans Limited	Sinotrans	31	32	50%	45 642	4 (7 000)
BAL Container Line	BAL	43	8	75%	25 070	
Marfret	Marfret	83	7	14%	7 728	

a. Ranking based on total TEUs operated.

Source: Alphaliner (2022).

Figure 2.11 – Import/export full containers are more balanced in Melbourne and Adelaide

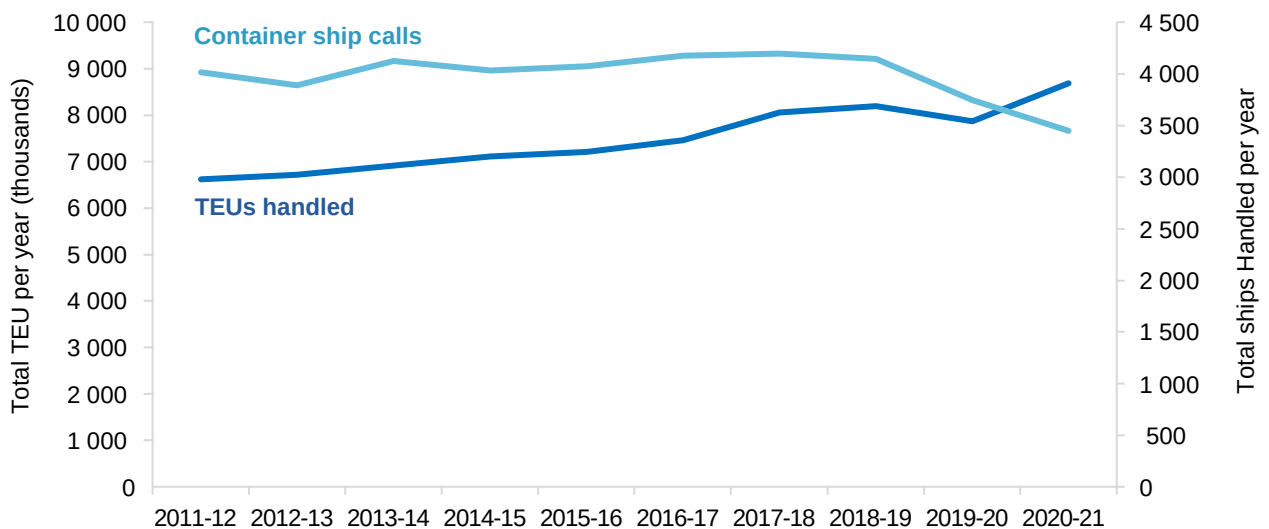
Total 20-foot equivalent unit movements for five capital city ports 2020-21



Source: BITRE (2021c).

Figure 2.12 – Volume have been increasing while ship visits have been decreasing

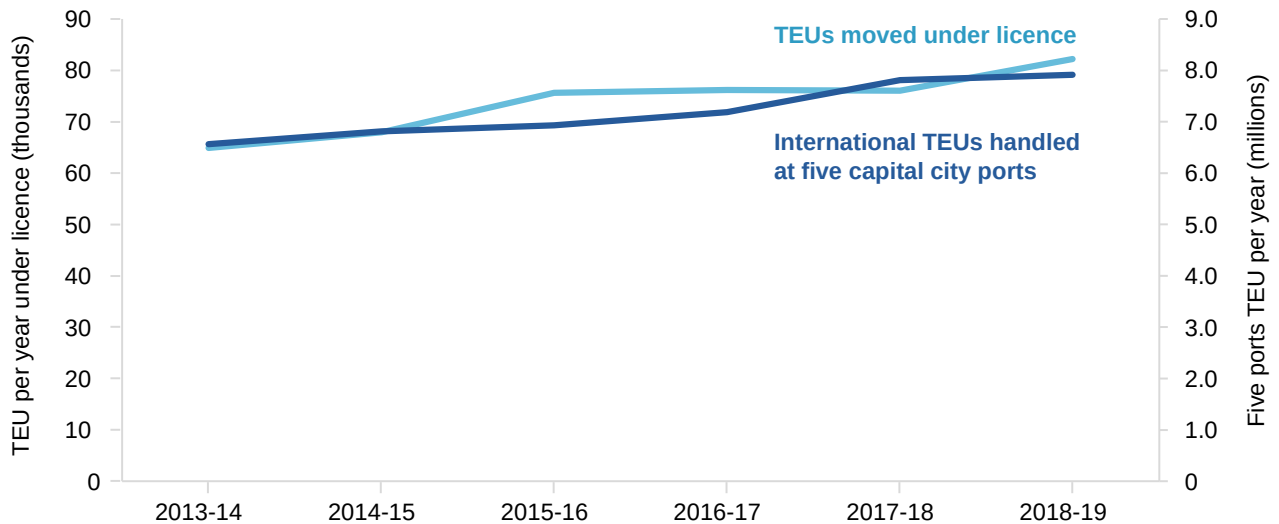
Annual number of 20-foot equivalent units and ship visits for five capital city ports 2011-12 to 2020-21



Source: BITRE *Waterline* (various editions).

Figure 2.13 –Growth in containers moved domestically under licence has reflected international container growth

20-foot equivalent units carried under permit and volumes at the five ports international TEUs 2013-14 to 2018-19



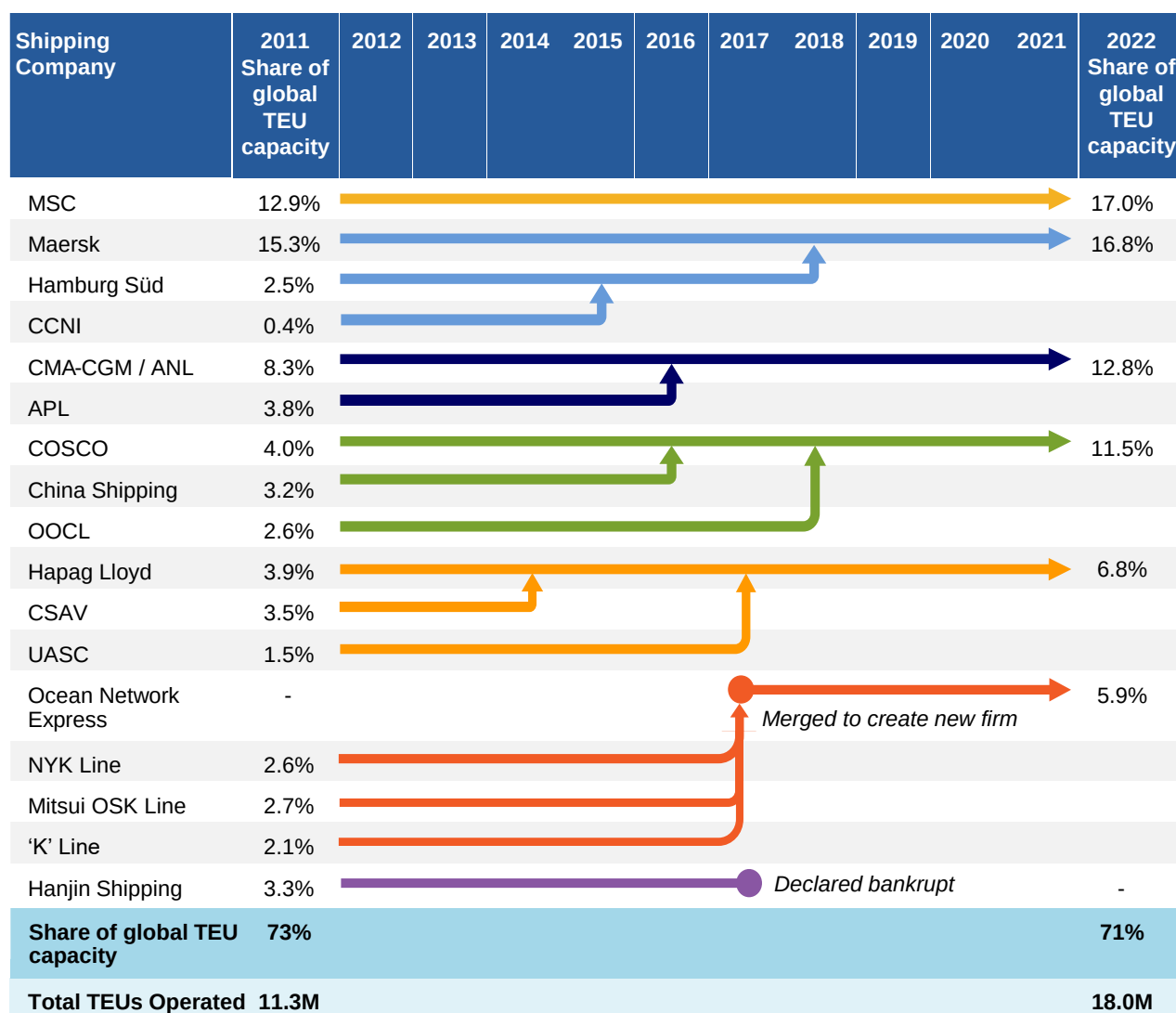
Source: BITRE (2021b; Waterline various editions).

Containerised freight is also carried between the capital city ports on international shipping services under temporary licences for coastal trading. These movements are subject to conditions laid out in the *Coastal Trading (Revitalising Australian Shipping) Act 2012* (Cth). The total volume of TEUs handled under permit has mirrored growth in international containerised trade over the last few years. Movements under licence constitute only one per cent of the total volume handled by the five capital city ports (figure 2.13). More details on coastal trading are discussed in chapter 12.

The large global carriers have been engaged in takeover and merger activity over the past ten years (figure 2.14). Takeover of competitors has enabled the remaining lines to increase their share of global shipping capacity. It has also allowed them to invest in larger, more efficient vessels, with a strong trend towards vessels with 15 000 TEU to 20 000 TEU capacity for global East–West trades. This in turn has allowed vessels in the 7500 to 10 000 TEU range to move to other trade lanes such as those servicing Australia (chapter 7).

Figure 2.14 – Shipping line takeovers and mergers have concentrated global shares of capacity

Major global container shipping line take-overs, mergers and change in capacity share, 2011 to 2022



Source: Alphaliner (2022) and shipping line websites.

While acquisition and merger trends have concentrated control of capacity amongst the top six global operators, they have also increased lines' global network reach, providing cargo owners with the ability to ship goods to more destinations with a single carrier.¹⁰ Outside of these major shipping companies, most of the remaining container shipping lines provide predominately regional networks with little scope for global connectivity under a single bill of lading.

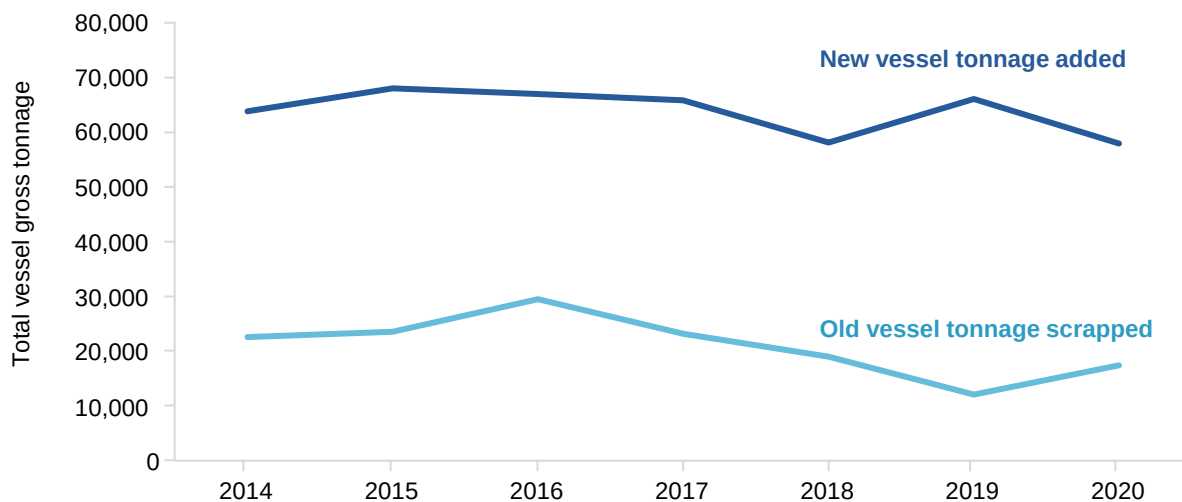
Overall, the capacity of the global shipping fleet has continued to grow over the past five years. The introduction of new shipping capacity exceeded ship demolition and scrapping activity in the years leading up to the COVID-19 pandemic (figure 2.15). Between January and July 2021, 81 new container vessels representing 540 000 TEU were placed in service, while new orders were placed for 322 new vessels

¹⁰ CMA-CGM (2021) claimed its network now reaches 420 of the world's 521 commercial container ports.

representing 2.8 million TEU. Fourteen container vessels (representing 14 000 TEU) were removed from service over the same period (Alphaliner 2021, p. 1).

Recent requirements by the International Maritime Organisation regarding reduced sulphur in exhaust emissions from vessels (known as IMO 2020) (IMO 2020) plus the surge in demand following the COVID-19 pandemic have also driven a major increase in new vessel orders. It is not clear if the pace of this investment may risk a repeat of the issues seen with excess shipping capacity and lack of commercial sustainability that emerged following the 2008-09 global financial crisis, which contributed to the bankruptcy of the then seventh largest global container shipping line, Hanjin Shipping, in 2017 (Notteboom, Pallis and Rodrigue 2022c).

Figure 2.15 – Introduction of new global vessel capacity exceeds retirements
Gross tonnage additions and scrapping for all trading vessel types between 2014 and 2020



Source: UNCTAD (2021c).

Stevedores and container terminal operators

Terminal operators handle containers

Container vessels require specialised cranes to load and unload; liner service schedules require flexible capacity and terminal service consistency to remain commercially sustainable while meeting the demands of cargo owners. This has led to the development of a global network of dedicated container terminals alongside the global liner service network.

Services at these terminals are managed by container terminal operators (CTOs)¹¹ who provide the labour and equipment to handle containers and supply this capacity to the container shipping lines. Shipping lines then incorporate container terminal handling in their overall service offering to cargo owners. Container terminal operators manage the loading and unloading of vessels and the short-term storage of containers awaiting collection by landside transport operators (imports) or accumulating containers for vessel arrivals (exports). The container terminal operators also provide the landside receipt and delivery of containers through their vehicle booking system (VBS), along with other ancillary services such as support for

¹¹ Unlike bulk and general stevedores who manually handle cargo on the port, manual handling of goods in containers is undertaken by the cargo owner, often many kilometres away. Employees at the container terminal operate specialised handling equipment to load and unload vessel without touching the goods.

biosecurity inspections. To efficiently utilise container terminal capacity, resources need to be allocated to ensure import and export containers flow smoothly in each direction between ship and landside in a co-ordinated and timely manner.

Shipping lines contract directly with container terminal operators by securing capacity at the container terminal through negotiations for berth windows. A berth window represents a block of time at which suitable space alongside the quay line, container cranes and operator labour will be made available to load and unload a nominal number of containers¹² for a shipping service; for example, 10:00 Monday — 02:00 Tuesday each week, 1500 containers exchange. Berth windows are managed by the container terminal operators across the week to optimise utilisation of berth space, container cranes and available labour shifts. Allowances are made for variations in volumes and unplanned operational delays. To allow for variability in vessel arriving off-window and volume demands, a target level of berth occupancy of around 65 per cent is desirable (based on the mix of number of berths and competing container terminal operators in Australia's ports). At higher levels of utilisation, container terminals begin to experience congestion and vessels are likely to experience increased waiting times when trying to berth (GHD 2017, p. 19)

Container terminal operators make resources available to start vessel work based on the planned vessel arrival time.¹³ If a vessel does not berth at its allotted arrival time (within a limited tolerance for navigation delays), it is deemed 'off window' and will lose its right to access resources allocated to any 'on-window' services. Berth windows at a container terminal operator can be filled back-to-back across several days with services 'bunching' around certain days of the week. Being off window at these times can mean a considerable delay while a vessel waits for an available break in scheduled activity.

Such delays can impact the subsequent chain of port calls, as they too will be off window, creating a feedback loop of increasing delays until the vessel has no chance of recovering its schedule. Shipping lines can recover some delays through operating vessels at high speed, however if delays are too great this may not be possible. Port call voids (skipping ports), change of rotation and schedule sliding¹⁴ are ways the shipping lines try to avoid these spiralling delays, although these measures cause significant disruption to importers and exporters and may impact the shipping lines' ability to meet its contractual obligations under a bill of lading. At times where there is significant disruption (such as industrial action) and the majority of vessels are off schedule, the berth window system may be abandoned and vessels worked on 'turn of arrival' (prioritised as first come, first served) until normal schedules can be restored.

To manage capacity on the landside of the terminal, container terminal operators in Australia use electronic vehicle booking systems to make 'slots' available for landside transport carriers. A fixed number of slots are available every hour. The number of slots issued can be varied with the level of vessel activity and landside demand, to allow the spread of labour and equipment across terminal activities. However, the container terminal operator does not have control over which carriers apply for any given slot or which container they may request for pick up, and which may bear no relation to the order they are presented on the ship.

Landside transport carriers are engaged by cargo owners to pick up or deliver containers at the container terminal, independent of importer or exporter's agreement with the shipping lines. Carriers apply electronically for each slot they need, inputting the details of the vehicle, driver and container(s) they intend

¹² The number of containers is referred to as the 'proforma exchange' and is an estimate of the average number of combined import and export container lifts for the service. Actual containers handled will vary from week to week.

¹³ In this regard, shift start times can have a significant influence on what berth windows are agreed, to avoid underutilising labour at start of shift where no ship is available.

¹⁴ If delays are significant a vessel can 'slide' from its current berth window into the scheduled berth window for the following week. This may however further delay following vessels in the service.

to drop off or collect, as well as other relevant paperwork. Vehicles at terminals can then pick up and deliver the containers at the allotted time with entry and exit recorded using electronic tags and cameras.

Managers of landside activity at a container terminal must keep an eye on the quantity of containers held in the yard. As carriers request containers based on cargo owner priority, without any reference to the order they may be loaded on a vessel, the yard inventory of containers must be kept at a level where each container can be accessed with minimum obstruction from other containers stacked in the yard. Yard congestion can become a major issue for terminal productivity if containers must be continuously shuffled around to access specific units, consuming limited resources that is needed to work ships or trucks.

Five container terminal operators serve Australia's capital city container trade

The capital city ports of Brisbane, Sydney, Melbourne, Adelaide and Fremantle are served by a combination of the following five container terminal operators:

- **Patrick Terminals** is an Australian based business with terminals in Brisbane, Sydney, Melbourne and Fremantle. The terminals in Brisbane and Sydney use Autostrad technology and are semi-automated. Patrick Terminals is a 50/50 joint venture between Qube and Brookfield Investment Partners that emerged following a takeover of Asciano in 2016 (ACCC 2016a, p. 6)
- **DP World Australia** operates terminals in Brisbane, Sydney, Melbourne and Fremantle, as well as DP World Logistics and AWH warehousing. The Brisbane terminal is semi-automated. DP World Australia is a business unit of DP World, a global container terminal operator based in the United Arab Emirates. DP World was formed in 2006 following Dubai Ports International's takeover of P&O Ports and CSX World Terminals (including Adelaide Container Terminal, which it divested in 2011). DP World operates nearly 80 container terminals across 68 countries, and handled over nearly 80 million TEUs in 2021 (DP World 2022, p. 41; DP World, sub. 49, p. 2)
- **Hutchison Ports Australia (HPA)** operates semi-automated terminals in Brisbane (opened 2013) and Sydney (opened 2014). HPA is owned by Hutchison Port Holdings, a global container terminal operator based in Hong Kong. Hutchison Port Holdings operates 52 ports in 26 countries and handled over 88 million TEUs in 2021 (Hutchison 2022c, p. 6)
- **Victoria International Container Terminal Limited (VICT)** operates Australia's most highly automated terminal at Webb Dock in Melbourne, opened in 2017. VICT is owned by International Container Terminal Services Inc. which is based in the Philippines and operates 34 terminals in 20 countries and handled over 11 million TEUs in 2021 (ICTSI 2021, pp. 6–8)
- **Flinders Adelaide Container Terminal (FACT)** is the only container terminal operator in Adelaide and is owned by Flinders Port Holdings, a consortium of investors that acquired a ninety-nine lease for Port of Adelaide and six regional ports from the South Australian government in 2001. Flinders Port Holdings subsequently acquired FACT from DP World and has also developed warehousing, distribution and logistics businesses to complement its port operations.

Container services at other ports are serviced by local bulk and general stevedoring businesses. Some of these ports maintain container cranes or use mobile harbour cranes for handling containers alongside other cargo.

Other key maritime logistics system elements

International maritime and on water regulations

The key instrument governing international commercial shipping is the United Nations Convention on Law of the Sea 1982 (UNCLOS), which creates the legal framework for all maritime and marine activities. This

enshrines the concept of 'freedom of the seas' to all nations and responsibilities for parties to themselves and each other for on-water activities.

The International Maritime Organization (IMO), an agency of the United Nations, is the peak global body administering global regulations and safety at sea, including the International Convention for the Safety of Life at Sea (SOLAS, 1974), the International Convention for the Prevention of Pollution from Ships (MARPOL, 1997) and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW 2010) among others.

Signatory 'flag states' to UNCLOS operate their own national shipping registers. A 'flagged' vessel is deemed to be an extension of flag state's territory and is subject to its rules and regulations on board the vessel (IMO 2019). There is no restriction on where a vessel must be registered for international trade, but flag states may apply various conditions and incentives around ownership and operations connected to their registries as well as maintaining vessel compliance with international conventions. Of the 5400 container vessels registered globally in 2021, just under half were registered in four states: Panama, Liberia, Hong Kong and Singapore (UNCTAD 2022).¹⁵

The United Nations conventions are given effect under Australian law under the *Navigation Act 2012* (Cth). Vessels may be registered in Australia in accordance with the *Australian Shipping Registration Act 1981* (Cth), subject to meeting national safety and operational certification requirements.

National maritime safety, border control and biosecurity

The Australian Maritime Safety Authority (AMSA) is the lead Australian government statutory body managing marine safety and acts as Australia's representative at the IMO. All merchant vessels engaged in trade and operating in Australian territorial waters are subject to AMSA oversight, with regulatory powers exercised through the issue of Marine Orders. Through these regulations AMSA has the authority to verify vessel certification and safety standards, and under IMO Port State Control agreements may detain a vessel in port for non-compliance until issues are rectified. AMSA is also responsible for recognition of international seafarer qualifications and regulation of marine pollution.

Border control for international maritime trade is managed by the Department of Home Affairs through its agency Australia Border Force (ABF). The agency controls matters relating to immigration (including ships crews), trade tariffs on cargo (including taxes and customs duties), and cargo clearances (including legal restrictions on trade in goods). Australian Border Force operates cargo examination facilities at each of the capital city ports.

The Department of Agriculture, Forestry and Fisheries (DAFF) Biosecurity section works closely with ABF to detect potential biological threats posed by vessels or cargo. DAFF Biosecurity will direct and detain vessels and cargo for treatment of pest infestation. DAFF also provides certification of biosecurity standards for export cargo to ensure it meets destination state standards.

Marine safety, pollution and crew health standards are also administered by individual state port safety, environment and health authorities.

¹⁵ These national registers provide favourable terms for ship registration, which can include tax incentives and flexible crewing conditions, allowing ship owners to competitively position themselves to meet the highly mobile demands for international shipping services.

Regulation of maritime business

International shipping business is subject to specific rules and regulations connected to international conventions. Of note, the *Carriage of Goods at Sea Act 1991* (Cth) recognises the rules and requirements under international convention for transport of goods by sea (the 'Hague-Visby Rules' and their amendments), including the functions of the Bill of Lading, while the *Limitation of Liability for Maritime Claims Act 1989* (Cth) limits compensation payable by ship operators for certain ship sourced damage.

In regard to the provision of shipping services and the operation of vessels, three key pieces of regulation create special conditions for marine transport:

- Part X of the *Competition and Consumer Act 2010* (Cth) provides a mechanism for competing shipping companies to jointly set rates and work together on the provision of liner services, with protection from cartel restrictions. The competition impacts of this are discussed chapter 6
- the *Coastal Trading Act 2012* (Cth) regulates interstate shipping transport and the carriage of domestic freight through the licensing of vessels. The act provides for international vessels to carry domestic cargo ('cabotage') under a prescriptive and time limited temporary licence, or in special circumstances under an emergency licence. A general licence allows unrestricted coastal operation for vessels flagged on the Australian General Shipping Register. Coastal trading is discussed further in chapter 12
- the *Marine Safety (Domestic Commercial Vessel) National Law Act 2012* (Cth) provides the regulatory framework for Australian flagged vessels including evaluation and certification issued by AMSA of minimum safe crewing levels for vessels. Once AMSA has certified a vessel and it has been placed on an Australian register, its owners may be entitled to seek approval for special tax incentives from the Department of Infrastructure, Transport, Regional Development and Communications under the *Shipping Reform (Tax Incentives) Act 2012* (Cth).

Vessels operating in Australian waters may also be subject to other national and state legislation. Of note, the *Fair Work Act (2009)* (Cth) (Fair Work Act) applies to ships either registered on the Australian General Shipping Register, operated or chartered by an Australian employer and using Australia as a base, or are operating in Australian waters and are majority Australian crewed (Fair Work Ombudsman 2021). While most ships engaged in international trading are not covered directly by the Fair Work Act, foreign flagged vessels may be subject to the Act under a general or emergency coastal trading licence or if making more than two coastal voyages in twelve months under a temporary coastal trading licence.

Regional maritime safety regimes and harbourmasters, pilots and tugs

Maritime safety and environmental regulations are also administered through various state maritime authorities under a variety of supporting legislative structures. The primary focus of these bodies is the safe use and protection of state coastal environments and port waters. These include the appointment of harbourmasters and pilots to manage the access standards and safe navigation of vessels within their operational territories. The regulatory roles may be administered by standalone port safety and environment bodies (as in New South Wales and Victoria) or integrated with regional port authorities (as in Queensland, South Australia, Tasmania, and Western Australia).

Navigational safety operations are based on regional zones with large vessels (those greater than 30-50 meters length overall) required to use vessel traffic services systems (VTS) to control transit through confined or port waters. VTS operators are authorised by AMSA. Although VTS systems fulfil common functions around the country, each state has their own VTS platform and there is no contiguous national VTS system.

Maritime workplace safety and labour relations

Labour classifications and certifications of maritime roles on board vessels are based on IMO conventions, including the application of regulation based on the vessel's flag state. In Australia these regulations are overseen onboard all vessels by AMSA.

AMSA also has the responsibility for safety on-board a vessel for all labour (including stevedores and terminal operators). On-shore workplace safety in the ports is subject to the respective state-based workplace safety regulators, including ship's crew working on-shore.

Workplace relations for on shore port operations, vessel registered on the Australian General Shipping Register and other trading vessels at certain time are subject to oversight under the Fair Work Act, primarily by the Fair Work Commission and Fair Work Ombudsman. The operation of workplace laws in the maritime logistics system is discussed in chapter 7.

Labour working in the Australia maritime sector is represented by three key unions:

- the Maritime Union of Australia (MUA), a division of the Construction, Forestry, Mining, Maritime, and Energy Union. The MUA represent ratings on-board vessels and stevedoring and terminal operator labour in the ports, with very strong representation at each of the container terminals at each of the five major capital ports. The MUA was formed through the merger of the Seaman's Union of Australia and the Waterside Workers Federation in 1993. The MUA merged with the Construction, Forestry, Mining and Energy Union in 2018
- the Australian Maritime Officers Union (AMOU) represents skilled professionals on-board vessels including ship's masters, as well as some onshore skilled roles
- the Australian Institute of Marine and Power Engineers (AIMPE) represents skilled engineering officers, principally on-board vessels.

In addition to the three major maritime sector unions, the Australian Workers Union and Transport Workers Union also have presence in some aspects of the maritime logistics system, mainly connected with landside cargo handling and transport around the ports. Occupational unions, for example representing electricians or plumbers, are also represented. The International Transport Workers Federation (ITF) represents seafarers and dock workers globally and has strong links with the MUA¹⁶. It has also been active in promoting the activities of the MUA, such as calling for a global in support of the of reforms to Australia's coastal trading regulation (MUA 2019).

There is a long history of industrial actions and labour disputes between the maritime labour force, stevedoring companies and container terminal operators, with the waterfront dispute between Patrick and the MUA in 1998 seen as a seminal event in workplace relations for the Australian maritime industry. Dock working in particular has a global culture of workplace, with confrontation in Australia and elsewhere stretching back many decades (Turnbull and Sapsford 2001, pp. 240–244). This history and its continuing effect on workplace relations in the industry are discussed in chapter 9.

Economic, competition and planning regulatory regimes

The Australian Competition and Consumer Commission has been directed by the Australian government to monitor prices, costs and profits of container stevedores at international container ports in Brisbane, Sydney, Melbourne, Adelaide and Fremantle and publishes an annual report on the activities of the container terminal operators. The Australian Competition and Consumer Commission may also investigate the conduct of

¹⁶ The national secretary of the MUA since 2000 has also been serving as the president of the International Transport Workers Federation since 2010 (ITF 2022).

maritime businesses as part of its broader regulatory role, including shipping line conduct in relation to part X of the *Competition and Consumer Act 2010* (Cth).

The Minister for Infrastructure and Transport also has regulatory and enforcement powers under part X of the *Competition and Consumer Act 2010* (Cth). Administration of part X is undertaken through the Registrar of Liner Shipping as the ministerial delegate in the Department of Infrastructure, Transport, Regional Development, Communications and the Arts. The Department also regulates coastal trading under the *Coastal Trading Act 2012* (Cth), discussed in more detail in chapter 12.

The Bureau of Infrastructure and Transport Research Economics has a longstanding role in collecting and publishing national sea freight and container terminal statistics, most notably through the publication of its Waterline series of reports on the operational performance of the five major container ports, which assists other parties in their monitoring role.

Regulation of the ports, including pricing and access regimes, is managed through a variety of state government bodies which vary in the level of oversight and intervention from state to state. These are discussed in more detail in chapter 5.

3. Container port performance

Key points

- * Well-functioning, efficient, and dependable container ports are vital to the maritime logistics system and the Australian economy, as most imports and a range of exports pass through these ports
- * The Australian data does not enable a comprehensive assessment of overall container port productivity owing to its focus on the separate activities that ports undertake (marine, quayside and landside operations) and on partial measures of productivity. As a result, there are some important information gaps that are material to understanding port productivity, particularly in relation to labour productivity.
- * The existing framework for assessing port performance could take a more holistic view on the time it takes to move containers through a port by expanding the time-based metrics collected.
- * Productivity levels for 2019 (pre COVID-19 pandemic) differ across the five main Australian container ports, with some ports being more productive in some areas than others.
 - Ships spend an average of 35 hours in a port. Adelaide, Brisbane and Sydney had the slowest arrival process times (anchorage plus steam in) suggesting room for improvement.
 - Melbourne achieved the highest average hourly throughput of any port, in part because it used more quay cranes to un/load ships. It also avoided the major delays encountered by some of the ships that entered Sydney and Brisbane.
 - Gross crane rates can vary significantly across terminal operators within the same port and over time for terminal operators. Scope exists for terminal operators to improve the consistency of their performance.
- * The quayside productivity of Australian container ports has risen since 1989 regardless of the measure chosen. Growth in crane and ship rates was strongest in the late 1990s following significant waterfront reforms. Since then, growth rates have been lower.
- * International and domestic evidence suggests there is scope for productivity improvements at Australian ports.
 - Benchmarking with comparable international ports shows that most Australian ports are not technically efficient; they could handle an increase in throughput by using their capital inputs more efficiently.
 - Variability of performance within and across Australia's major container ports also suggests that productivity could be improved by maintaining consistent high performance.
 - The absence of data on short-term variable inputs (such as labour) means that benchmarking can only provide guidance on how to improve technical efficiency by altering long-term inputs (such as the number of quay cranes and length of berths).

Key points

- Australian ports do not compare well against international ports on measures of ship turnaround times. Poor rankings in a recent World Bank study of 351 international container ports reflect the fact that Australian ports take longer than many international ports to process ships (particularly medium to larger vessels). This mainly reflects the fact that they use fewer quay cranes to handle containers — average container movements per crane per hour at Australia's ports are similar to those in the average international port.
- The World Bank study did not account for the fact that some ports use an excessive level of capital. This over investment in costly capital is inefficient even if it means that a port can turn ships around quickly.

*** Increasing container port productivity results in estimated direct cost savings of \$605 million. The economy-wide impacts are likely to be much larger given the importance of ports in the supply chains that support Australian businesses. The productivity and dependability of Australian ports ultimately affects the living standards of all Australians.**

Well-functioning, efficient and dependable maritime ports are essential to the Australian economy and to all Australians.¹ They enable goods to enter Australia faster than otherwise and reduce the cost of these imports. Similarly, they enable Australian exporters to compete more effectively on price-sensitive global markets.

This chapter explores the performance of Australian container ports. It begins by outlining what the Commission has been directed to do (section 3.1), and highlights some of the motivations for this inquiry (section 3.2). The chapter then looks at why port performance matters for the Australian economy (section 3.3) and what container port productivity means (section 3.4). The remainder of the chapter addresses issues raised in the terms of reference. It first develops a conceptual framework for assessing port productivity and sets out how existing measures of port performance relate to this framework (section 3.5). It then looks at productivity in Australian container ports and long-term trends therein (section 3.6), and at how Australian container ports compare to ports overseas, to ascertain the scope for possible productivity improvements (section 3.7). The chapter concludes by looking at the potential economy-wide benefits from improved port performance (section 3.8).

A technical paper supports this chapter. It provides additional detail on the framework, the empirical techniques and data used to assess port productivity, both in Australia and overseas. It also canvases the empirical literature that reviews the productivity of Australian ports in an international context.

3.1 What the Commission has been asked to do

The terms of reference direct the Commission to:

Examine the long-term trends, structural changes, and impediments that impact the efficiency and dependability of the maritime logistics system, including developing a framework of performance measures to determine port performance and benchmarking Australian ports internationally.

Port performance encompasses the efficiency and dependability of ports. Efficiency is interpreted here as being the technical efficiency with which ports undertake their operations, while dependability refers to how

¹ Dependability covers whether goods are delivered undamaged/unspoilt and certainty around container delivery/departure. Certainty enables importers/exporters to plan their businesses with greater confidence.

reliable the ports are in handling containers and ensuring goods reach their destination. The chapter focuses on the technical efficiency (productivity) of Australian ports, noting other dimensions of performance where relevant or where data permits.

As per the primary scope of this inquiry (chapter 1), this chapter focuses on the performance of container ports. Reflecting where most containers are un/loading and data availability, this chapter also focuses on the performance of the five main Australian container ports: Brisbane, Sydney, Melbourne, Adelaide and Fremantle.²

All these container ports also handle other types of cargo (chapter 1). For example, the port of Melbourne also handles: motor vehicles; bulk liquids from petrochemicals to crude oil and molasses; dry cargo including cement, sugar, grain, and gypsum; breakbulk commodities such as timber, paper, iron and steel; and a variety of non-containerised pack types including farm equipment and machinery. These non-containerised activities are not included in the subsequent analysis.

Measurement of long-term trends in container ports requires extensive time-series data. It also requires the ability to identify and exclude the effects of short-term influences from the data and analysis. The COVID-19 pandemic led to many disruptions in the maritime logistics system, including shipping delays, quarantine of supply chain workers, surges in demand and price spikes.³ Long-term trends are presented where data permits, allowing for the impact of the pandemic between 2020 and 2021 to be noted.

The terms of references also directed the Commission to:

Determine the broader economic impact of the maritime logistics sector ...

The chapter concludes by examining these broader economic impacts through the lens of the economy-wide gains from potential improvements in the productivity of the maritime logistics sector.

3.2 Motivating concerns about port performance

A motivating factor for this inquiry was the poor performance of Australian container ports in a recent international study undertaken by the World Bank in conjunction with IHS Markit (2021).⁴ This study developed a Container Port Performance Index (CPPI) to enable comparisons of quayside performance, and assessed performance across 351 container ports in 2019-20. The CPPI was the first attempt at a comprehensive cross-sectional international comparison of container port performance using a consistent dataset. Earlier international studies focused on benchmarking far fewer ports, and each used data compiled from numerous and different sources. Subsequent iterations of the CPPI are intended to be released annually.

For the CPPI, port performance was measured with reference to port hours (that is, the time from when a ship reaches the port limit to the time it departs from the berth; this covers anchorage, steam in and cargo handling operations). The rationale is that more efficient ports handle a given ship-call-size combination more quickly than less efficient ports.

² A recent World Bank study also included Bell Bay Tasmania (which was serviced by the international shipping line MSC), and their data source also included Townsville in Queensland. In keeping with official Australian data sources, this chapter focuses on the five main container ports. These ports are listed in the order in which international shipping lines generally service them. Sydney refers here to the container port at Port Botany (as Sydney has more than one port).

³ COVID-19 was first detected in Wuhan, China in December 2019. The first case in Australia was confirmed on 25 January 2020. The World Health Organization declared it a pandemic on 11 March 2020.

⁴ IHS Markit supplied the Port Performance Program data used in the study. The Program collects data from ten of the world's largest shipping carriers (accounting for 76 per cent of global capacity).

Nearly all Australian container ports ranked in the bottom 20 per cent of the ports assessed in the inaugural report (table 3.1). The exception was Brisbane, which ranked in the bottom 30 per cent. These results suggest that Australian ports took longer than most international ports to turn over ships. The port of Yokohama in Japan was found to be the most efficient container port globally, followed by the port of King Abdullah in Saudi Arabia.

The performance of Australian ports was still poor in the second edition of the CPPI for 2021 which was released in late May 2022 (The World Bank 2022). The 2021 index reflected the impacts of the COVID-19 pandemic on performance. For example, Los Angeles and Long Beach ranked last which is unsurprising given the backlog of ships waiting to dock.

The accompanying technical paper provides more details on the World Bank study and the performance of Australian container ports.

Table 3.1 – Australian container ports rank poorly in the World Bank's Container Port Performance Index (CPPI)^{a,b}

Sample of 351 container ports, 2019-20

Port	Statistical approach		Administrative approach	
	Rank	Total score	Rank	Total score
Brisbane (QLD)	246	+0.569	234	-8
Sydney (NSW)	337	+3.907	327	-63
Melbourne (VIC)	302	+1.676	313	-40
Adelaide (SA)	339	+4.546	333	-78
Fremantle (WA)	326	+2.716	319	-49
Highest ranked				
Yokohama (Japan)	1	-5.995	1	130
King Abdullah (Saudi Arabia)	2	-5.684	2	114

a. The statistical approach used factor analysis to identify the relevant factor weights for each input. Total scores can be negative (more efficient) and positive (less efficient). **b.** The administrative approach calculated an index that arbitrarily weights each input. The higher the index, the more efficient a port is found to be. The index can be positive (more efficient) or negative (less efficient). Both approaches are discussed in more detail in the accompanying technical paper.

Source: The World Bank (2021).

The COVID-19 pandemic may have affected the results. The World Bank analysed shipping calls from July 2019 to June 2020, which covered the onset of the pandemic. It is unclear to what extent the impacts of the pandemic on international shipping influenced the study's results, including the rankings of Australian ports. But ports that faced disproportionately more disruptions (such as ships arriving off schedule or COVID-19 outbreaks among dock workers) likely ranked lower due to increased port hours.

Given the widespread media coverage of supply chain issues during COVID-19, the World Bank's ranking of container port performance attracted considerable attention and criticisms of the CPPI have been raised in submissions to this inquiry (box 3.1).

Box 3.1 – Some inquiry participants criticised the World Bank study

Many submissions to this inquiry raised concerns that the World Bank study had not compared like-for-like ports (ACL, sub. 57, p. 9; Deakin University, sub. 39, p. 7; FPH, sub. 55, pp. 10–11; MUA, sub. 59, p. 70; NSW Ports, sub. 66, p. 17; Ports Australia, sub. 45, p. 4). Particular concerns included that it did not differentiate ports by:

- the amount and type of trade
- the ship sizes serviced
- the function of the ports (transshipment versus destination/origin ports).

The Maritime Union of Australia (sub. 59, p. 71) also noted that few of the top ranked ports had similar labour and human rights standards to Australia. Inquiry participants suggested that these factors likely contributed to the poor rankings of Australian ports.

Inquiry participants also noted other criticisms relating to the focus of the study on:

- port hours as the key measure of performance, which misses other important indicators of port performance, such as container dwell times and landside performance (Deakin University, sub. 39, pp. 7–8; DP World, sub. 49, pp. 6–7)
- the interests of one key stakeholder (the shipping lines) (MUA, sub. 59, p. 83)
- port-wide performance rather than terminal-level performance. Some participants advocated for performance to be measured at the terminal level because the productivity of individual terminals differs (NSW Ports, sub. 66, p. 17; Ports Australia, sub. 45, p. 4).

Overall, submissions questioned the validity of the results and cautioned drawing conclusions about Australian port productivity based on the CPPI. In particular, DP World (sub. 49, p. 7) highlighted that the study ‘cannot precisely identify the cause of delays — including the extent to which these are caused by poor productivity or other (exogenous) factors’, which limits the usefulness of the CPPI. However, in its submission, Shipping Australia Limited (sub. 11, p. 102) advocated for the CPPI to be included as part of the port performance monitoring framework. They acknowledged that, while the CPPI would always attract criticisms, ‘if two separate methodologies, devised and implemented by world-leading transport economists, both rank the performance of Australian container ports badly, then ... it is not the methodologies that are at fault’.

Two of the main criticisms focused on the failure of the study to:

1. ensure like-for-like comparisons across ports given perceived differences across container ports, particularly in terms of throughput, differences in the size of ships that visit each port, and whether the ports were transshipment or origin/destinations ports⁵
2. take into account the efficiency of landside operations of each port.

There is some validity to each of these criticisms. While it did not receive much prominence, the published indexes did take ship and call size (that is, the number of containers un/loading on each ship visit) into

⁵ Transshipment ports pass the bulk of the cargo unloaded from one ship to another ship. These ports are typically the ‘hub ports’ in the series of ‘hub and spoke’ networks that service international maritime trade. These ports are strategically placed on, or close to, major international shipping routes and channels (such as the Panama Canal, the Strait of Malacca, the Suez Canal and the Straits of Gibraltar) and typically handle much larger ships than other ports. Transshipment ports include, for example, Singapore, Port Said and Cristobal.

account to facilitate greater comparability across ports. The analysis did not, however, differentiate between transshipment and origin/destination ports. Collecting landside data is difficult given the heterogeneity of landside operations and numerous firms involved. Therefore, the absence of a consistent, comparable global dataset precludes the inclusion of landside operations across the 351 ports analysed.⁶ The World Bank recognised and acknowledged many limitations in their report, and they intend to enhance the methodology, scope and data in subsequent reports.

Despite these criticisms, it is worth noting that the number one ranked port, Yokohama, is similar in size (that is, it handles a similar number of containers annually) to Melbourne and Sydney and could therefore be considered 'broadly comparable'.

The findings of the World Bank study are similar to many previous empirical studies on the performance of Australian container ports relative to international ports (reviewed in the accompanying technical paper). For example, one somewhat dated OECD study, Merk and Dang (2012, p. 35) also found that Australian container ports were relatively inefficient in an international context. (In contrast, the study found that Australian bulk ports were among the most efficient in the world (p. 19, 22), particularly Port Walcott (for iron ore) and Gladstone, Newcastle and Hay Point (for coal). There has been limited national or international performance benchmarking of bulk ports; presumably a reflection of their diversity.)

Unfortunately, the World Bank study did not identify *why* Australian container ports ranked so poorly or *what* they could do improve their performance and world ranking, especially given that many of the drivers of performance may be outside the control of individual port operators (such as the demand for imports in Australia and world demand for Australian exports, the size of ships operated by international shipping lines and service frequency). These issues are explored in section 3.7 of this chapter.

3.3 Why port performance matters

Efficient ports are vital to the functioning of the Australian economy

Ports play a critical role in the maritime logistics system and hence, in the global economy. As the World Bank (2021) explained:

Maritime transport carries more than 80 percent of global merchandise trade by volume, and any impediment or friction at the port will have tangible repercussions for their respective hinterlands and populations. In the short term, this is likely to take the form of shortages of essential goods and higher prices, as we saw early in the pandemic. But over the medium to longer term, an inefficient port will result in slower economic growth, lower employment, and higher costs for importers and exporters. (p. 8)

Most goods that enter Australia pass through container ports (aside from crude oil, motor vehicles and petroleum), as do most manufactured and processed exports.

While details on the number of containers handled exist, it is hard to be definitive about the share of Australian imports and exports that pass through Australian container ports, or even ports more generally (that is, including containerised and non-containerised trade) using data from public sources.

In its submission to this inquiry, Shipping Australia Limited (sub. 11, p. 6) attempted to identify the share of trade passing through Australian ports by combining data from different official sources. They noted some

⁶ Moreover, while partial measures of landside productivity exist for Australian container ports (such as truck turnaround times), comprehensive measures of landside productivity do not exist.

material differences in the value of goods trade that passes through airports and seaports across sources. They estimated that seaports handled 99.93 per cent of all trade (imports and exports) by volume, and 83.6 per cent by value in 2018-19. These estimates were not broken down between imports and exports and between container and non-container trade. The ABS publishes the volume and value of maritime trade by port, but likewise does not differentiate between containerised and non-containerised trade. The lack of distinction in the type of trade is particularly an issue for ports that handle multiple types of cargo because the value of containerised trade cannot be distinguished.

The efficiency, effectiveness and dependability of Australian ports affect the cost of importing and exporting goods, and, consequently, play a role in determining the international competitiveness of many Australian businesses in global markets and the cost of goods purchased by Australian households. The performance of Australian ports ultimately affects the living standards of all Australians.

Strong growth in containerised trade is forecast for Australia (chapter 1). Moreover, ships are getting bigger and, with this, so are their call sizes (chapter 7). These trends are expected to continue. Ports will need to be efficient to be able to deal with the projected growth in the number of containers handled annually and per ship (that is, the throughput and call size).

Productivity is integral to the efficient functioning of ports

Productivity is the 'technical efficiency' (sometimes called 'engineering efficiency') of how a current mix of outputs is produced from existing inputs (either individually or collectively) (box 3.2).⁷

A port that is *technically efficient* uses the fewest inputs possible to produce a given level of output. In other words, given the prevailing technology, it is not possible to reduce the use of any input (such as cranes or labour) at this port without reducing the level of output (such as the number of containers passing through the port).

Ports may also be technically efficient in the use of one, but not all, inputs. In this case, they could produce the same level of output using less of some, but not all, inputs. An example of this might be a port that used its cranes efficiently but had an excess of labour inputs for the level of throughput handled.

Being technically efficient, however, does not necessarily mean that the existing level of throughput is being achieved in the most cost-effective way. For example, it may be that a port is fully efficient in the use of manually operated cranes and labour, but these manual cranes may cost them more in the long run compared to fully automated cranes (chapter 11). So, even if fully automated cranes are unable to move more containers or move them more quickly than manual cranes, investing in fully automated cranes would reduce a port's overall costs in the long run (by reducing labour costs). Such an investment would alter the mix of inputs used (in this case, using more capital and less labour) with resultant benefits to profitability (and, potentially, overall productivity).

⁷ This gives rise to two different representations of technical efficiency. The first measure relates to the extent to which the existing level of output could be produced using *fewer* inputs (referred to as 'input-augmenting technical change'). The second measure relates to the extent of the *increase* in output that could be achieved from the existing inputs (referred to as 'output-augmenting technical change'). Curvature of the underlying production function means that these two measures will often differ. This chapter focuses on the potential for input-augmenting technical change because, as far as ports are concerned, the demand for imported containers is outside their control.

Box 3.2 – Different measures of productivity

Different types of productivity measures exist, with many relating to the choice of inputs.

Partial productivity measures relate to the use of a single input (such as capital or labour). Examples of partial productivity measures relevant to ports include lifts per crane (capital), containers moved per hour worked (labour) and containers moved per berth metre (capital). Partial productivity measures may also differ in the measure of output used (such as container movements or the number of ship calls).

Productivity measures can also relate to the use of groups of inputs (such as the use of capital and labour, often called value adding factors, or all inputs, referred to as total factor productivity). Such measures of productivity are uncommon for ports. Value added and total factor productivity measures are frequently used in studies that cover broader ranges of economic activity and are used by the Australian Bureau of Statistics in the Australian National Accounts.

Technical efficiency is one of several measures of economic efficiency (chapter 1). Technical efficiency is a prerequisite for productive efficiency — when a given quantity of output is produced at the lowest possible cost.

Measuring technical efficiency (in the form of productivity levels) is useful in benchmarking the same activity in one port against another. This benchmarking can provide useful insights into how port productivity and practices can be improved and to identify which ports to learn from. Care is still needed in analyses of this type as any undue focus on an individual performance measure may miss wider issues (including the trade-offs between different activities, as one port may not be good at everything). For example, a port may be the fastest at unloading containers but the slowest at getting those containers out the gate and to customers, and as a result has a congested container yard.

Growth in productivity is often more informative than point-in-time measures when assessing an individual port because it details how productivity has changed over time (such as whether improvements are occurring and whether this is coming from using inputs more efficiently or from output growth with a comparatively small increase in inputs).

3.4 Measuring port performance

The exercise of measuring container port productivity raises two key questions:

1. what constitutes a 'container port'?
2. what physical outputs and inputs should be used to assess port productivity?

What constitutes a 'container port'?

Container ports consist of a range of separate, but inter-related, activities. These include:

- a port authority: the agency or company that has overall responsibility for the port
- container terminal operators (referred to as stevedores in Australia): the companies that employ the labour used to un/load ships and that frequently invest in the cranes, land and other infrastructure needed to move containers from ships to other forms of transport such as road, rail or ship (and vice versa)
- pilots: who are responsible for navigating ships safely into harbour
- tug operators: who assist pilots to manoeuvre ships safely through the port to and from assigned berths

- container park operators: which manage the flow and stock of empty containers
- road (trucks) and rail (trains) transport within the perimeter fence that surrounds the port
- ancillary services such as customs and quarantine, which affect the speed at which goods flow through ports.

The maritime logistics system also includes other activities such as transport outside the port fence and freight forwarders (chapter 2).

The disparate nature of these activities means that productivity analyses do not, in practice, assess an entire container port. Instead, ports are usually assessed on activities connected with:

- *marine operations* — the on-water activities involved in bringing ships into and out of port
- *quayside operations* — the activities that occur at the interface of the ship with the land when it is berthed, including the loading and unloading of containers
- *landside operations* — the movement and temporary storage of containers in the container yard and the loading or unloading of containers on to land-based transport (typically trucks or trains) and the passage of that transport into and out of the port.⁸

The most common metrics of port performance published in Australia relate to their quayside and landside operations (discussed below).

Notwithstanding that their results are presented in terms of ports, most international port benchmarking studies, including the World Bank study mentioned above, focus on quayside operations.

What outputs and inputs should be used to assess productivity?

The most common measure of container-port output is throughput — denoted as either the number of containers handled, or the number of 20-foot equivalent (TEU) containers handled.⁹ A less common measure is the number of ship calls, but this measure fails to account for the number of containers that pass through the port — the main function of a container port.

The main inputs of container ports are berths, quay cranes, labour, container yard area and land-based cranes. These can be broadly grouped into capital, labour and land. Container ports also use a wide range of standard business inputs such as offices, information technology, vehicles, fuel, legal and accounting services, telecommunications, electricity and water. Some empirical studies also include the number of container terminal operators as an input.¹⁰

Inputs and outputs may be expressed in terms of physical units such as the number of cranes or the number of employees, or as time-based measures such the number of hours that a crane or employees worked or were available for use.

Productivity analysis focuses on input use and outputs produced over specified periods of time (such as a quarter or year).

⁸ Some landside operations may be involved in transshipping a container onto another ship (such as temporary storage in a container yard). Such operations are relatively small in the Australian context.

⁹ The difference between these measures reflects the size of the containers handled. The movement of one forty-foot container (FEU) constitutes the movement of one container that is equivalent to two 20-foot containers (TEU). The TEU is the international standard size measurement for maritime containers.

¹⁰ The premise being that ports with more terminal operators have increased competition and are therefore likely to be more productive.

Not all inputs and outputs are within the control of ports

The demand for container port inputs and outputs that drive their productivity may result from factors that are not within the control of the port or container terminal operators (table 3.2).

Table 3.2 – Some factors affecting port productivity

Factors within and outside the control of port or terminal operators

Controllable factors	Uncontrollable factors
Service and waiting time	Tidal and weather restrictions
Terminal layout and configuration	Other physical and technical constraints
Capacity development and expansion	Trade pattern, traffic type and mix
Terminal procedures	Container status, type, and dimensions
Working hours, shift/labour arrangements	Ship size and type
Type, size, and maintenance of equipment	Pattern/frequency of shipping services
Routing and stacking of containers	Arrival pattern of ships, trucks ^a , and trains
Equipment allocation and deployment	Stowage plan
Berth and yard management systems	Landside and intermodal connections
ICT and Terminal Operating System modules	Customs and trade related procedures
Reliability and level of customer service	Health and safety requirements
	Other regulatory requirements

a. The arrival of trucks is not within the control of ports because truck operators use their own discretion to book slots to pick up containers. Further, the terminal operators have no control over which operators handle the containers nor the order in which the containers are picked up or delivered at the terminal, which is undertaken by transport companies at the direction of the cargo owners.

Source: Adapted from Bichou (2013, p. 31).

Whether these factors are controllable or not at the port or container terminal level is particularly important in providing context in any performance benchmarking analysis. For example, sometimes inefficiencies may be unavoidable for ports if they are caused by factors outside of their control (such as tidal and weather restrictions). Interpreting benchmarking results therefore requires an understanding of the specific factors affecting each port.

The most obvious external factor outside the control of ports is container throughput. The number of containers that pass through a port reflects the demand for imports by the local community and world demand for local exports. As such, port throughput is a 'derived' demand. Competition between container terminal operators is ostensibly about the division of port-level throughput and the cost of handling those containers (chapter 5).

Shipping lines also control some of the factors that drive input use by container terminal operators. The length and draught of a ship affects which berths it can dock at and affects the type and number of cranes needed to service it, as well as the height and distance that the cranes need to travel to access containers. External factors such as bridge heights, channel depth and tidal ranges also affect vessel choice. These factors may also affect port and terminal productivity, albeit indirectly.

While these 'external' factors may affect the nature of the physical inputs and outputs of a port and the use of physical inputs, terminal operators often have discretion in how they respond to these factors. Terminal

operators control the number and type of cranes allocated and workforce deployed to service vessels, even if they are unable to control the size of the vessel being serviced or its call size. Thus, how container terminal operators respond to ‘external factors’ means that these operators’ actions may still influence their productivity.

3.5 A framework for assessing port performance

The terms of reference direct the Commission to develop:

... a framework of performance measures to determine port performance and benchmarking Australian ports internationally.

Australia was at the forefront of early efforts to measure and benchmark container port performance:

Australia was a pioneer in efforts to [develop] efficiency metrics, as the Australian government sought to assess its waterfront reform initiatives in the late 1980s and early 1990s (Bureau of Industry Economics, 1993). The government wished to understand port performance in terms of operational efficiency and the customer requirements of timeliness and reliability. (Mary R. Brooks Transportation Consulting 2015, p. 22)

The key publication that benchmarks the performance of Australian container ports is the *Waterline* publication, published by the Australian Government’s Bureau of Infrastructure and Transport Research Economics (BITRE). *Waterline* was first published in July 1994, initially on a quarterly basis, and is now released on an irregular basis. The *Waterline* data also underpins the annual Australian Competition and Consumer Commission’s (ACCC) *Container Stevedoring Monitoring Report*.

Waterline was introduced to monitor and publish the impact of waterfront reforms on port performance. ‘The Waterfront Industry Reform Authority (WIRA) monitored the progress of waterfront reform from June 1989 to September 1992, producing performance indicators at quarterly intervals’ (BTCE 1994, p. 1). Self-initiated by the Bureau of Transport and Communications Economics (BTCE) in 1994, *Waterline* was designed to continue to monitor and disseminate the impacts of waterfront reform.¹¹ Since then the *Waterline* report has evolved and changed in response to feedback, but monitoring has continued.

The latest *Waterline* report consists of four sections:

- measures of container terminal throughput
- measures of container terminal productivity
- vehicle booking system and empty container park operations
- port interface cost index (used by the ACCC in its Container Stevedoring Monitoring Report).

Waterline also contains some commentary on the statistics and on recent developments. Earlier editions included some discussion of other related matters, such as some employment and labour market issues.

Understanding how container ports operate

An understanding of the basic anatomy of container ports (chapter 2) is helpful to understanding the rationale for the existing approach for assessing port performance and as background to the discussion below about its strengths and weaknesses.

¹¹ In 1992, the Australian Government directed the BTCE to produce a six monthly indicator on port interface costs; this formed part of *Waterline* (Hamilton 1999, p. 4).

The role of container ports is to move containers into and out of the country. This requires linking the waterside operations of a port (referred to here as marine operations) with its landside activities (landside operations). The interface between these two areas of operation, where containers are loaded and unloaded from ships, is referred to the quayside (quayside operations). The ship's crew, employees of the port and employees of other port-related business (such as, pilots and tugs) undertake the bulk of marine operations. Container terminal operators and their employees link the waterside and landside activities.

An efficient port, given its inputs and external constraints, minimises the collective time that it takes for containers to pass through the port (both inwards and outwards). Such ports also minimise the time that ships and land transport spend within the port. Ports that move containers more quickly, reliably and in a cost-effective manner are better performers than those that do not.

The multi-dimensionality of the processes involved in moving containers gives rise to a variety of performance metrics. Some relate to different parts of the process (such as port, quayside and landside operations) and others relate to different measures of performance (such as crane productivity and time-based metrics).

Ports may perform well against certain metrics, while simultaneously performing less well against others.

Thus, there is no one overall measure of port performance. Instead, port performance needs to be assessed using a range of different metrics.

Container movements

Container movements are central to determining how effectively container ports operate. Focusing on imports for brevity, each container that passes through a port undergoes a series of separate, but related, broad steps:

- it enters a port onboard a ship
- it is unloaded from a ship
- it clears customs and quarantine
- it sits in the container yard awaiting collection
- it is loaded onto land-based transport
- it exits the port on that transport.

Empty containers may also sit in container parks within ports awaiting collection. Exported containers follow similar, but reversed, steps.

Hiccups in any one of these steps add to the time taken for the container to pass through the port. At best, this adds unnecessarily to the cost of importing/exporting goods and, at worst, may lead to perishable goods spoiling, making them worthless.

Ship visits

Ship visits are frequently expressed in terms of the size of the vessel that visits a port, its call size and its turnaround time.

The turnaround time is the total time that a ship spends in port (also known as 'port hours'). This can be broken down into stages (figure 3.1).

Most container ships operate to schedules that set out their expected arrival and departure times. The shipping lines provide this information to ports. The ports then determine arrival 'windows' during which the ship is expected to arrive. These enable the port and terminal operators to plan the delivery of services to the

ship and the un/loading of containers around these windows (such as allocating berths and providing pilots, tugs, line boats, mooring gangs, cranes, workers and fuel).

If ships miss their window or if their berths are otherwise unavailable, ships may have to anchor at the port limits and wait until a suitable berth is available (referred to as anchorage time).

Ships missing their windows also affects the reliability of the maritime logistics system. When ships miss their windows, it can disrupt operations of the port and container terminals and therefore delivery of goods to customers.

Anchorage time is wasted time. It may reflect port or channel congestion, the designated berth already being occupied, the terminal operator not being otherwise ready to receive the ship, or ships missing their window. And it may be a consequence of the actions of port authorities, terminal operators or the ships themselves (for example, choosing to miss their designated window for berthing to save fuel).

Ships then enter the port under the direction of the harbourmaster and vessel pilot. The time taken to sail to the berth will reflect, among other things, the distance from the port limit to the berth (which varies greatly by port) and vessel type. This steam-in time is largely outside the control of port operators and container terminal operators. Ships leave the port ('steam-out') in a similar fashion.

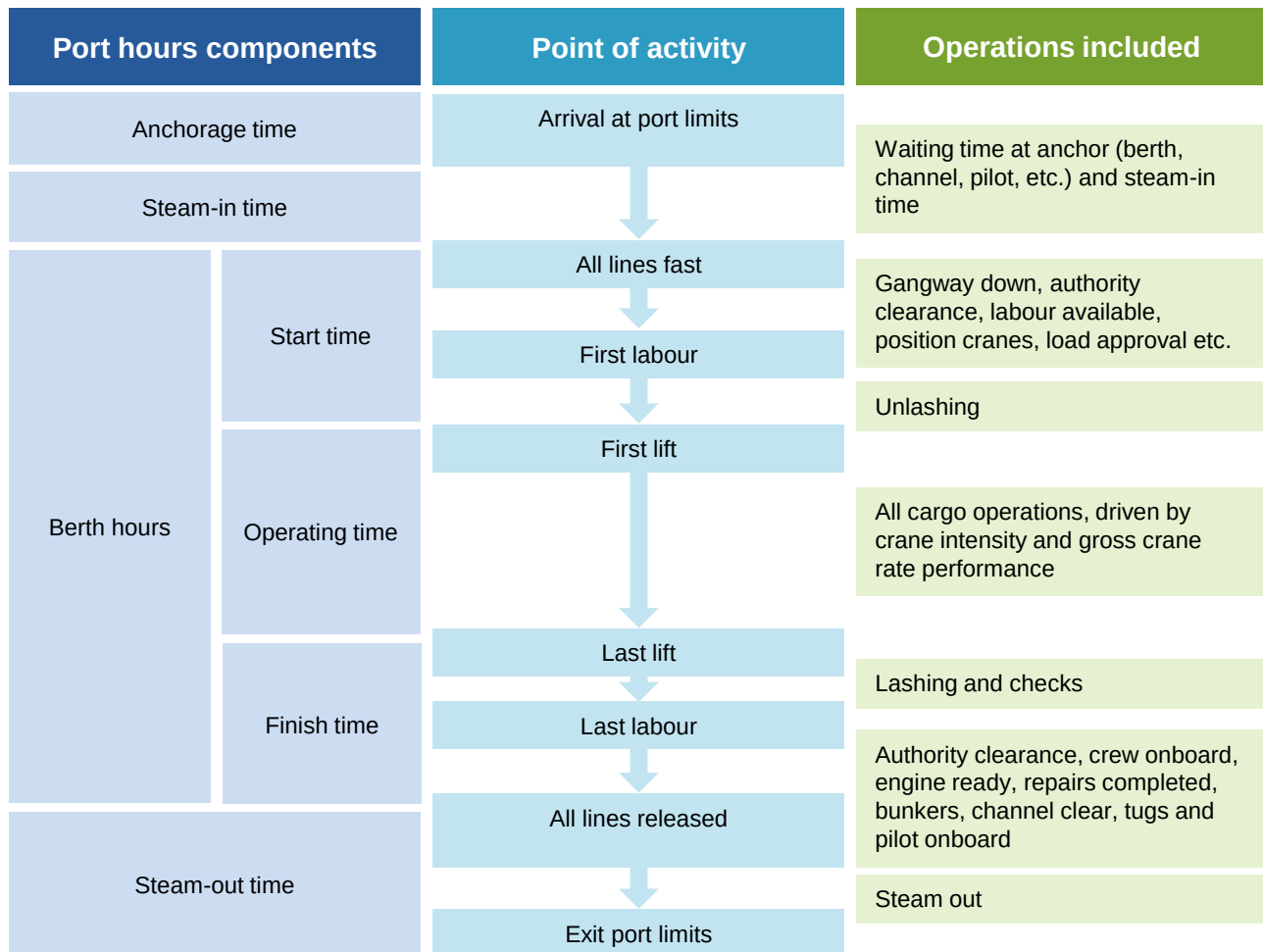
The remaining time is the time that ships spend at berth. This is the time between when all the lines that secure the ship to the berth are secured (referred to as all lines fast) to when all those lines are released so that the ship can depart (referred to as all lines released).

Time spent at berth is composed of three components: start, finish and operating time. Start and finish involves the time taken for the crew to ready the ship for boarding and for land-based workers to board the ship to unlash and unpin the containers so that they are ready to be moved. (The time when labour first boards the ship is referred to as first labour.) Likewise, finish time involves the opposite as the workers secure the containers and the crew readies the ship for sailing. (The time when labour last leaves the ship is referred to as last labour.) Operating time relates to the time during which containers are ready to be unloaded and loaded. Gross operating time is the total time during which containers can be lifted; net operating time excludes any operational and non-operational delays. The duration of operating time will be correlated with call size, the number of cranes used and crane productivity — ships with larger call sizes will generally be in port for longer.

Land transport

Land transport takes the full and empty containers to and from port. Trucks carry most containers across all Australian container ports.

A more efficient port will minimise the total time that land transport spends in the port. That is, the time between when it enters and exits the port. The time that trucks spend waiting at the port gate also should be minimised (even though this occurs outside of the port perimeter), otherwise ports could artificially deflate truck turnaround times by forcing trucks to wait outside the gate. All other things equal, lower turnaround times are indicative of higher landside productivity. Further, a more efficient port will backload trucks such that trucks haul containers on both the in-bound and out-bound legs of a single trip.

Figure 3.1 – The anatomy of a port call

Source: Adapted from The World Bank (2021, p. 45).

The existing approach to assessing port performance

The metrics published in *Waterline* anchor to many of these concepts.

A range of the published throughput and productivity measures relate to port performance (table 3.3). These measures are published for the five main container ports (Brisbane, Sydney, Melbourne, Adelaide and Fremantle) and a 'five ports' total. Numerous metrics are expressed on both a container and TEU basis. Each productivity indicator tells us about a different aspect of port productivity. For example, containers per truck tells us about the productivity of trucks that visit the port.

The focus of the quayside productivity measures in *Waterline* is crane usage. The report does not provide information on the workforce. Three key quayside productivity measures are presented: *the crane rate*, *the elapsed labour rate* and *ship rate*.

The three measures reported in *Waterline* are 'net' measures in that they *exclude* any operational or non-operational delays (such as award breaks or public holidays). In contrast, a 'gross' measure of time would include these delays.

As the net time will always be the same or lower than the gross time, the resulting net productivity measure will always be the same or higher than the corresponding gross productivity measure. If the net and gross

measures are computed on a consistent basis, then a comparison of them will indicate the extent of delays (that is, the relationship between net and gross times indicates the duration for which cranes and/or labour were unavailable to work a ship).

One *Waterline* measure in particular merits further comment. Contrary to how it is often interpreted, the elapsed labour rate reveals nothing about labour productivity. The measure is defined as the number of containers handled per elapsed labour hour — the time between when labour first boards the ship to when it leaves the ship. Labour productivity is defined as output per worker or per hour worked. The elapsed labour rate does not reflect the number of workers involved nor the average number of hours they worked the ship. The crane rate, on the other hand, measures capital productivity because it reflects the number of hours that cranes worked.¹²

It is for this reason that the elapsed labour rate is not presented when assessing port performance.

Waterline does not publish measures of labour productivity or total factor productivity.



Draft finding 3.1

The elapsed labour rate is not a measure of labour productivity

The elapsed labour rate, which measures the number of containers handled per hour that stevedoring workers are on a ship, is often interpreted as a measure of labour productivity (output per worker or hour worked). However, the rate does not reflect either the number of workers or hours worked and is therefore not a measure of labour productivity.

¹² Labour and capital productivity are each influenced by both capital and labour initiatives. For example, improvements in crane technology may improve both the productivity of labour and capital.

Table 3.3 – Selected indicators presented in *Waterline*

Throughput measures	Definition
Number of ship visits	The number of ships handled by terminal operators.
Number of containers handled	The total number of containers un/loaded on/off ships at container berths.
Number of containers transported by road/rail	The total number of containers transported in all modes on the landside, either by trucks or by rail.
Number of full container imports and exports	The number of full containers imported (unloaded) and exported (loaded).
Number of empty container imports and exports	The number of empty containers imported (unloaded) and exported (loaded).
Productivity measures	
Marine operations	
Ship turnaround time (median, 95th percentile)	The hours from when a ship enters a port to the time a ship leaves the port.
Anchorage time (average/median)	The hours ships waited at anchorage if a ship waited more than 2 hours.
Time spent at berth	The total hours spent at berth by container ships at that port.
Time available to stevedores (terminal operators)	The total hours that ships can be loaded or unloaded.
Quayside operations	
(Net) crane rate	The number of containers handled per hour that the crane worked.
(Net) elapsed labour rate	The number of containers handled per elapsed labour hour, which is defined as the time between when labour first boards the ship to when it leaves the ship.
(Net) ship rate	The average number of containers moved on or off a ship in an hour. It is calculated as the (net) crane rate multiplied by the average number of cranes used.
Average lifts per berth visit	The total number of containers handled divided by the number of berth visits of container ships.
Average lifts per berth hour	The total containers un/loaded on/off container ships divided by the total time ships spent at berth.
Landside operations	
Containers per truck	The number of containers processed through the VBS/TAS ^a systems divided by the total number of VBS/TAS trucks used.
Per cent of backloaded trucks	The number of backloaded trucks as a proportion of the total VBS/TAS trucks.
Average truck turnaround time (average)	The time elapsed from when the truck enters the gate of a container terminal to the time when the last container is loaded.
Average container turnaround time (average)	Calculated as the 'average truck turnaround time' divided by 'average containers per truck'.

a. VBS = vehicle booking system. TAS = truck appointments system.

Source: BITRE (2021c).

Gaps in the existing approach

The existing approach for assessing port performance in Australia could be improved.¹³ The metrics collected in *Waterline* focus on separate areas of port performance. As such, the fragmented nature of the approach means that there are some areas of port performance for which data is missing. Taking a more holistic view of the port and of the time it takes to move containers through a port helps to identify the gaps in the existing approach.

The gaps identified are in relation to:

- missing metrics
- missing information on underlying distributions
- lack of more disaggregated data.

These gaps represent areas in which the existing approach can be extended.

Missing metrics

Labour

Labour is a vital input in the operation of ports, playing an important role in almost all activities and therefore in the productivity of ports.¹⁴ Workers, for example, unlash and unpin containers so that cranes can lift them from the ship and are, thus, central to the un/loading of containers. Most cranes have a driver, whether seated in the cabin or operating from a remote location. A team of workers usually accompanies each crane, and they operate together. Workers are also essential for many port activities. Pilots and tugboat crews, for example, guide ships into and out of port and their moorings, and harbourmaster are responsible for the safe and efficient operation of ports.

Unfortunately, no detailed data is published on the use of labour inputs — the number and type of workers, the hours that they work and their remuneration — in Australian container ports.¹⁵ To measure labour productivity, the data would need to be collected and linked to outputs, such as the number of containers handled. This would enable measures like the average number of TEUs handled per person-shift to be constructed. This data is not currently published and as such labour productivity measures are not presented here or elsewhere. As noted above, the elapsed labour rate, which is referred to as measuring labour productivity, is not a *true* measure of labour productivity. The lack of labour information is a major limitation with the Australian container port data and with freight data more generally (iMove Australia 2019, pp. 4–5).

Being able to assess labour productivity could provide insights into opportunities for productivity improvements in the short term. Labour is one of the few inputs over which terminal operators have some degree of control, notwithstanding terms in enterprise agreements that may restrict or otherwise constrain recruitment, the amount and type of labour used and how it is used (chapter 8). Labour is also relatively more flexible than capital. Thus, understanding labour productivity is critical to improving productivity in the short term.

That said, the lack of data does not mean there is no evidence on the link between workplace arrangements and productivity. Chapter 9 examines in detail the content of enterprise agreements in container terminals and finds that there is content which unduly restricts the allocation of labour and capital in container

¹³ The extended framework could also be applied in an international context.

¹⁴ Although some terminals such as the Victorian International Container Terminal (VICT) at the port of Melbourne are often described as being ‘fully automated’, they still employ labour.

¹⁵ The ABS provide some information on port workers through the census, labour force and characteristics of employee datasets. However, none of this data is sufficiently granular to be able to be used to measure labour productivity of container terminal operations.

terminals. For example, clauses which restrict merit-based recruitment, promotion and training make it less likely that the most appropriate person is performing each task in a container terminal. Overall, this increases the likelihood of inefficient labour allocation, which in turn affects the productivity of the terminal.



Information request 3.1

The Commission is seeking data on the productivity of labour within ports. Measures could include the average number of 20-foot equivalent units handled per person-shift, per employee or per hour worked. Ideally, the data would enable benchmarking across Australian ports or assessment of productivity trends over time.

Time-based metrics

Missing ship call metrics

The published time-based metrics for ships covers many of the important parts of a ship visit, but do not cover all the stages (figure 3.1). For example, cargo operation times, start and finish times, operational and non-operational delays, and elapsed labour hours are not reported.

The inability to unpack and understand what is driving the aggregate time-based metrics in the *Waterline* collection limits the ability to identify activities in which performance appears relatively slow and to understand whether ports can influence these times. For example, longer ship turnaround times may reflect slow start times and inefficiencies in the activities that occur within this time (such as authority clearance, labour available and positioning cranes). Providing a more detailed breakdown of time-based metrics would allow for a more precise identification of inefficiencies.

There is also an absence of ship arrival and window data. Ports may appear inefficient if many ships miss their windows and are forced to spend time at anchor. But this may be an inaccurate reflection of the port's performance. Instead, this could reflect inefficiencies on behalf of the shipping line (or external factors that caused the ship to miss its window) or another port (given multiport calls are a feature of Australian ports, delays at one port can cascade through the system). Information on ships missing windows and arrival schedules could help to correctly attribute inefficiencies, especially in relation to anchorage times.¹⁶

Information published online by each port on individual ship movements indicate the raw data needed to identify ships missing windows are available. The collection and distribution of this ship-level data could provide additional information on the servicing of Australian ports (such as how many ships visit multiple ports and which ports they visit) and enable a closer assessment of the reliability of the shipping lines, and consequently Australian ports.¹⁷

Missing container dwell times

Container dwell time refers to the time a container spends in port after being discharged from a ship until it leaves the port for delivery to clients, in the case of imports. And the time containers spend in port after being

¹⁶ Information on the productivity of pilots and tugs may also help to unpack and understand anchorage times.

¹⁷ Further, information on the per cent of goods that arrive damaged or that are lost could provide more information on the reliability of the maritime logistics system more broadly.

delivered to the port until they are loaded onto ships, in the case of exports. Longer dwell times may reflect inefficiencies in the logistics system and result in slower delivery of goods to end customers.¹⁸

The published data do not cover the time that containers spend in the container yard. This data is also not linked with the time that it takes containers to enter or exit the port and for it to be un/loaded quayside. Information regarding dwell times would enable a deeper understanding of where a container spends most of its time in port and may reveal areas for improvements. For example, the port of Halifax collects updated information on container dwell times and presents them on their website to help set and monitor performance standards and reduce yard congestion (Morley 2018).



Information request 3.2

The Commission would appreciate data on container dwell times in Australian and international terminals or ports.

Missing gross productivity measures

Waterline presents 'net' time measures of productivity (that is, for the crane, elapsed labour and ship rates). Ideally, both net and gross measures should be made available. This would provide users with a sense of operational and non-operational delays, and the degree to which productivity could be improved by reducing those delays. For example, the net crane rate shows the maximum productivity of a crane; reducing delays could help bring the gross measure in line with the net measure.

Alternatively, providing information on the extent of operational and non-operational delays, in terms of the number of minutes lost, for example, and the relative distribution of operational verse non-operational delays, could help to identify whether these delays are a problem for a port.

Missing rail turnaround times

No rail turnaround times — that is, the time it takes for containers to enter or exit the port by rail — are published in *Waterline*. To provide the complete picture of how containers move through ports this metric also needs to be collected and reported.

Measurement issues

There are some measurement issues with the time-based metrics presented in *Waterline*.

- Truck turnaround times do not include the time taken for the truck to exit the port after a container is loaded or any time that the truck spends waiting outside the port. As noted above, ports can appear relatively efficient if trucks are forced to wait outside the gate rather than inside the port.
- Presenting anchorage times for all ships that anchor rather than only those that anchor for more than two hours would more accurately shed light on how much time 'wastage' occurs at anchor (or how long ships are waiting for tugs and pilots).

¹⁸ Quarantine and customs processes may also increase dwell times for some containers, therefore information on durations of customs clearances would be beneficial.

Missing information on underlying distributions

The existing framework takes a high-level view of port operations and consequently, the metrics published tend to be aggregate summary statistics, such as totals, averages and medians, which summarise underlying distributions. For example, *Waterline* publishes the average and median anchorage times and the median and 95th percentile ship turnaround times. These published aggregates tell us little about the underlying distribution and may not provide an accurate representation of the underlying data. Average time-based metrics in particular can be sensitive to outliers in the data (such as ships that stay at anchor for days at a time in the case of anchorage times), which tend to increase the average measure reported and render cross-port comparisons misleading.

Understanding the underlying distributions is important for assessing port performance. Information on the distributions (such as reporting percentiles or standard deviations) would provide insights into the reliability of the port system. A wider spread of ship turnaround times, for example, would indicate lower reliability because the port is less consistent in the time it takes to handle ships and containers. In contrast, if there is less spread in the distribution there is more certainty in ship turnaround times and in the reliability of the port system. A wider distribution also provokes questions as to why port performance is so variable within a port. Only more disaggregated data can address these types of questions.

Lack of more disaggregated data

While *Waterline* reports metrics for each of the main Australian container ports, more disaggregated data would be useful for assessing port performance.

More data is needed on ship sizes and call sizes. For example, data on the average size of ships calling at each port or the average call sizes for those ships is missing from *Waterline*. Without understanding these important factors, it is difficult to make performance comparisons across ports. For example, comparing the average ship turnaround time across each port can be misleading for assessing performance without taking into account ship size and, in particular, call size. Ports with larger call sizes would have longer turnaround times and thus appear relatively inefficient compared with those with smaller call sizes. Comparing turnaround times within ship and call size categories (as done by the World Bank (2021)) would allow for a fairer approach in evaluating performance.

Data on performance by terminal operator are also needed. Performance may differ between terminal operators in a port. Metrics published reflect the average performance. These measures do little to help identify best practice among terminal operators. Providing performance metrics (confidentiality permitting) for each terminal operator may help to identify underlying trends and patterns in performance and help shipping lines make an informed decision when selecting which terminal operator to use. (International datasets, such as the one used by the World Bank (2021), provide data at the terminal level already.)

The lack of raw underlying data released is also observed as a significant gap in freight data more generally (iMove Australia 2019, p. 4).



Draft finding 3.2

Data gaps limit assessment of port performance

Publicly available data relating to port performance is fragmented, incomplete and inadequate. This constrains analysis. Data on labour inputs, for example, are not available, precluding analysis of labour productivity. Other data gaps mean that productivity during some key steps of a container's journey through a port is not visible.

Filling the gaps in the existing approach

Filling gaps in the existing framework would require tracking the movement of containers, ships, trucks and trains throughout the duration of their time spent in port and at the various stages of port operations. Some time-based metrics are collected and published in *Waterline* but others (such as container dwell times) are notably absent (figure 3.2). The reporting of labour productivity measures is also an important gap to fill.

The suggested extension of the existing framework would place greater emphasis on time-based metrics, greater cohesion of time-based metrics across port operations, and more disaggregation of the data. This is similar to the approach used for ship calls by the World Bank (2021) and is similar to a port-wide approach proposed for Canadian ports (Mary R. Brooks Transportation Consulting 2015), which both place a greater emphasis on time-based metrics.

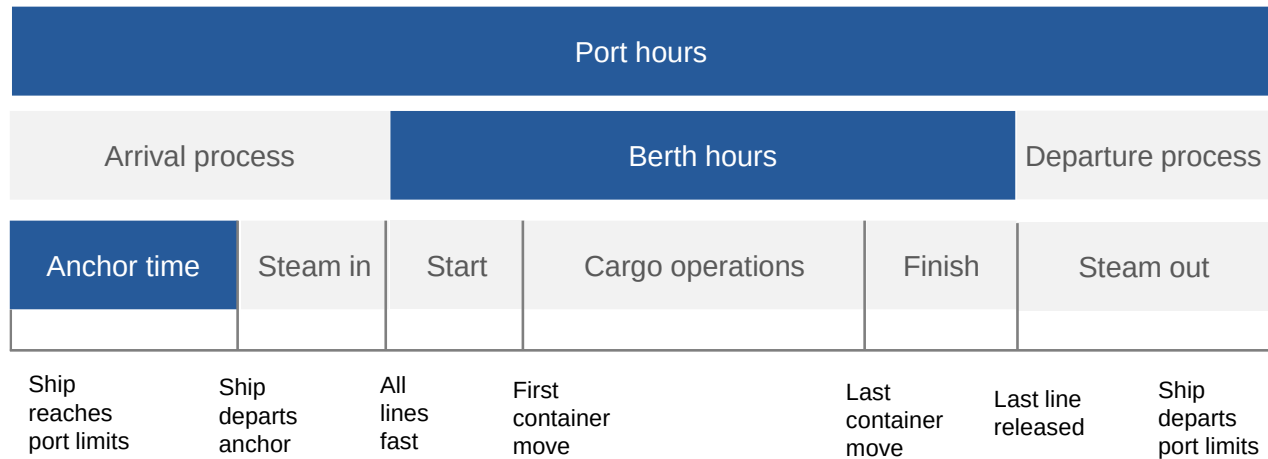
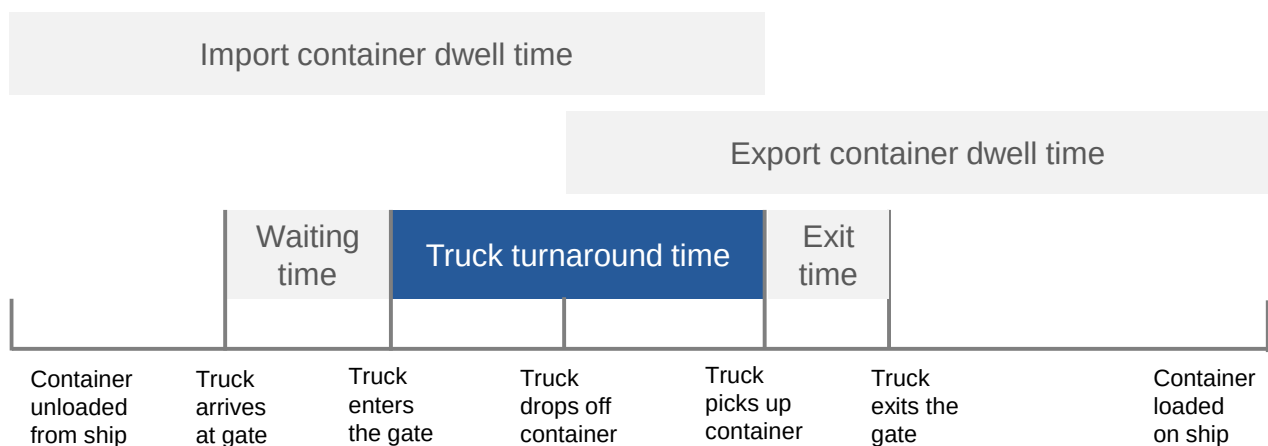
The benefits of extending the existing framework to include more time-based metrics include, but are not limited to:

- allowing for a comprehensive assessment of productivity across the maritime logistics system and what actions can improve the system and inter-port coordination
- helping the many participants of the logistics chain understand the 'pinch points' in the system and where they can improve their operations
- assisting government policy and improving strategic planning. Full data is needed to make sure that our ports develop in the best way going forward (recognising that a poor decision today can have significant long-term consequences).

Much of the time-based data is already collected elsewhere but is currently not linked. A time-based recording system already occurs for ships. The automatic identification system (AIS) records when ships arrive at the port limits, how long they spend at anchorage, the time taken to sail to berth, when the ship is berthed, when it leaves the berth, and when it leaves the port limit. Terminal operators also collect time-related data for their landside operations for their own use. The existing framework could be improved by linking these existing data collections and, potentially, augmenting them.¹⁹

Not all data would need to be published in *Waterline*. Some data could be released in the additional electronic data tables that accompany the *Waterline* publication. For example, information on underlying distributions could be aggregated for publication (such as providing the mean, median and standard deviation). This would also help to maintain presentability and confidentiality. More detailed data could be released in electronic data tables or made available on request.

¹⁹ Chapter 11 discusses maritime logistics system data more broadly than the data specifically required for the extended performance framework. It includes a discussion of public and private data sources, data gaps identified by stakeholders, the siloing of data and the role for government in sharing data.

Figure 3.2 – Grey areas represents gaps in existing time based metrics^{a,b}**a) Marine operations and quayside time-based framework****b) Landside time-based framework**

a. The blue boxes indicate that the time-based metric (or some form of it) is available in BITRE's *Waterline* publication. A grey box indicates that data is currently unavailable. **b.** Containers can also be transported via trains. This is not depicted in the figure.

That said, linking, cleaning and maintaining data is not costless. While much of the data needed to fill the gaps in the framework appear to be collected by participants in the supply chain, there are costs associated with gathering and reporting this data. These costs potentially include, but are not limited to:

- the administrative burden for the participants involved in providing the data (for example, the burden of providing more data for firms with outdated data systems may be too high)
- ensuring confidentiality is maintained and that publishing more data does not facilitate anticompetitive behaviours among the firms
- additional governmental resources required (such as setting up contracts to collect data, cleaning and linking the data and reporting and maintaining the data)
- potentially undermining third-party businesses who currently track individual container movements (although, the extended framework focuses on reporting more aggregated statistics rather than container-level data).

While richer data would support deeper insights into port performance, it is unclear if the associated benefits would outweigh the potential costs inherent in extending the existing framework. But as the Commission has previously noted:

the substantive argument for making data more available is that opportunities to use it are largely unknown until the data sources themselves are better known, and until data users have been able to undertake discovery of data. (PC 2017b, p. 2)

Further, some of the gaps identified are relatively easier to fill. For example, labour productivity measures or container dwell times could be sourced from container terminal operators, who already provide other related information for publication in *Waterline*. This suggests there is 'low-hanging fruit' to be picked that could fill the gaps in the existing framework in a valuable way. More detailed data on time-based metrics, especially data disaggregated by ship and call size, may be more costly to gather and report.



Information request 3.3

The Commission is seeking feedback on the costs and benefits of collecting and processing the richer data required to implement a comprehensive performance management framework. Insights into whether there would be any significant downsides to increased information availability, such as the possible facilitation of anticompetitive behaviour, would also be appreciated.

Other data issues in the existing approach

Lack of recent information

Waterline has a long publication lag. For example, *Waterline* 67 was released in December 2021 and contained quarterly data up to December 2020. This means that any productivity analysis uses data that is at least a year old. The significant delay in releasing government data is also an issue identified for most freight datasets (iMove Australia 2019, p. 4).

Releasing electronic data tables online, perhaps prior to releasing the *Waterline* publication, may improve the timeliness of data. The New Zealand port performance data is published online enabling access to more recent data for users (Ministry of Transport 2021).

Limited time-series data

Despite having been published since July 1994, *Waterline* contains limited time-series data. This is because the range of reported metrics has expanded over time (which limits time-series data for newer measures) and because some metrics have been renamed and refined (so are no longer consistent over time).

The duration of time series data varies by metric. The crane rate, elapsed labour rate and ship rate span the longest period (1989–2020), enabling a long-term assessment of quayside productivity. Other measures have much shorter time series which limit their usefulness for examining long-term trends. For example, metrics such as truck turnaround time, anchorage time and ship turnaround time only span 2011–2020.

The limited time-series data makes it difficult to analyse long-term trends in port performance as directed by the terms of reference.

The proposed way forward for assessing port performance

The range of time-based metrics (in figure 3.2) could be collected, assessed and potentially combined into an index of port performance. The index could build upon the work done by the World Bank (2021), and

could be used to compare ports on the basis of container movement times (that is, from arrival on ship to departure on transport for imports and vice versa for exports).²⁰ This index should incorporate time-based metrics from marine, quayside and landside operations and, importantly, these time components should be able to be disaggregated into subcomponents (such as anchorage, operating time and container dwell time).

Comparing performance in different time metrics across ports should reveal operations in a port that are relatively inefficient compared with other ports. Other metrics of performance could be used to help to understand *why* these relative inefficiencies are present. For example, analysing crane rates can shed light on cargo operation times: more productive cranes should result in faster times. Unpacking any index and understanding *which* components are inefficient and *why* there are differences in performance can provide more value than the index itself. This is because the process sheds light on specific inefficient areas and potential ways to improve performance.

Such an index should be feasible for Australian ports *if* gaps in the existing data can be filled.

Developing such an index to use in international comparisons would be more challenging. Collecting data on the landside would be more difficult than collecting data for the quayside because landside operations are more fragmented (more operators and different transport types). Given this, the World Bank and IHS Markit's CPPI have made an impressive first pass at collecting time-based metrics for marine and quayside operations and at constructing a performance index based on these metrics.

This type of performance benchmarking and detailed unpacking of the index could shed new light on port inefficiencies. The analysis, however, may not reveal any role for government intervention. For example, inefficiencies in loading and unloading containers would be an issue for terminal operators to directly address. That said, there may be a role for regulators or governments in setting performance benchmarks.

Given BITRE are the main data collectors and have already undertaken benchmarking exercises in the past (BITRE 2009), they would be well placed to perform a benchmarking analysis. Consultation with industry following the analysis could help to unpack the findings of the benchmarking exercise and help identify ways to improve performance.



Information request 3.4

The Commission is seeking feedback on its proposed methodology for benchmarking Australia's ports. Would it be feasible and useful? Would alternative approaches have greater merit? If benchmarking is considered useful, who should undertake it? And how often should it be undertaken?



Draft finding 3.3

The framework for measuring Australian container port performance could be enhanced

A comprehensive framework for measuring port performance would include data on the time taken to move containers through each of the key steps between ship and port gate. Comparison of these time-based metrics across ports would reveal where operations in a port are relatively inefficient. Other performance measures could then be used to understand *why* these relative inefficiencies exist.

²⁰ Ideally the index would also incorporate information about the distribution of these times. Doing so would capture an element of how dependable the port system is. For example, a port with fast container turnaround times with a narrow distribution would be both highly efficient and dependable.

3.6 How productive are Australian container ports?

To assess the performance of Australian ports, the Commission has combined metrics from *Waterline* with those from IHS Markit's Port Performance Program data.

The Port Performance Program data help to fill some of the gaps in the existing framework and provide a wider range of metrics. In particular, the advantages of this data is that they:

- provide comprehensive information on ship-visit times
- provide terminal operator data
- contain gross measures of productivity
- enable greater consistency with the international comparisons of container port productivity (section 3.7).

Combining data sources allows for more in-depth analysis of the performance of Australian ports than would otherwise be possible. Still, gaps in the data mean that a performance benchmarking index of the time it takes to move a container through a port (as described above) cannot be constructed. Missing data, for example, on container dwell times, mean that a significant part of the time that a container spends in port would be missing, potentially biasing the index. Instead, the Commission has sought to benchmark components of time for which data is available and unpack the reasons for relative performance where possible.

COVID-19 pandemic-related supply disruptions have caused major disruptions to international and Australian container shipping markets (chapter 1) and introduced significant volatility into the data. This is evident in the Port Performance Program data for 2020 and 2021 and *Waterline* data for 2020, and it means that those years are unlikely to be representative of productivity in international container ports, including those in Australia. Given this, the Commission's benchmarking of port performance focuses on the 2019 calendar year, as it preceded the COVID-19 pandemic and is, therefore, more representative of a 'typical' year.

That said, while in many ways the data for 2019 can be considered representative of earlier years and consistent with longer-run trends, this may not be the case for every port. For example, the nature, type and duration of industrial action undertaken to support negotiations over enterprise agreements means that individual terminal operators may have been affected by stoppages and other actions that reduced their throughput and impeded efficient port operations (chapter 9). The ongoing rolling nature of these industrial actions mean that their effects will be present in the data for many years. While less severe than industrial action in 2020 and 2021, rolling industrial action occurred in 2019 across the main Australian container terminal operators (DP World, Hutchison, Patrick, and the Victorian International Container Terminal) and most container ports (other than Adelaide). The effects of industrial action were particularly evident at Port Botany in Sydney and the subsequent ship diversions affected operations at Brisbane. Events of this type will affect how Australian ports compare, both with each other and international ports.

The following sections assess:

- the reliability of ships arriving at Australian ports on schedule (and thus containers arriving on schedule)
- the productivity of ports (including marine, quayside and landside operations) in moving those containers through the port.

Service reliability has declined markedly over the past three years

Ships missing windows has clearly become a significant problem worldwide following the onset of the COVID-19 pandemic. The trend appears to have started in mid-2019 in Australia and was exacerbated by COVID-19 (figure 3.3). The Maritime Union of Australia (sub. 72, p. 1) stated that 'over the 18 months from August 2020 to January 2022, 83 per cent of all the international container vessels arriving in Australia's five

major container ports arrived late for their allocated slot'. Ships were between 5-8 days late in calling at Australian ports in January 2022 (p. 2).

Detailed data on shipping schedules and windows are not publicly available. Neither *Waterline* nor the Port Performance Program contain data on the extent to which ships meet their designated windows. The Maritime Union of Australia relied on data from Sea-Intelligence which is not publicly available. Public access to data on shipping schedules and movements would enable an assessment of short- or long-term trends in the reliability of ships servicing Australian ports.

Figure 3.3 – Reliability of ships arriving on schedule has declined

Per cent of container ships arriving on time, 2019–2022



Source: MUA Supplementary Submission (sub. 72, p. 1).

Marine operations

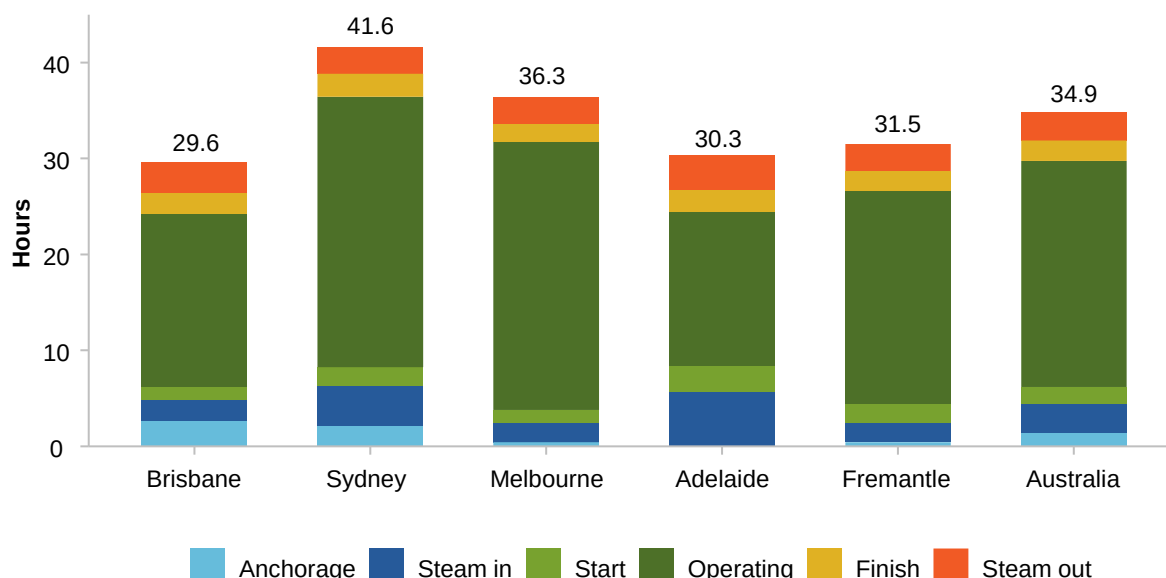
The productivity of marine operations is reflected in the time it takes for ships to get into and out of port — ship turnaround time (or port hours). Because container handling is a large part of the time a ship spends in port, quayside operations time is also included here.

Each container ship spent 35 hours in each Australian container port on average in 2019 (figure 3.4). Over three-quarters of this time was spent at berth (27 hours) and two-thirds was spent handling containers (24 hours). But there is substantial variation in the average time between ports.

The remainder of the section unpacks port performance in each component of port hours (as presented in figure 3.2a).

When interpreting the following results, it is important to bear in mind that there is sometimes a trade-off between the speed of operations and safety. For example, increasing the speed of using cranes may result in higher productivity but also increase the risk of straddle cranes tipping over. Similarly, increasing the speed of entering a port may compromise the safety of tug operators.

Figure 3.4 – The average container ship spent 35 hours in port^a
Total port hours by component, 2019



a. Observations with arrival hours greater than 72 hours are removed from the sample because of data cleaning advice provided by IHS Markit. Observations with data on all time-based metrics are included in the sample. They represent 85 per cent of the full sample.

Source: IHS Markit's Port Performance Program data.

Australian ports are relatively safe. The Maritime Union of Australia (sub. 59, pp. 104–5) stated that there has not been a stevedoring fatality on Australian ports since May 2014, nor have inquiry participants raised concerns about serious injuries or accidents in Australian ports. This contrasts with the experience of New Zealand where the port of Auckland had two fatalities in two years (2018–2020) (Maritime Union of New Zealand, sub. 30, pp. 3–5).

The guidelines and regulations that ensure the safety of Australian workers should not be compromised for speed. The Maritime Union of New Zealand (sub. 30, p. 2) cautioned that when long-standing work practices that ensured the safety of employees were removed, 'productivity of the port may have improved, [but] anticipated direct safety consequences followed'.

Notwithstanding this, the analysis below sheds light on components of port operations that are slowing down ship turnaround times and point to areas for further investigation as to whether time could be improved without compromising worker safety.

Arrival and departure processes

Arrival and departure processes accounted for about 20 per cent of port hours on average. Reducing anchorage time is a key way to improve performance, whereas steam-in and steam-out times are likely more difficult to reduce because they should only reflect the sailing of ships within a port.

Anchorage time

As noted above, the time that ships spend at anchorage is wasted time.

Ships spent an average of 1.3 hours at anchorage in 2019, with Brisbane and Sydney having the highest average anchorage times (2.6 hours and 2.1 hours, respectively) (figure 3.4). These times are averages

across all vessels and, as such, may be skewed both by ships that steam straight in and by outliers that have to wait much longer than other ships. Consistent with this point, average wait times are higher when ships that did not anchor are excluded, and median anchorage times are lower than average times for vessels that anchored.²¹

These averages mask variations in anchorage times across terminal operators and over time (see technical paper). For example, anchorage times increased for ships using all three Sydney terminal operators from September quarter 2018 through to the end of 2020. Several factors could have contributed to this increase, including:

- intense storms — October 2018 included seven days where waves were above 3 meters in Sydney, including three consecutive days. Significant wave events were further experienced in June 2019 (Manly Hydraulics Institution 2020, fig. 5.15). This can create unsafe conditions for pilotage forcing ships to anchor rather than enter port
- industrial action — there were industrial disputes at DP World and Hutchison (ACCC 2019a, p. 24).

The average anchorage time returned to below September quarter 2017 levels by June quarter 2020, only to then rise sharply again due to the COVID-19 pandemic and subsequent industrial action (NSW Ports 2020).

Steam-in and stream-out times

Steam-in time should reflect the movement of the ship from port limits or exit from anchorage to the berth. Similarly, steam-out time reflects the movement from the berth to port limits. Some anchorages are located further away from the berth and therefore steam-in and out times are expected to be larger for these ports, but factors such as sailing speed will also affect these times.

Steam-out times were similar across ports, but steam-in times differed (figure 3.4). Steam out times averaged 3 hours, with the longest average time recorded in Adelaide (3.6 hours) and the shortest in Melbourne (2.8 hours). Steam-in times were highest in Adelaide (5.6 hours) and Sydney (4.3 hours) compared with other ports (2.1 hours on average). Higher steam-in times for these ports appear to be due to how the data were collected.

- For Adelaide, the Port Performance Program data suggest that no ships anchored but the Waterline data indicate that they did. Because anchorage could not be discerned from steam-in time in the 2019 Port Performance Program data, steam-in time was inflated. Indeed, data for 2021 contain both anchorage and steam-in time and revealed that average anchorage time in Adelaide was 4 hours and steam-in time was 2.6 hours.
- For Sydney, some ships crossed an anchorage zone assigned to Sydney and then left the zone to wait somewhere outside before finally berthing after an extended wait. The additional waiting time was captured in steam-in time rather than anchorage time (Turloch Mooney, IHS Markit, pers. comm., 11 May 2022). Therefore, steam-in time is inflated and anchorage time is deflated for Sydney.

Notwithstanding this, the arrival process in Sydney (6.4 hours), Adelaide (5.7 hours) and Brisbane (4.8 hours) is more than double the time taken in Melbourne and Fremantle (2.5 hours each), suggesting that improvements could be made by reducing anchorage time since steam-in time should only reflect sailing from anchorage to port.

²¹ In 2019, 93 per cent of ships anchored in Brisbane, they waited an average of 3 hours (median 2.1). For Sydney, almost 50 per cent of ships anchored, they waited an average of 4.3 hours (median 1.9). In contrast, only 3 per cent of ships anchored in Melbourne but they waited 13 hours on average (median 9 hours).

Berth hours

Berth hours account for almost 80 per cent of port hours on average and encompass start and finish times, and cargo operating time. Improving performance in these time components could help to turn ships around faster. This is especially true for cargo operations which account for the bulk of a ship's time spent in port.

Importantly, giving terminal operators access to a ship once it has berthed allows them to start container handling operations as soon as possible. Terminal operators may not, for example, be able to unload containers until the ship or its cargo have undergone a clearance procedure or before containers are unlashd by dock workers. If ships are sitting idle with no work being carried out, then this idle time is wasted and reduces port productivity. On average, ships were available to terminal operators (stevedores) for 86 per cent of the time that they were berthed in 2019 (figure 3.5). Cranes operated for three-quarters of that time, or 65 per cent of total berth hours.

Start and finish times

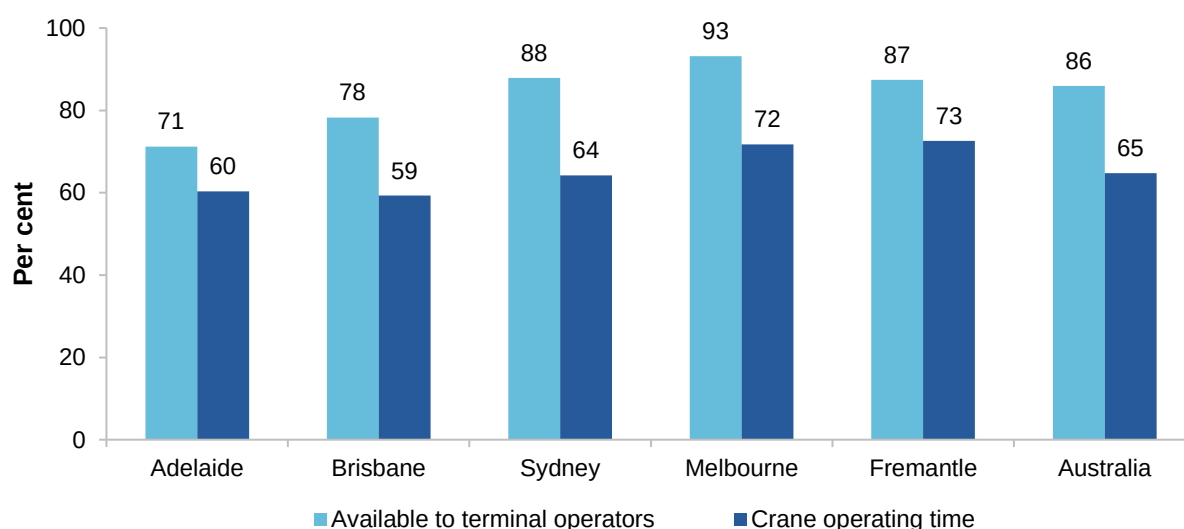
The average time taken between when a ship arrived at berth (all lines fast) and when cargo operations started (first lift) varied across ports (figure 3.4). Adelaide had the longest start time on average (2.7 hours), while Melbourne had the fastest (1.3 hours on average).

Finish time, that is, the time taken from when cargo operations finished (last lift) to when the ship was ready to leave (last line released), was more similar across ports. Sydney had the slowest finish time on average (2.4 hours), while Melbourne had the fastest (1.8 hours).

When start and finish times are combined, Adelaide has the slowest time on average (5 hours), followed by Sydney (4.3 hours) and Fremantle (4 hours). Melbourne and Brisbane were the fastest (3.1 and 3.5 hours respectively). This suggests that Adelaide, Sydney and Fremantle have scope to improve start and finish times and lower their berth hours.

Figure 3.5 – Terminal operators had greater access to ships in Melbourne^a

Share of total berth hours where ships were available to terminal operators and cranes were operating, 2019



a. Available to terminal operators: total time ship available to stevedores divided by total berth hours. Crane operating time: total operating hours divided by total berth hours.

Source: BITRE (2021c).

Cargo operating time

Cargo operating time is the largest single component of port hours (figure 3.4). On average, operating time accounts for almost 68 per cent of port hours. Adelaide had the shortest average operating time at 16 hours and Sydney and Melbourne had the longest (about 28 hours each) (table 3.4).

Operating time is influenced by a range of factors; the key ones include:

- call size (recapping, the number of containers un/loading on each ship visit)
- the number of quay cranes used to handle containers and the productivity of those cranes (discussed in more detail below).

Larger call sizes will typically require longer cargo operating hours because there are more containers to be handled. Differences in average operating times between the Australian ports largely reflect differences in average call sizes. The ports with higher average call sizes — Melbourne and Sydney — had the longest average operating time per ship (table 3.4). The performance differential is less pronounced once call size is taken into consideration — that is, differences in operating minutes per move are considerably smaller than those in average operating times.

The number of cranes allocated to ships also influences cargo operation times. More cranes (within the physical restrictions of the ship and berth) will enable more containers to be moved simultaneously. The number of cranes deployed will typically be higher for larger call sizes. Melbourne and Sydney have the largest average call sizes and deploy more cranes per ship (discussed below). As a result, these ports recorded faster average container moves. Adelaide, with the smallest average call size, had the longest average handling time at 1.3 operating minutes per container move (table 3.4).

As larger ships typically have larger call sizes, larger ships generally result in lower minutes per container moved (port hours per move). The fact that Sydney and Brisbane handle more smaller ships and call sizes than Melbourne helps to explain why their time taken to handle each container on average is higher than Melbourne's (figure 3.6). Melbourne's lower anchorage times also contribute to this.

Table 3.4 – Average operating time related to call size^a

Operating time, 2019

Port	Total calls no.	Total moves no.	Average call size no.	Total operating time hours	Average operating time hours/ship	Operating minutes per move min
Brisbane	620	541 797	874	11 225	18.1	1.24
Sydney	719	1 060 157	1 474	20 260	28.2	1.15
Melbourne	652	1 125 798	1 727	18 223	27.9	0.97
Adelaide	309	225 565	730	4 974	16.1	1.32
Fremantle	341	371 826	1 090	7 595	22.3	1.23
Australia	2 641	3 325 143	1 259	62 276	23.6	1.12

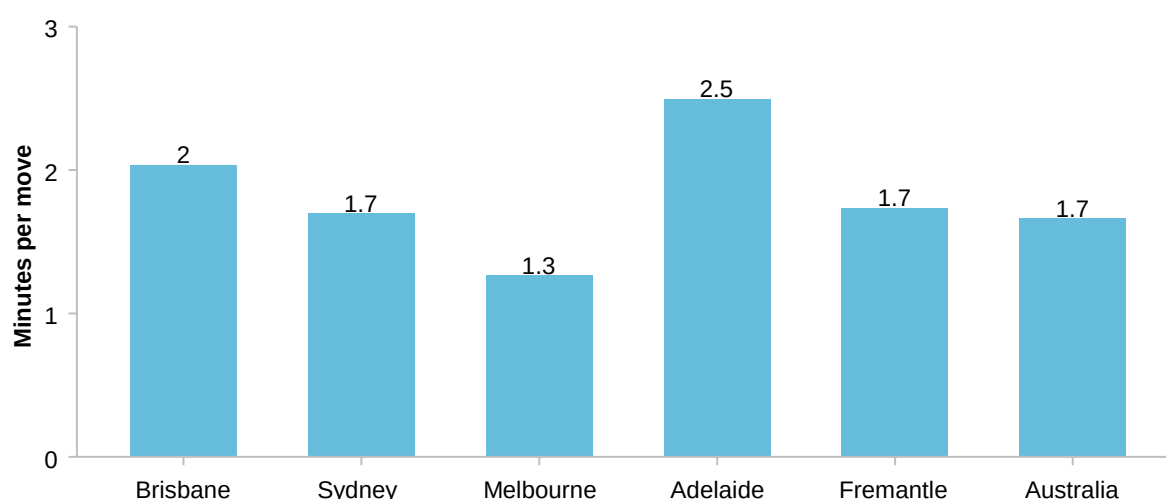
a. Observations with data on all time-based metrics are included in the sample, 85 per cent of full sample.

Source: IHS Markit's Port Performance Program data.

There are 'economies of scale' in the time it takes to un/load ships (UNCTAD 2021b, p. 100). That is, the larger the call size the fewer minutes on average it takes to load or unload a container, although port hours are longer. There are two dimensions to understanding this.

1. The number of cranes used increases as call sizes increase and is part of the reason why the time taken to move containers (operating minutes per move) is less in Melbourne than in Adelaide (table 3.4).
2. Time that is relatively 'fixed' per ship (such as arrival, start and finish, and departure times), and not as closely related to the call size, is spread over more containers moved resulting in lower minutes per container moved (port hours per move, figure 3.6).

Figure 3.6 – Ships in Melbourne spend less time in port per container
Total port hours per container move, 2019



Source: IHS Markit's Port Performance Program data.

Quayside operations

Quayside productivity captures the efficiency of moving containers from or onto ships using quay cranes. It also includes any incidental container movements, such as re-stowing cargo for unloading at later ports.

A more productive quayside results in fewer minutes per container move and faster cargo operation times for a given call size. This can help to turn ships around faster, especially given cargo operations account for the bulk of a ship's time in port.

The time taken to un/load a ship depends, among other things, on:

- the number of quay cranes working the ship
- the gross productivity of each crane.²²

This section focuses on two measures of quayside productivity — the crane rate and ship rate. Box 3.3 presents a numerical example of these measures.

²² The time taken to un/load a ship will also depend on the extent of operational and non-operational delays if a net crane rate measure is being used.

Box 3.3 – Understanding quayside productivity measures

A simplified numerical example illustrates commonly used quayside productivity measures.

Assume that a typical ship call involves:

- Containers handled = 1000 containers (also known as call size)
- Total number of cranes allocated = 3
- Operating hours = 17 hours
- Gross crane time = 30 hours (assumes that each crane is allocated to work 10 hours^a)
- Crane intensity (average number of cranes working the ship per operating hour) = 1.8 (gross crane time / operating hours^b)
- Operational and non-operational delays = 3 hours
- Net crane time = 27 hours (gross crane time less operational and non-operational delays).

The following measures are reported in Waterline:

- *Net crane rate* = Containers handled / Net crane time = 37 moves per crane hour
- *Net ship rate* = Net crane rate x Crane intensity = 67 moves per hour.

Measures not published in Waterline but are commonly used internationally (JOC Group 2014; The World Bank 2021) and that can be calculated using the Port Performance Program data are:

- *Gross crane rate* = Containers handled / Gross crane time = 33 moves per crane hour
- *Gross ship rate* = Gross crane rate x Crane intensity = 60 moves per hour.

a. The data reflect that not all cranes will typically operate for the full operating time. **b.** *Waterline* calculates crane intensity by replacing operating hours with elapsed labour time.

Average crane rates are similar across ports, but average ship rates differ (figure 3.7). Gross crane rates were similar across ports in 2019, with each crane handling an average of 25 container movements per hour. Melbourne had the highest gross ship rate at 60 moves per hour and Adelaide had the lowest gross ship rate at 44 moves per hour.

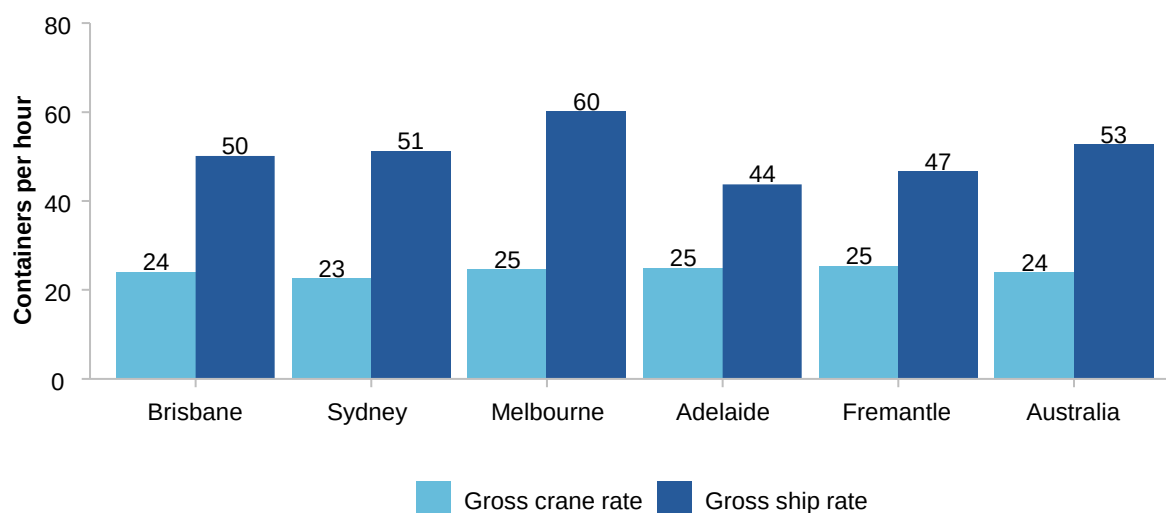
Differences in gross ship rates is explained by the number of quay cranes deployed. The gross ship rate depends on the number of cranes deployed to that task (or crane intensity). For a given level of crane productivity, a port can move more containers in a ship hour if they allocate more cranes to ships. Melbourne and Sydney had higher gross ship rates than the other Australian container ports because they used more cranes per ship on average. Melbourne used 2.5 cranes per ship in 2019 compared to 1.8 in Adelaide and 1.8 in Fremantle (figure 3.8). This higher average crane intensity meant that Melbourne moved 13 to 16 more containers per hour than did Adelaide and Fremantle despite having similar crane productivity.

Assuming comparability between the Port Performance Program (gross rates) and *Waterline* (net rates) data, differences between the gross (figure 3.7a) and net rates sheds (figure 3.7b) light on the extent of operational and non-operational delays. For each port, differences in the two crane rates suggests that delays are reducing crane productivity. For the ship rate, differences are larger. For example, in Melbourne, the gross ship rate is 60 containers, but the net ship rate is 75 containers, suggesting that operational and non-operational delays reduce the number of containers that can be moved in an hour by 15 containers on average.

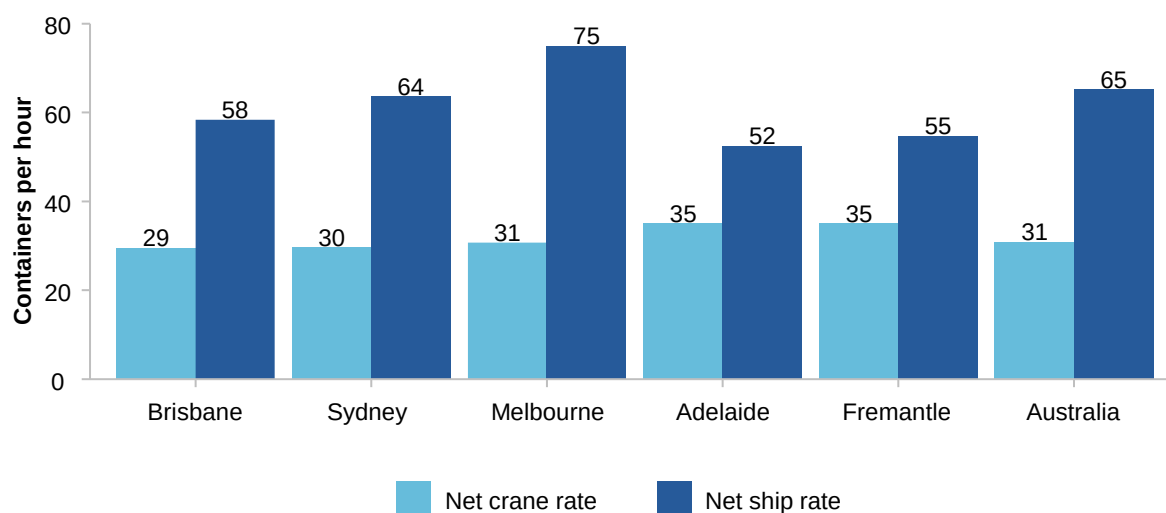
Figure 3.7 – Fremantle and Adelaide have the highest crane rates; Melbourne and Sydney have the highest ship rates

Quayside productivity, 2019

a) Gross measures

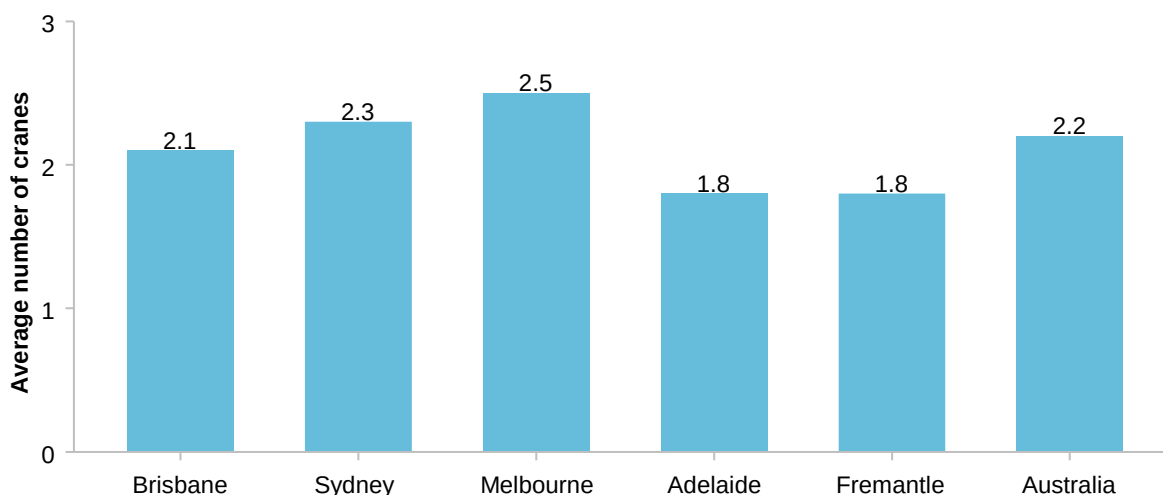


b) Net measures



Sources: BITRE (2021c) and IHS Markit's Port Performance Program data.

Figure 3.8 – Melbourne uses more quay cranes than other ports^a
Crane intensity, 2019



a. Defined as gross crane hours divided by operating hours.

Source: IHS Markit's Port Performance Program data.

Terminal operator quayside productivity

Port-wide averages do not reveal much about each terminal operator's productivity within a port. The Port Performance Program data enable the assessment of productivity by terminal operator. Adelaide is excluded from the analysis because there is only one terminal operator (Flinders) present, which means that port performance is equivalent to the terminal operator's performance.

Gross crane productivity varies across terminals within a port (figure 3.9). In Melbourne, for example, cranes at Patrick's terminal averaged 10 more moves per hour between 2017 and 2019 than cranes at DP World's terminal (with similar levels of automation at the two terminals). Newer entrants to the market (such as Hutchison and VICT) tended to have lower or more variable average gross crane rates. The exception to this variability was Sydney, where gross crane rates converged across terminal operators in 2019.

Crane rates also vary markedly over time for terminal operators within a given port (figure 3.9). For example, the average monthly gross crane rate for Patrick in Melbourne between 2017 and 2019 ranged from 27 to 38 container moves per hour, while rates for Hutchison in Sydney ranged from 17 to 32.

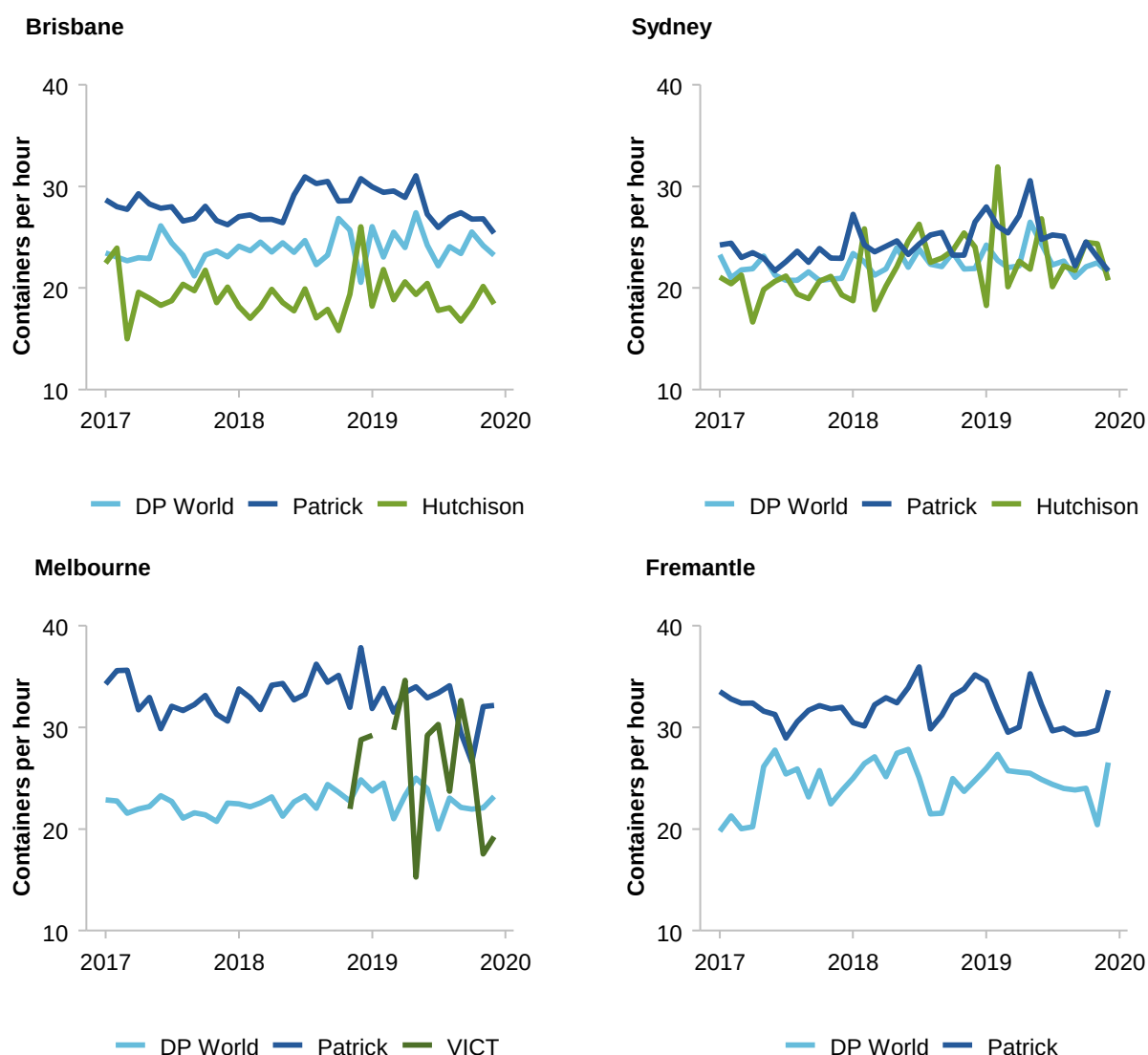
Evidence of considerable variations in gross crane rates for each terminal operator over time, and between terminal operators requires further consideration. The data suggest that Australian terminal operators have significant scope to improve ship turnaround times without making any changes to crane intensity.

Regardless of the technology used, terminal operators have an incentive to utilise their cranes as efficiently as possible to reduce their per unit costs. Higher rates of crane productivity imply higher rates of asset utilisation. Given the substantial fixed costs involved in purchasing quay cranes, the cost per container moved declines as the number of containers handled by a crane increases (referred to as 'economies of scale'). The irregular nature of ship arrivals and variations in call sizes that are outside the control of terminal operators means that achieving high rates of crane utilisation may not always be possible. This observation also applies to other assets such as berths and, on the landside, container yard area. And one downside to

high capital utilisation is that there may be limited capacity to handle any future growth in throughput without further investment.

Figure 3.9 – Productivity varied between terminal operators within ports^{a,b}

Average monthly gross crane rates, 2017–2019



a. The Port of Adelaide was excluded because there is a single terminal operator (Flinders) and so the port average is equivalent to the terminal average. **b.** The first observation for VICT in Melbourne was in November 2018. The observation for VICT in February 2019 was excluded because it was an extreme outlier in the series.

Source: IHS Markit's Port Performance Program data.



Draft finding 3.4

There is scope to improve crane rates

Crane rates can vary significantly across terminal operators within the same port and over time within the same terminal operator. More consistent attainment of high crane rates would lift productivity.

Long-term quayside productivity trends

The productivity of Australian container ports has risen since the late 1980s (figure 3.10).²³ For example, the net crane rate rose from 16 containers per hour in 1995 to 30 containers per hour in 2020 (figure 3.10b), or at an average annual rate of 2.5 per cent. The net ship rate across all Australian ports similarly grew from 21 containers per hour in 1995 to 65 containers per hour in 2020, or at an average annual rate of 4.6 per cent, implying that the number of cranes used grew at an average annual rate of about 2 per cent over the period.

In part, net crane rates measured in TEUs per hour have improved because cranes are handling larger containers — the number of *TEUs* moved per hour has grown more than the number of *containers* moved per hour since the early 2000s.²⁴ Movement of one 40-foot container is equivalent to the movement of two TEUs (20-foot equivalent containers), and the share of 40-foot equivalent unit containers has been increasing (for example, from 24 to over 55 per cent between 1997 and 2020). The fact that this increase has not reduced the rate at which quay cranes move containers suggests that these (or newer) cranes have handled the shift to larger containers well. It is also a good indication that ports are handling more goods per container movement than previously — a productivity improvement.

Productivity growth was strongest in the 1990s (table 3.5). Growth in the net crane rate (containers) averaged 4.1 per cent in the four years to the June quarter 1998. This may have reflected continuing improvements in efficiency related to the 1989–1992 waterfront reform.²⁵ Annual growth in the crane rate increased to 20 per cent between June 1998 and June 2001. The increase was due to the 1998 reform package which aimed to improve the efficiency of the waterfront (PC 2003, p. 9). One key objective was a five-port average net crane rate of 25 container movements per hour — a rate achieved for the first time in the December quarter 2000 (PC 2003, p. 12).

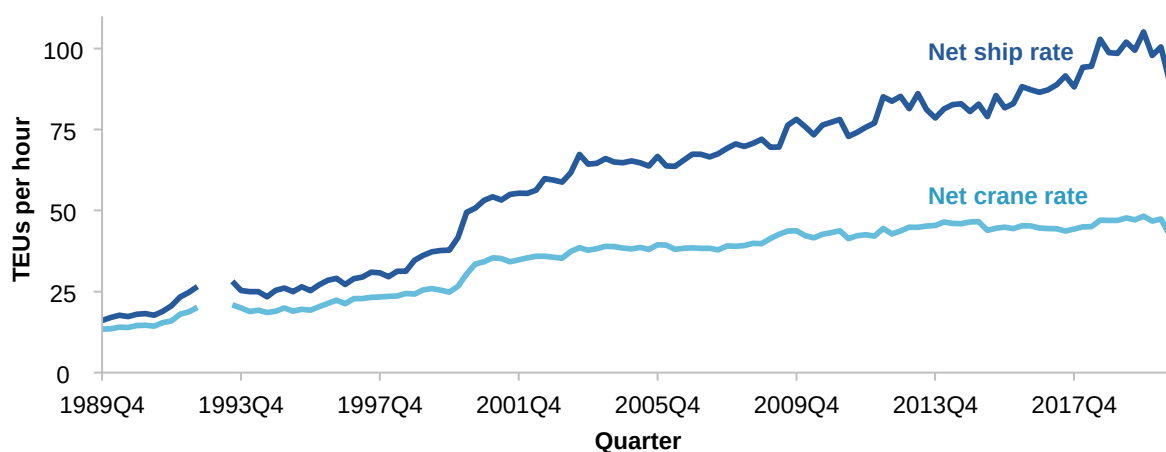
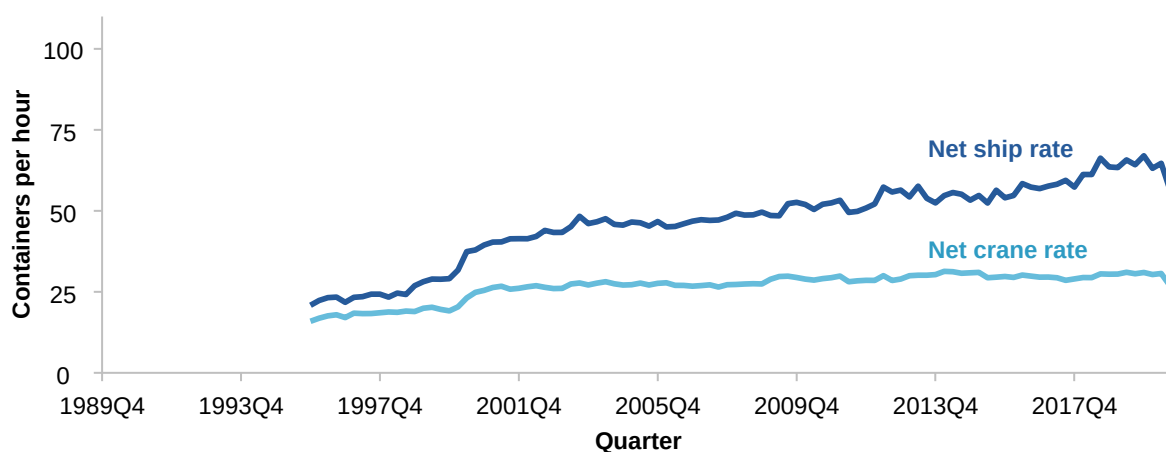
Productivity growth has slowed over the last two decades (table 3.5). But without longer time-series data (of periods that do not reflect the effects of waterfront reforms) one cannot rule out that the more recent growth rates reflect a return to a long-term trend.

Reflecting maritime supply chain issues arising from the effects of the COVID-19 pandemic and industrial action, quarterly productivity growth rates over the last two years have become quite volatile with exaggerated quarterly growth rates (both positive and negative), particularly for net ship rates.

²³ This result also holds for each port (see technical paper). *Net* rates are presented reflecting the limited long-term data available in *Waterline*.

²⁴ Other factors can also affect crane rates such as changes in crane technology and the speed of yard operations (that is, the movement of containers under the quay crane).

²⁵ The three-year program reformed the stevedoring industry with a move from industry-based to company employment, and the creation of career structures in the industry with suitable training and incentive arrangements. An evaluation found efficiency indeed improved (BTCE 1995, p. xviii).

Figure 3.10 – Long-term productivity has risen in Australian ports^a**Net crane and ship rates, 1989Q4 to 2020Q4****a) TEUs per hour****b) Containers per hour**

a. Data for both crane and ship rates in TEUs was not published between 1992Q4 and 1993Q2. Data for both crane and ship rate in containers was not published prior to 1995Q4.

Source: BITRE *Waterline* (various editions).

Table 3.5 – Australian port productivity growth has slowed**Five-port average growth rates in per cent, selected periods**

	Net crane rate		Net ship rate	
	TEUs annual growth (%)	Containers annual growth (%)	TEUs annual growth (%)	Containers annual growth (%)
1995 to 1998	5.3	4.1	5.5	4.2
1998 to 2001	23.3	19.7	30.5	28.1
2001 to 2010	1.7	0.8	3.6	2.5
2010 to 2020	1.3	0.7	3.2	2.5

Source: BITRE *Waterline* (various editions).



Draft finding 3.5

Container port productivity has increased in the last 30 years

Measured by crane rates (container movements per hour that cranes are operating), productivity at Australia's major container ports (Brisbane, Sydney, Melbourne, Adelaide and Fremantle) rose strongly in the late 1990s following significant waterfront reforms, and continued to grow at a slow pace over the following two decades.

Landside operations within ports

Landside operations within ports cover the movement of containers between the base of quay cranes and the port gate (or perimeter). This covers movement through the container yard, temporary storage by terminal operators prior to collection, un/loading onto land-based transport (trucks and trains) and the customs and quarantine clearance process.

The efficiency of some of these processes cannot be analysed due to a lack of data. For example, there is little information published on container dwell times (as noted above, the time a container spends in port after being discharged from a ship until it leaves the port for delivery to clients). There is also a lack of readily available data on the time it takes for containers to clear customs or quarantine (section 3.5). DP World (pers. comm., 27 May 2022) noted that the container dwell times in their Australian terminals are among the best in the world. In 2021, their Australian container dwell times were recorded at two or fewer days, lower than the international median of approximately five days.)

This section analyses the efficiency of Australia's major container ports in handling the trucks that drop-off and/or pick-up containers within the port perimeter. Trucks handled the bulk of all landside freight movements to and from Australian container ports in 2019, accounting for 84 per cent of the just over 5.3 million TEUs handled landside. Trains handled the rest. Because data on rail are relatively scarce, this section focuses on trucks.

There are some important differences across ports that impact landside productivity, including that:

- land transport (both trucks and trains) is utilised most effectively when it carries containers into and out of the port (referred to as 'backloading'), as this reduces the number of empty movements
- trains can carry significantly more containers per trip than individual trucks
- trucks are far more flexible than trains, both in terms of their potential turnaround times and where they can go
- trucks are more cost-effective than trains for smaller loads and over shorter distances
- differences in the mix of container movements across ports will affect their landside productivity.

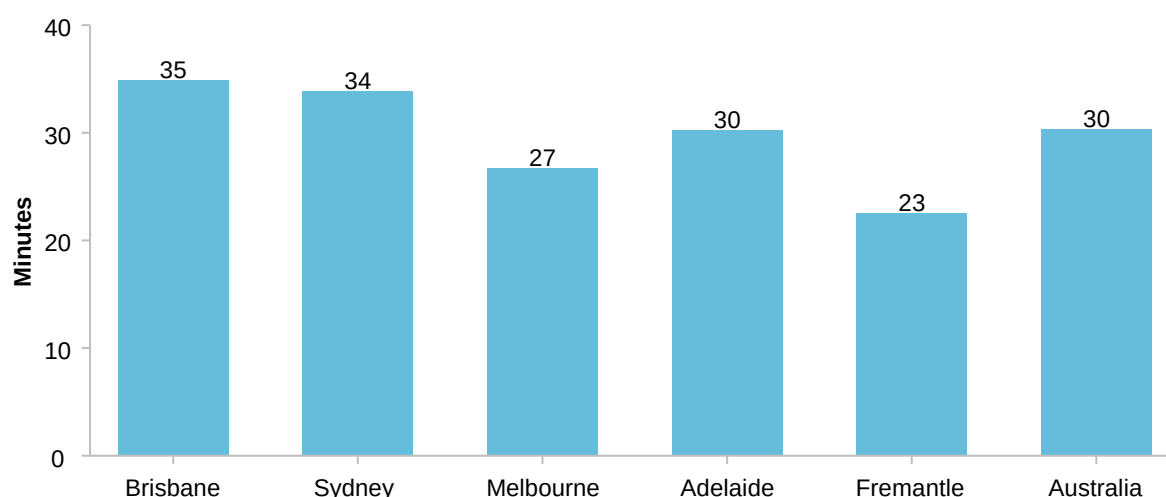
These factors will be discussed where relevant.

Truck turnaround times

Lower truck turnaround times are indicative of higher landside productivity (figure 3.11). In 2019, Fremantle and Melbourne had the shortest turnaround times, while Sydney and Brisbane had the longest. These times are likely influenced by several factors such as, the degree of port congestion, how many containers were dropped-off or loaded per visit and the speed of terminal operations in loading containers onto/off the trucks.

As noted above, truck turnaround times may appear artificially low if trucks wait outside the port gate until their containers are ready for collection. Given the absence of data on at-gate waiting times, it is not possible to ascertain if, and by how much, this practice affects measured turnaround times.

Figure 3.11 – Landside turnaround times vary by Australian container port^a
Average truck turnaround time, 2019



a. The average time from when trucks enter the port to when the last container is loaded, and the truck is ready for departure.
 Source: BITRE (2021c).

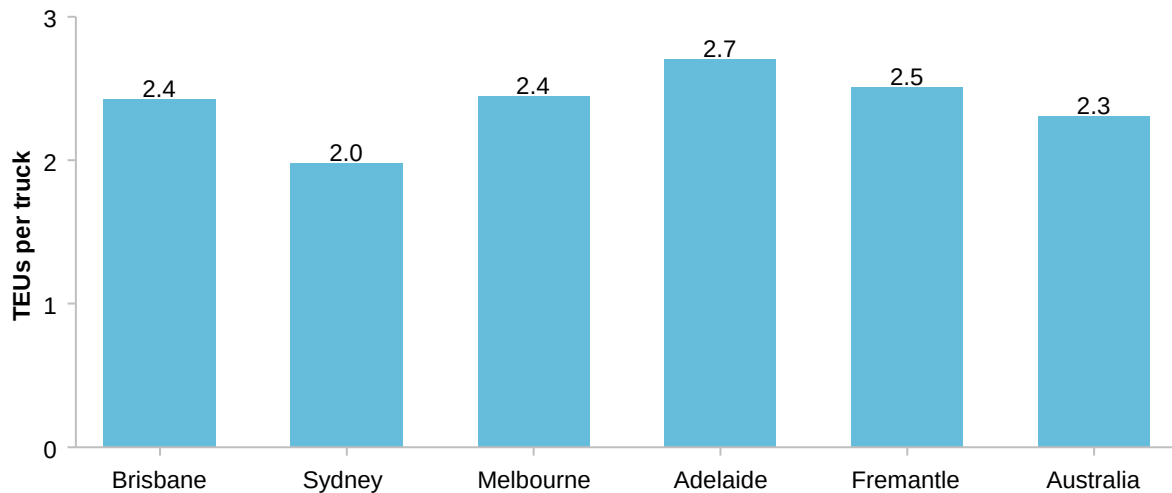
Truck utilisation

Truck utilisation measures the average number of TEUs handled per truck trip. All other things equal, higher utilisation rates are indicative of higher landside productivity because the port is moving more containers per truck trip. Higher productivity vehicles (bigger trucks) (chapter 7) and increased backloading would tend to increase the truck utilisation measure.

Most ports averaged around 2.5 TEUs per truck (equivalent to 1.7 containers per truck). Adelaide recorded the highest rate at 2.7 (figure 3.12). And the one exception was Sydney, which averaged 2 TEUs per truck. Truck utilisation in Sydney is much lower than the other ports because Sydney has the highest trade imbalance (chapter 2, figure 2.10). A low proportion of *full* export containers reduces the opportunity for backloading (because empty containers are stored and handled by empty container parks rather than transport companies) such that each truck transports fewer containers per trip (see below).

Figure 3.12 – Sydney has the lowest rate of truck utilisation^a

Average truck utilisation rate, 2019



a. Average number of TEUs handled per truck. Calculated as the count of TEUs through the VBS/TAS systems divided by the total number of VBS/TAS trucks used.

Source: BITRE (2021c).

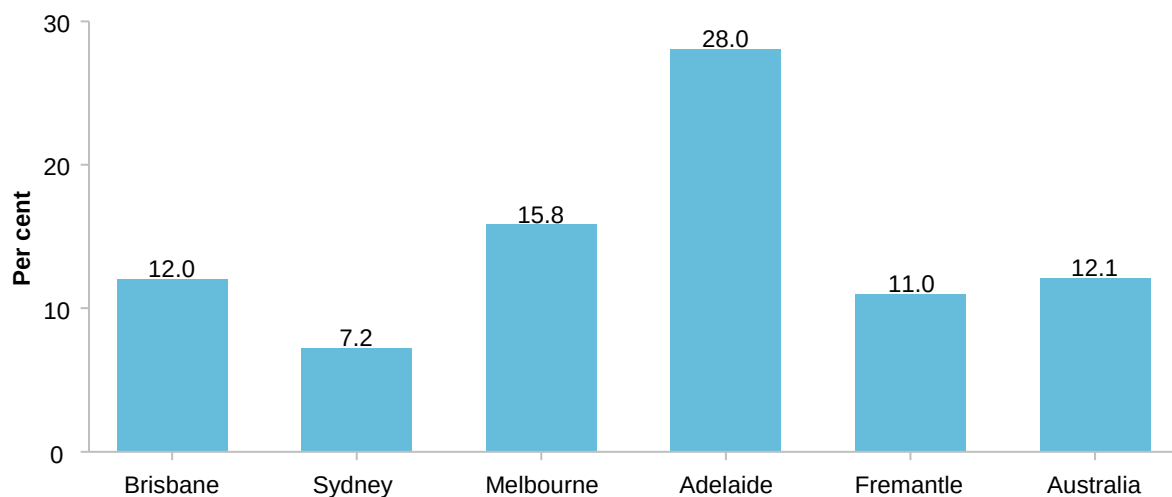
Backloading of trucks

Backloading refers to trucks which haul containers on both the inbound and outbound legs of a single trip to a port. Such operations make more effective use of trucks and landside infrastructure.

The share of backloaded trucks varied widely across Australian ports (figure 3.13). Adelaide had the highest share, and close to twice the rate of Melbourne which was the next best port. The higher degree of backloading in Adelaide corresponds with the higher truck utilisation rates in figure 3.12. That is, each truck transported more containers because 28 per cent of trucks both dropped off and picked up containers. Similarly, the lower backloading rates in Sydney shed light on why truck utilisation rates were so low in Sydney.

Figure 3.13 – Sydney also had the lowest share of backloaded trucks

Per cent of trucks backloaded, 2019



Source: BITRE (2021c).

Summary

The number of containers that pass through Australian ports reflects the demand for imports by the wider community and world demand for Australian exports.

Adelaide and Fremantle generally performed well across a range of marine operations and landside productivity-related metrics. These two ports also had the highest net crane rates in 2019. They used fewer cranes on average than the other ports but worked them harder. And truck turnaround times were fastest in Fremantle, while Adelaide trucks transported the most containers per trip, increasing their efficiency.

Of the bigger ports, Melbourne performed well on many quayside and landside measures. Melbourne moved more containers per hour than any other Australian port, owing to its use of more cranes per ship than the other ports. Sydney, on the other hand, has scope to improve their utilisation and turnaround times of trucks.

Quayside productivity varied across terminal operators within a port and, for each operator, over time. This suggests that there is scope for all terminal operators to improve the consistency of their performance.

Ship turnaround times point to potential areas for improvement. The fact that ships in Sydney and Melbourne spent longer in port (42 hours and 36 hours, respectively) is unsurprising; they are bigger ports and handle more container movements, giving rise to longer operating times — the main component of port hours. However, the fact that ships spend longer at anchorage or steaming-in in Sydney, Brisbane and Adelaide relative to Melbourne and Fremantle could be indicative of port congestion and/or port inefficiency. Addressing time spent at anchorage should be an easy way to improve port performance.

While the Australian data is not well suited to assessing long-run trends in Australian container ports, the available data point to the quayside productivity at *all* Australian ports having grown since late 1989. Growth in crane and ship rates was strongest in the late 1990s following significant waterfront reforms. Since then, growth rates have been lower. However, the fact that Australian ports are handling larger containers and the crane rate (in terms of the number of containers) has been relatively stable may point to productivity improvements in terms of the quantity of goods being moved through the ports. Ports are also using more cranes to service ships and as such the ship rate has continued to improve.



Draft finding 3.6

Each Australian container port has different strengths

How well Australia's major container ports compare to their local peers depends on the performance metric considered. For example, in 2019 Melbourne moved more containers per hour than the other ports because it used more cranes per ship. Adelaide and Fremantle had the highest net crane rates — while they used fewer cranes on average, they worked them harder. Sydney, Brisbane and Adelaide recorded longer anchorage and steam-in times — potentially indicating port congestion and/or port inefficiency. And Sydney underperformed on truck utilisation rates and turnaround times.

3.7 How do Australian ports compare internationally?

Benchmarking is the process of comparing the performance of a port against a benchmark or ideal level of performance. Benchmarks can be based on a single port's performance over time or across a sample of similar ports, or against some externally set standard (such as key performance indicators set in contracts).

The core reason for benchmarking is to identify performance gaps and areas for potential improvement.

This section examines the productivity of Australian container ports in an international context by:

- investigating why the Australian ports ranked poorly in the World Bank's CPPI study
- presenting an alternative approach to the World Bank for benchmarking container ports.

Why did Australian ports rank poorly in the World Bank study?

The Commission obtained the data that underpinned the World Bank study (that is, IHS Markit's Port Performance Program data) to understand *why* Australian ports ranked so poorly in the CPPI.

The appendix of the World Bank study pointed to issues in the relatively long times that it takes Australian ports to turn ships around (table 3.6). The performance of Australian ports — in terms of their percentile rank — deteriorated as ship sizes increased. While the Australian ports did not rank particularly well for feeder and small ships, their performance was worse for medium and large ships. The exceptions were Brisbane, which received a higher percentile ranking than other Australian ports for large ships, thanks to them having generally faster turnaround times, and Sydney which handled even the feeder ships slowly.

Australian ports are particularly slow in handling medium and large ships (figure 3.14), with average turnaround times for these vessels above the average international port and the top performers in the CPPI (box 3.4).

Table 3.6 – The performance of Australian ports deteriorated as ship sizes increased^{a,b,c}
CPPI percentile rank by ship size, 2019-20

	Feeder	Small	Medium	Large
	<1500 TEUs (219 ports)	1501-5000 TEUs (331 ports)	5001-8500 TEUs (213 ports)	8501-13 500 TEUs (162 ports)
Brisbane	64%	54%	73%	69%
Sydney	84%	71%	89%	91%
Melbourne	-	72%	75%	88%
Adelaide	-	73%	96%	93%
Fremantle	-	63%	80%	90%

a. Ports were ranked in order of best to worst performance. Higher percentile rankings indicate relatively worse performance.

b. Not all 351 ports are included in each ship size category because not every port handles each ship size. The number of ports included in each ship-size category is presented in parentheses. **c.** The percentile rankings for ship sizes greater than 13 500 TEU capacity is excluded from the table because Australian ports were not visited by these ultra large ships.

Source: The World Bank (2021).

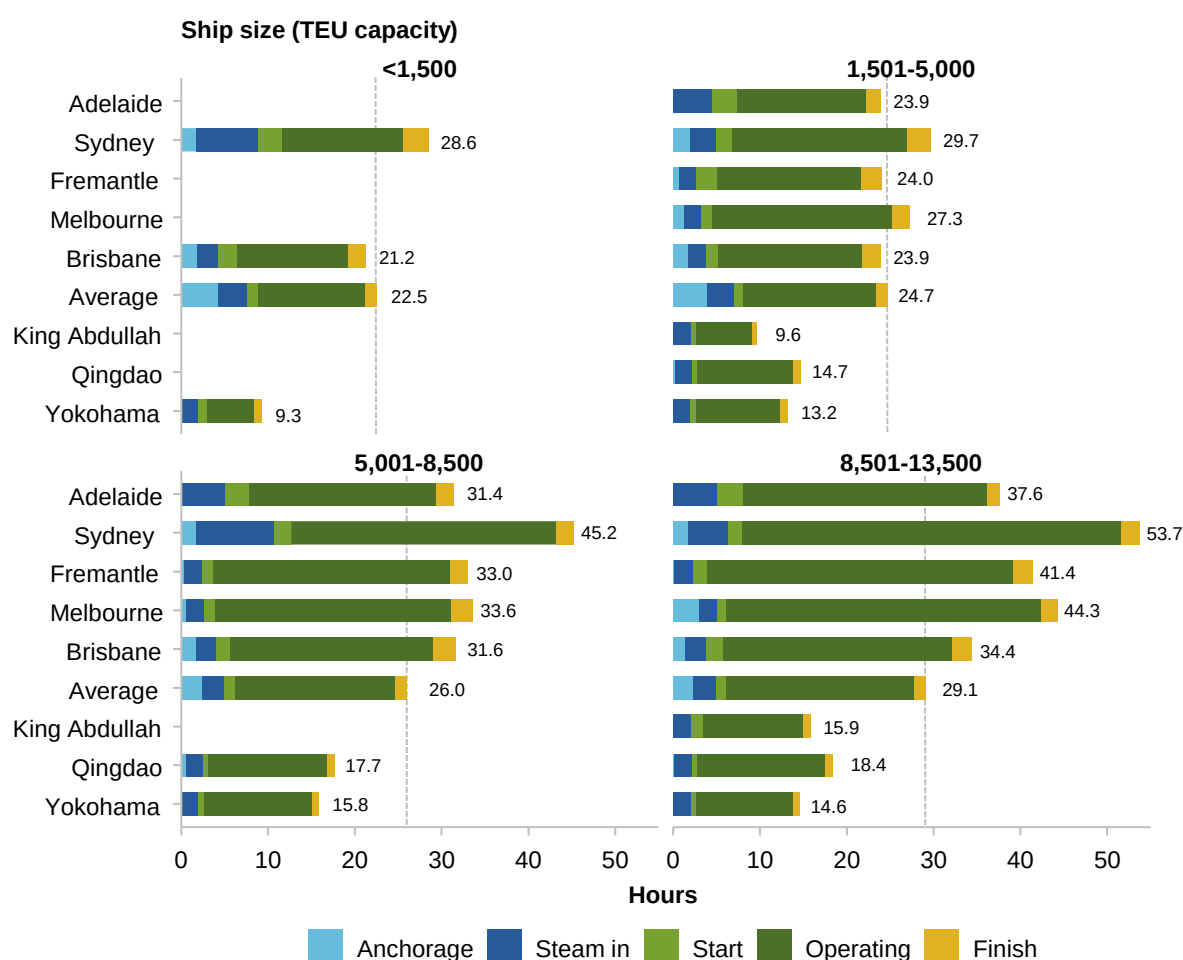
Most of the difference reflects longer operating times — Australian ports take longer to load and unload ships. As noted above, operating times are influenced by call sizes and the number (crane intensity) and productivity (gross crane rates) of the quay cranes used to handle containers.

While Australia typically receives larger call sizes for a given ship size, this does not seem to explain longer than average operating times. Figure 3.14 presents data on operating times for different ship-size categories. These data were derived by aggregating turnaround times for different call sizes within each ship-size category. The potential influence of call size on turnaround times was neutralised by using global call size frequencies to weight data for all ports rather than port-specific frequencies.

The productivity of Australian cranes also does not seem to explain the longer than average operating times. Australian ports had similar gross crane rates to the average international port (figure 3.15), but lagged some of the top performers — notably Yokohama and King Abdullah both of which have some twin-lift quay cranes (that is, cranes that can handle two forty-foot containers at once).

Instead, a key explanation for Australian ports' slow operating times is that they used fewer cranes to service ships than the average international port (figure 3.16). This is particularly noticeable for the medium and larger ship sizes. For example, for medium sized ships (capacity 5001–8500 TEUs), Australian ports used almost one less crane than the international average port to service ships.

Figure 3.14 – Australian ports are slow to turn around medium and large ships^{a,b,c}
Port hours by ship size and component, selected ports and global average, 2019-20



a. Port hours in the CPPI exclude steam out time. The influence of call size was neutralised by using global ship-call-size frequencies, rather than port-specific frequencies, in aggregating call-size data within size categories to ship-size level.
b. Gaps indicate that the port did not receive at least ten visits in the period. **c.** King Abdullah, Qingdao and Yokohama were the top performers in a World Bank's 2021 study of 351 ports.

Source: IHS Markit's Port Performance Program data.

Box 3.4 – What features contribute to making these ports the best in the world?

The World Bank study does not explicitly state why ports rank the way they do. The Commission investigated the top performing ports of Yokohama, King Abdullah and Qingdao to identify characteristics that could contribute to fast turnaround times or efficiency more generally. These are not exhaustive lists.

All three are relatively new ports or have new terminals within an older port. For example, King Abdullah port first opened and serviced a ship in 2013, while Qingdao's newest terminal opened in 2017. Because these ports are new, they were built and designed to accommodate growth in ship sizes and containerised trade and therefore can accommodate the largest ships (some up to 24 000 TEU capacity). To achieve their goals, these ports have:

- strategic locations at the entrances of deep-water bays or harbours (sometimes man made) which helps to reduce steam-in times and minimise weather disruptions
- numerous long and deep berths, high numbers of large quay cranes (some with an outreach of 25 TEUs or twin lift capabilities) and large container yards. They also have room to expand by adding additional terminals or extending yards. This gives ports the ability to intensely work a ship which helps to reduce operating times
- good connections to the landside (all with direct access to highways, Qingdao with rail to dock) which may help to reduce container dwell times and truck turnaround times (but not necessarily ship turnaround times).

There are also port specific characteristics that could affect current and future performance.

Yokohama

- Unionised industrial action might happen once a year. When it does all Japanese ports are affected. Typically, it is scheduled for 24 hours on a Sunday to minimise disruption to operations (APM Terminals Yokohama, pers. comm., 23 June 2022).
- At the APM Terminal:
 - they handle more containers per berth hour than any other terminal (APM Terminals 2015)
 - some stevedoring companies (who handle the containers at this terminal) are owned by the shipping lines, helping to align the incentives to turn ships around fast (APM Terminals Yokohama, pers. comm., 23 June 2022)
 - an online vehicle booking system (CONPAS) has been introduced but so far there has been limited take up. The paper based (fax) system remains preferred (APM Terminals Yokohama, pers. comm., 23 June 2022).

King Abdullah

- Constructed on a greenfield site and therefore does not face many of the constraints present at historical ports (such as urban encroachment). There are also plans to expand port to handle 20 million TEUs per year, through construction of additional terminals and a dedicated rail terminal adjacent to the port (King Abdullah Port 2022b).
- Investments in port technology include a Port Community System (a single online platform for document sharing that increases supply chain visibility) and Smart Gate System (which automates security functions, authenticating the identity of the driver, vehicle and cargo, which improves truck turnaround times) (King Abdullah Port 2022a).

Box 3.4 – What features contribute to making these ports the best in the world?

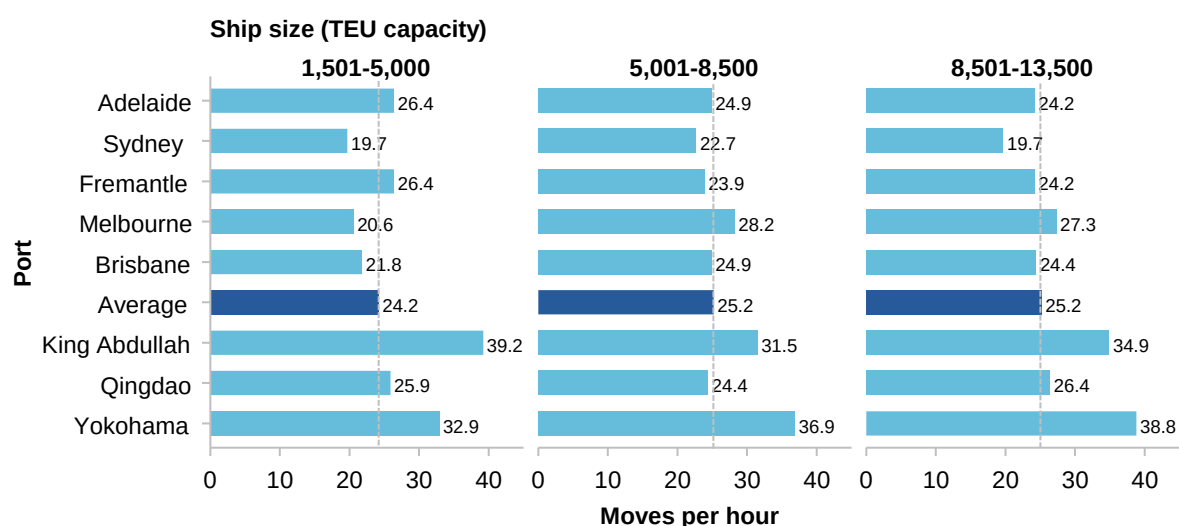
Qingdao

- This is a fully automated terminal, which claimed to have reduce labour costs by 70 per cent and increase efficiency by 30 per cent compared with traditional terminals (CRI Online 2018).

Sources: APM Terminals (2022a, 2022b); IHS Markit's Port Characteristics data; King Abdullah Port (2022a, 2022b, 2022c); Yokohama Port Corporation (2022).

Figure 3.15 – Australian crane productivity is similar to the global average^{a,b}

Gross crane rates by ship size, selected ports and global average, 2019-20

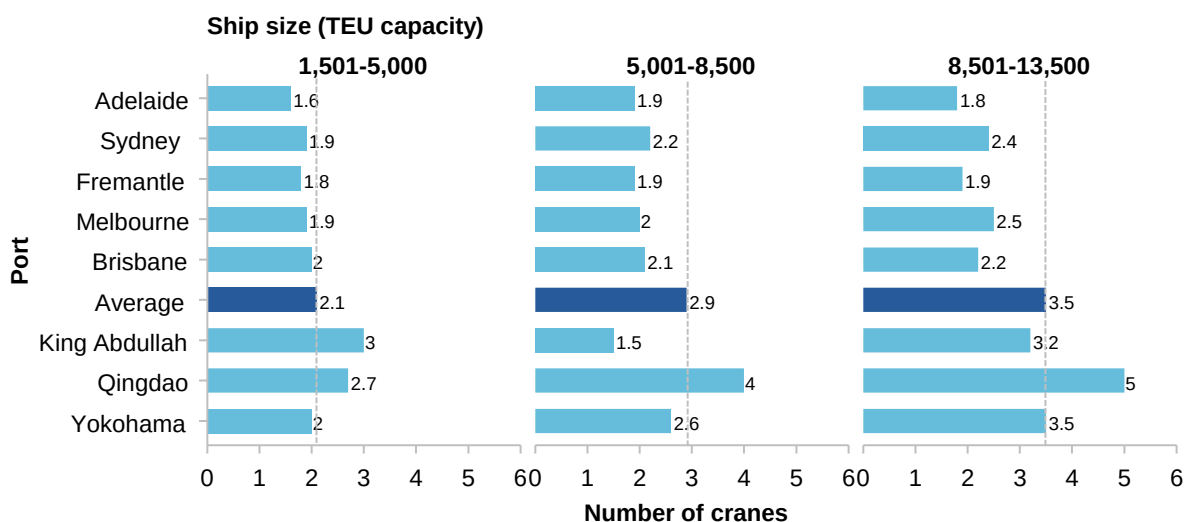


a. Ships with capacity less than 1500 TEUs are excluded because of missing gross crane hours data for Australian ports.

b. King Abdullah, Qingdao and Yokohama were the top performers in the World Bank's 2021 study of 351 ports.

Source: IHS Markit's Port Performance Program data.

Figure 3.16 – Australian ports use fewer cranes to handle medium and large ships^{a,b}
Crane intensity by ship size, selected ports and global average, 2019-20



a. Crane intensity is calculated as gross crane hours divided by operating hours. Ships with capacity less than 1500 TEUs are excluded because of missing gross crane hours data for Australian ports. **b.** King Abdullah, Qingdao and Yokohama were the top performers in the World Bank's 2021 study of 351 ports.

Source: IHS Markit's Port Performance Program data.



Draft finding 3.7

Australian container ports take longer to turn ships around than many international ports

Australian ports do not compare well against international ports on measures of ship turnaround times. Their poor rankings in the World Bank's Container Port Performance Index reflect the fact that they take longer than many international ports to process ships (particularly medium to larger vessels — that is, those with a capacity of more than 5000 twenty-foot equivalent units). Slower turnaround times in Australia mainly reflect the use of fewer cranes to handle containers — Australian cranes are just as productive as those in the average international port.

There may also be a few issues with the CPPI methodology that affect the rankings of Australian ports (box 3.5). Notwithstanding these, the index provides a useful international comparison of port hours (or turnaround times).

Ships are getting larger and Australian ports need to find ways to handle these larger ships more efficiently (chapter 7). This could involve reducing anchorage times or deploying more cranes to each ship to un/load containers more quickly. However, a port involves a series of interconnected operations, as discussed above. Improving the performance of one part of the process without also considering other port operations may not improve overall efficiency. For example, it is not clear that terminal operators would have sufficient spare capacity to handle ships if anchorage was reduced or eliminated. Thus, unloading ships faster could result in congestion in the container yard, which would not improve the efficiency of the maritime logistics system and instead shift problems along the supply chain.

An alternative way to benchmark container ports

The World Bank study is closely related to the benchmarking framework described in section 3.5; in that it focuses on the turnaround times of ships. But given the newness and criticisms of the World Bank's study and the fact their methodology is being developed and improved, the Commission sought to use a more conventional approach to benchmark the technical efficiency of international container ports — by estimating a production possibility frontier using data envelopment analysis (DEA) and assessing where Australia's ports sit relative to that frontier.

A range of factors impact on the usefulness of any benchmarking exercise, including:

- the difficulty in ensuring that comparisons are being made between like-with-like ports (one of the main criticisms of the World Bank study (box 3.1))
- the availability, accuracy, integrity and timeliness of the data used in the analysis
- that lower observed performance may not actually equate with inefficiency. For example, it may be optimal to operate at 60 per cent to 70 per cent of full capacity utilisation to prevent congestion in the port and retain spare capacity to cope with peaks in trade.

Each of these factors is discussed below where appropriate.

Finding suitable benchmarking partners is a challenging exercise (box 3.6). There are many factors that distinguish Australian ports from each other (such as the level of throughput, frequency of ship visits, port infrastructure and operations and restrictions on vessel height and size). The same applies to international ports (such as Australia's small market size, multi-port ship calls and destination orientation). Given these differences, ports should be benchmarked against 'reasonably similar' ports to ensure that the results are meaningful. Nevertheless, care still needs to be exercised to ensure that differences in port characteristics that cannot be replicated are not driving the results.

Box 3.5 – Can aspects of the CPPI method affect the ranking of Australian ports?

Several methodological choices and data issues may have affected the CPPI rankings of Australian ports, particularly in relation to the handling of larger ships. Because two methodologies were used to construct the index, the approach the issue relates to is presented in parentheses.

- Small sample size issues. There are 43 unique ship call size categories. This means that performance will be based on a small sample of vessels for ports with few ship calls and the measures may, therefore, not be overly reliable. For example, Australia received under 230 visits from large ships in 2019-20 (8501-13 500 TEUs). (Both approaches.)
- Outliers in the data can inflate average port hours. For example, a port that had one ship at anchor for a few days could substantially increase average anchorage hours and, therefore, port hours, making the port seem inefficient. (Both approaches.)
- The imputation method for missing data might bias the performance of a port. Relative performance in call sizes for which there was sufficient data was used to approximate performance for call sizes with missing data. As such, good or bad performance can cascade across missing call sizes. For example, Brisbane's relatively good performance for the call size range 2001–2500 containers would also be attributed to larger call sizes (figure 3.15). (Both approaches.)
- For a given a ship size, global frequencies of call sizes are used as weights to construct the index. The Australian call size frequencies differ from the global frequencies, which might distort the scores

Box 3.5 – Can aspects of the CPPI method affect the ranking of Australian ports?

for Australian ports because higher weights are placed on call sizes that are not as common in Australia. (Administrative approach.)

It is not possible to replicate the CPPI and, therefore, it is difficult to assess whether these issues cause material differences in the rankings.

However, the Commission can rule out a few aspects of the methodology that do not materially affect the rankings of Australian ports:

- the use of the fuel consumption index, which applies progressively higher weights to larger ships to aggregate ship level performance to a port score. The use of this index did not materially affect the rankings for Australian ports. That is, even if all ship sizes received equal weighting, the rankings of Australian ports remained relatively unchanged. This is not to say that ports that handled large ships well did not get a boost to their ranking from this weighting approach (Both approaches.)
- excluding some ports from the different ship size categories and attributing a score of zero to these ports essentially gave them the average score and, therefore, should not bias the rankings. For example, all Australian ports received a zero score for ships larger than 13 500 TEUs, because no Australian ports handle ships this large. (Both approaches.)

Box 3.6 – Identifying comparable benchmarking partners

The value in benchmarking arises from comparing Australian ports to international ports that possess broadly comparable characteristics such that the analysis provides meaningful insights into what improvements may be possible and the extent of those potential improvements.

For example, Australian ports may never be able to achieve the same levels of efficiency as transshipment ports, which handle large volumes of containers from very large ships and move significant numbers of containers from ship to ship. Nor might Australia achieve the economies of scale present at larger ports (for example, the throughput of the port of Shanghai is five times larger than all Australian ports combined).

As such, the Commission selected 'broadly comparable' ports by selecting origin destination ports (rather than transshipment ports) and ports with similar throughput levels to the Australian ports whose levels range between 0.4 and 3 million TEUs annually.

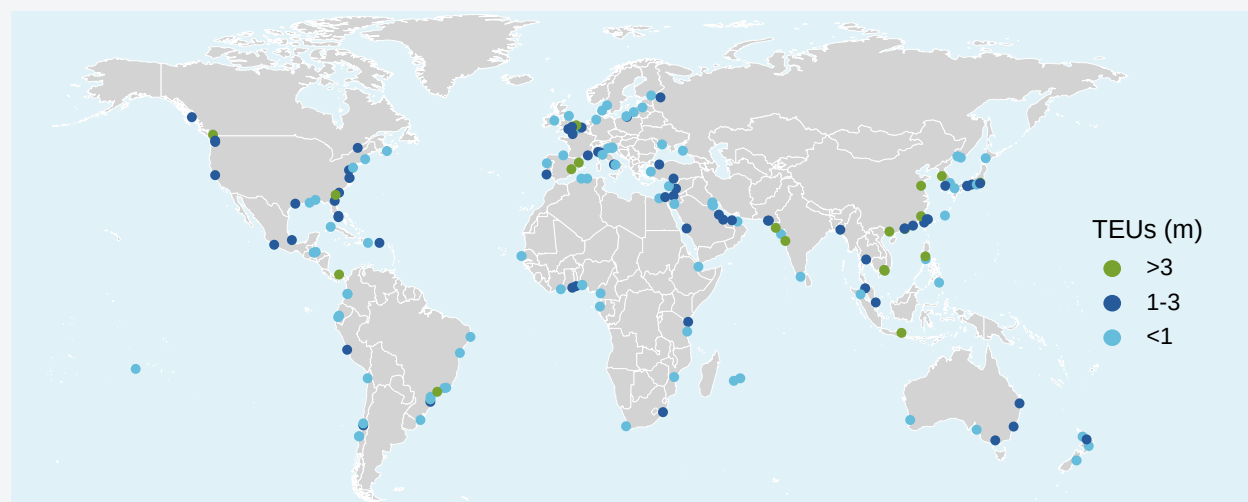
The Commission initially selected all 351 port ports included in the World Bank study. From these:

- 30 ports were excluded as they had a transshipment incidence higher than 50 per cent
- 17 ports were excluded as their throughput was larger than 7 million TEUs
- 107 ports were excluded as their throughput was smaller than 0.25 million TEUs
- 31 ports were excluded because of missing data.

This process identified 166 ports as being broadly comparable to those in Australia, including ports in North America (for example, Montreal, Vancouver, Halifax, Charleston, Houston), South America (Callao, San Antonio, Santos), New Zealand (Tauranga, Auckland), Europe (Felixstowe, London, Valencia, La Spezia, Le Havre), Asia (Shantou, Yokohama, Tokyo) and Africa (Durban, Lomé).

Box 3.6 – Identifying comparable benchmarking partners

Ports that are broadly comparable to Australian ports



Data envelopment analysis was used to estimate a production possibility frontier (that is, the maximum output that can be achieved for different combinations of inputs) and to generate a summary 'technical efficiency score' for each port. Ports that maximise their output given their input use are identified as being on the 'best practice frontier'. In other words, all the ports in the sample were compared and those that were doing best (using their inputs the most efficiently) formed the frontier. Ports on the frontier were then given a score of one. Ports inside it (those less efficient than the best) were given scores of less than one that indicate how far they are behind the best. A port with a score of 0.8, for example, is 20 per cent below the frontier, meaning that it used 20 per cent more inputs than the most efficient port did to process the same number of containers.

The DEA analysis is based on the IHS Markit's Port Characteristics dataset for 2019. The selection of outputs and inputs largely followed the precedent set by the literature. It is assumed that there was only one output (throughput in TEUs) and that ports used the following inputs:

- number of terminals — a proxy for terminal-level competition within the port
- number of berths — a proxy for the number of ships a port can service
- total length of berths — a proxy for the size of ships a port can handle
- maximum draft — a proxy for the weight and depth of ships that a port can service
- the number of container cranes (separated into quay, mobile and other cranes to allow for technology differences across ports) — a key resource for increasing container throughput.

While land and labour are also important inputs in port production, indicators relating to them could not be included in the analysis. Yard size can dictate the capacity and flexibility to manage container traffic flows and store containers, while labour (such as managers, terminal operators, crane operators and gangs) is critical for terminal operations. Unfortunately, a lack of data on these inputs meant that only capital inputs are accounted for in the model. This is a limitation of the analysis but is consistent with the wider literature on port performance which also fails to include labour inputs.

The DEA results point to most Australian ports having substantial scope to improve the efficiency of their operations (table 3.7). Adelaide is found to be fully technically efficient; the other ports are not — Melbourne is

10 per cent from the frontier, while Sydney, Brisbane and Fremantle are between 21 and 25 per cent from the frontier. The results suggest that most Australian ports could reduce their capital inputs and achieve the same level of output.²⁶ Alternatively, most Australian ports should be able to cope with an increase in throughput by using their inputs more efficiently (figure 3.17 — the vertical distance between the port and the frontier). But this interpretation depends on the ability of marine operations and the landside to cope with increased container traffic (more ships or larger call sizes).²⁷ Figure 3.17 depicts a two-dimensional production function and because of this it depicts Adelaide within the frontier even though Adelaide is technically efficient.

Many port inputs for which data is available, both in Australia and overseas, are effectively fixed in the short to medium term (such as the number of terminal operators and berths, and berth length). Other factors that affect productivity are also ostensibly outside the control of port and terminal operators (such as the number of ship visits, their arrival times and the number of containers to be handled). Aside from crane usage, there is generally minimal data on the inputs over which terminal operators have day-to-day control (such as employment and labour utilisation) that could influence their measured productivity. Therefore, the absence of data on short-term variable inputs (such as, employment) mean that the factors identified in the DEA only provide guidance on how to improve technical efficiency in the long term.

Table 3.7 – Most Australian ports have scope for improvement^a

Technical efficiency scores for Australian ports

Port	Technical efficiency score	Rank (percentile) ^b	Peers
Adelaide	1.00	1 (0.01)	Batangas, Douala, Posorja
Melbourne	0.90	101 (0.61)	Davao, Puerto Cortes, Chiwan, Qinzhou, Cat Lai
Sydney	0.75	125 (0.75)	Douala, Qinzhou, Cat Lai
Fremantle	0.73	128 (0.77)	Douala, Puerto Cortes, Chiwan, Taipei, Posorja
Brisbane	0.71	135 (0.81)	Douala, Qinzhou, Cat Lai

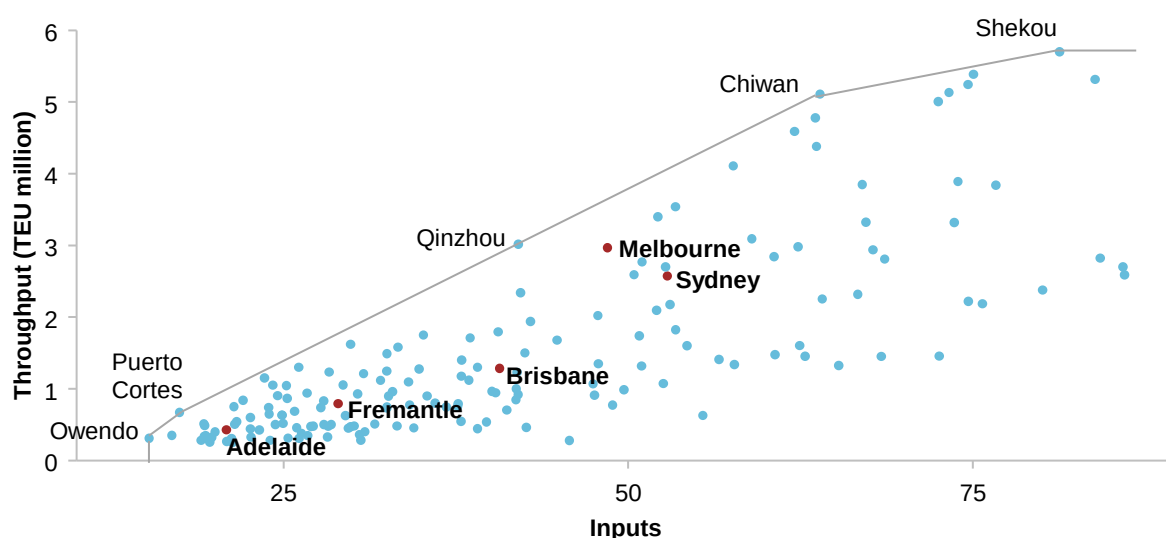
a. A variable returns to scale model was used to account for differences in throughput levels and economies of scale. **b.** There were 87 ports out of the 166 ports in the sample that received a technical efficiency score of one, indicating the port was fully efficient. So, even though Melbourne has quite a high technical efficiency score, their percentile rank is in the bottom 60 per cent.

Source: Commission estimates using IHS Markit's Port Characteristics data.

²⁶ Ports' capital investment cycles may affect DEA results. A port may appear inefficient following a capital expansion and appear more efficient when approaching a capital expansion. Capital investment data is unavailable and as such the effect of investment cycles on the results is unknown.

²⁷ That said, to the degree that landside constraints are fixed for a port, that port should alter its quayside investment and operations over time so that quayside operations are efficient given the landside constraint. If this occurs, quayside operations would be measured as efficient by the DEA approach.

Figure 3.17 – Scope exists for most Australian container ports to improve their productivity^{a,b}
The two-dimensional estimated productivity possibility frontier



a. Adelaide is estimated to be technically efficient (on the frontier), but the two-dimensional nature of this chart depicts Adelaide within the frontier. The production possibility frontier has multiple dimensions that cannot be depicted in a simple chart. **b.** 'Inputs' in the figure is the sum of all input variables in the model.

Source: Commission estimates using IHS Markit's Port Characteristics data.

The potential efficiency gains suggested by the Commission's preliminary benchmarking exercise should be interpreted cautiously.

- Investigations into the port characteristics data suggested that there are some inconsistencies with data found on port authority websites. Data for a significant number of ports has been verified (those ports on the frontier and those identified as peers), but further data verification is required.
- The performance of each port is based only on the inputs included in the DEA model such that missing inputs may bias results. There are characteristics of ports that affect efficiency that cannot always be accounted for. For example, the port of Chattogram in Bangladesh, a potential peer of both Sydney and Melbourne, used their general terminal to move containers as well as their dedicated container terminals. Container ships docking at the general terminal also typically used on-board cranes to move containers. As such, the port appears very efficient because it moved many containers with few inputs (as the general terminal did not factor into the inputs of the model). A greater understanding of how the peer ports differ from the Australian ones is required.
- The potential technical efficiency gains suggested by the model might not always be achievable. For example, there may be factors that constrain Australia's port productivity relative to the international ports that are outside the control of the port (such as infrequent ship visits).
- Australian ports might operate below the frontier and underutilise capacity to prevent port congestion and cope with seasonality in demand (peaks in container volumes and ship arrivals, see chapter 2).²⁸ Reducing the level of inputs could lead to greater inefficiencies, such as increasing ship turnaround times.

²⁸ DP World (sub. 49, p. 26) noted that there has 'been a near halving of the number of shipping line customers visiting Australia and increased 'lumpiness' in demand, through a small number of higher-volume services'.

This suggests there may be an optimal level of asset utilisation that strikes a balance between technical efficiency and turnaround times (and potentially cost minimisation).

- DEA results were sensitive to model choices, such as:
 - variables chosen as inputs into production (for example, excluding the number of terminals renders Adelaide not technically efficient, with a new score of 0.91)
 - production technology assumed (constant or variable returns to scale).

The Commission's benchmarking exercise differs from the World Bank's and, as such, the performance ranking of Australian ports does too. For example, Adelaide is ranked in the top 1 per cent for technical efficiency but bottom 25 per cent in the World Bank study.

Critically, the World Bank's benchmarking analysis did not account for the fact that some ports use relatively more inputs and can, therefore, turn ships around faster (while the Commission's analysis does not take *time* into account). For example, the port of Yokohama, which topped the World Bank rankings, had a technical efficiency score (0.65) — lower than the score achieved by all five Australian ports. While Yokohama had the fastest ship turnaround times as indicated by the CPPI and higher gross crane rates, they also had five container terminals, about 5.5 km of berths and about 40 quay cranes. In comparison, Melbourne and Sydney each had three terminals, about 2.5 to 3.6 km of berths and about 20 quay cranes each. Given Yokohama had similar throughput to Melbourne and Sydney, Yokohama's capital utilisation was much lower. This reduced their technical efficiency but helped them achieve faster turnaround times (and might enable them to better cope with any significant increase in the volume of containerized trade). In other words, Yokohama has an excessive level of investment for their current level of throughput. This over investment in costly capital is inefficient even if it means that they can turn ships around quickly.

Benchmarking is a challenging exercise. Different methods, samples, and data can produce different results, while focusing on different aspects of efficiency (physical inputs and outputs as opposed to time) can make it difficult to reconcile why the performance of individual ports may differ across studies.

These challenges make it difficult to identify concrete ways of improving port-wide efficiency, but comparisons across different types of studies can yield some powerful insights. Unpacking the results of the World Bank study revealed that Australia could improve turnaround times for large ships by reducing anchorage and, in particular, cargo handling times. It also revealed that Australian ports have similar gross crane rates to the average global port — in other words, Australia's major container ports do not rank poorly in the World Bank analysis because ports move fewer containers per crane while ships are being worked. And the Commission's benchmarking analysis showed that Australian container ports could utilise their physical inputs more intensively (and improve their technical efficiency), but data limitations mean the analysis cannot shed light on ways in which productivity might be improved in the short to medium term. The benchmarking also highlighted the role that capital can play in turnaround times.

The results found here are broadly consistent with other empirical studies of port productivity (outlined in the literature review in the technical paper) and with the findings of the World Bank — Australian container ports are generally less efficient than their international counterparts.

In tandem with the evidence above on considerable variation in gross crane rates within and across terminal operators, on balance, the empirical evidence from international comparisons of port performance suggests that there is scope for Australian container ports to improve their productivity.



Draft finding 3.8

International evidence also suggests that Australian ports could lift their productivity

Benchmarking analysis by the Commission identified a ‘best practice’ set of ports — those that were using their inputs most efficiently. Apart from Adelaide, Australian ports were not operating at this ‘efficient frontier’; they could handle an increase in throughput by using their capital inputs more efficiently.

The Commission’s work also revealed the importance of considering port inputs in performance analyses. Recent work by the World Bank did not account for the fact that some ports use relatively more inputs and can, therefore, turn ships around faster. Some ports have an excessive level of investment for their current level of throughput. This over investment in costly capital is inefficient even if it means that they can turn ships around quickly.

On balance, the empirical evidence from international comparisons of port performance suggests that there is scope for Australian container ports to improve their productivity.

3.8 What are the potential economy-wide gains from improving Australian container port productivity?

As noted above, ports play a vital role in linking Australian producers and consumers with world markets. The bulk of Australia’s goods trade passes through ports. This included nearly all imports and most exports (both by value and volume). These imported goods include important inputs into Australian production and include many of the goods purchased by Australian consumers.

Efficient and dependable ports provide greater certainty to importers and exporters, and reduce the cost and time involved.

The economy-wide impact of any potential improvements in the productivity of Australian ports of the kind identified in section 3.7 will depend on a myriad of factors (box 3.7). This makes it difficult to ascertain what these impacts are likely to be in the absence of specific improvements.

Box 3.7 – The economy-wide impacts of container port productivity improvements will depend on many factors

The economy-wide impacts of container port productivity improvements will depend on many factors, including:

- the extent of any potential improvements in port productivity
- whether these improvements relate to the activities of terminal operators or the port as a whole
- whether these improvements apply to container ports or to all ports
- whether these improvements apply to a single port, a range of ports or all ports
- the extent to which these improvements apply to imports and/or exports
- the extent to which these productivity improvements flow through into lower fees and charges paid by importers and/or exporters
- the size of these price reductions relative to the cost of the goods being imported or exported
- how these imports are used in the Australian economy (such as which industries use them and their importance in production)

Box 3.7 – The economy-wide impacts of container port productivity improvements will depend on many factors

- the responsiveness of demand to any changes in the price of imports
- the responsiveness of demand to any changes in the price of the finished product (whether exports or imports) that result in an increase in the volume of activity.

Additional impacts may also arise from other factors such as changes in incomes and resource constraints in the economy.

Examining how the cost of importing (or exporting) a container could change provides a way to examine the direct impacts of port productivity improvements (table 3.8). BITRE's Port Interface Cost Index details the cost components of importing a container, excluding blue-water freight charges, for 2020.²⁹ An improvement in port productivity (that is, all operations covered on the marineside, quayside and landside within the port gate) may result in lower:

- ship-based charges (conservancy, tonnage, pilotage, towage, mooring and unmooring)
- cargo-based charges (wharfage and harbour dues)
- stevedoring charges (quayside, landside and terminal access charges).

These selected components are estimated to account for about 40 per cent of the cost of importing a container (or about \$400 dollars), excluding blue-water freight charges.

An improvement in productivity could lower the cost of importing a container. If all five of Australia's major container ports achieved turnaround times in line with the global average, and assuming that any cost savings are fully passed on, then the cost of importing a container would decrease (table 3.8) by an estimated \$30 to \$120 per TEU, depending on the port.³⁰

Given the number of containers exchanged at each Australian port, price falls of this magnitude would translate into cost savings for importers and exporters of an estimated \$605 million annually. Put another way, this is the size of the impost created by inefficiencies in Australian ports. And this cost is rising with growth in container trade.

This cost saving is small relative to the value of imports and exports of goods, representing only 0.9 per cent of the value of goods trade (table 3.8). The magnitude of the potential impacts estimated here are broadly similar to earlier, albeit somewhat dated, Commission estimates (IC 1995, p. 385; PC 2005b, p. 51).

²⁹ The cost of exporting a container is similar to the cost of importing. As such, only importing costs are presented in table 3.8 but TEUs handled relate to both imports and exports.

³⁰ The relationship between the charges for importing a container and input costs are not always direct. For example, cost recovery strategies for infrastructure assets (such as channels, wharves and quay cranes) may not reflect the variable costs of handling a container. Charges may also be unresponsive or slow to change because of productivity improvements.

Table 3.8 – Potential direct impacts from improving port productivity^a
Estimates based on costs of importing (or exporting) a container (TEU), 2020

Costs of importing (\$/TEU) ^b	Brisbane	Sydney	Melbourne	Adelaide	Fremantle
Total ship-based charges	64.5	43.9	35.7	56.9	20.2
Cargo-based charges:					
Wharfage	38.9	141.5	129.5	92.5	83.7
Harbour dues	69.3	0.0	0.0	29.9	39.3
Other charges:					
Stevedoring — quayside	150.4	149.1	150.2	155.8	151.8
Stevedoring — landside	32.5	31.8	32.4	35.4	33.2
Terminal access charges ^c	58.4	56.1	71.6	20.4	28.4
Road transport charges	433.5	477.6	464.6	380.2	418.5
Customs broker fees	122.4	135.5	126.5	129.8	150.5
Total cost	970.1	1035.6	1010.6	900.9	925.7
Selected components (\$/TEU)	414.2	422.4	419.5	390.8	356.7
Estimated productivity improvement (%)	7.6%	29.2%	16.5%	11.9%	14.2%
Implied cost reduction (\$/TEU)	31.4	123.4	69.3	46.6	50.6
Potential cost savings (export and imports)					
TEUs handled	1 329 705	2 560 586	2 708 988	420 353	789 335
Potential cost savings (\$m)	41.8	316.0	187.8	19.6	39.9
Total potential cost saving (\$m)					605.1
Value of goods trade (\$m)					668 421
Per cent cost saving (%)					0.09

a. The cost of importing a container comes from *Waterline's* Port Interface Cost Index but has been transformed into a weighted average for each port. The total cost excludes blue-water freight charges. **b.** Costs of exporting a container are very similar to the costs of importing, so only the latter are presented in this table. **c.** Terminal access charges have increased substantially over the last few years: there was a 30 per cent average increase in Brisbane, Sydney and Melbourne (chapter 6). If TACs presented here were 30 per cent higher than the estimated potential cost savings would be \$25 million higher.

Sources: Commission estimates based on ABS (*International Trade in Goods and Services, Australia, May 2022*, Cat. no. 5368.0), BITRE (2021c) and DEA estimates (section 3.7).

While the direct impacts estimated here are small compared to the size of the entire Australian economy, they are significant. Moreover, ports play an essential role in the maritime supply chain and therefore have large indirect impacts on Australian businesses, consumers and the economy. The direct impact estimated here reflects *only* the cost savings to importing and exporting but not the broader impacts on supply chains. Any sustained disruption to imports or exports has the potential to cause substantially larger economic impacts than the direct impacts found here suggests.

Those parties that rely directly on the maritime supply chain would be adversely impacted by disruptions at ports. Some firms and consumers are reliant on ports for importing and exporting containerised goods such that any disruption to the ports could severely impact business operations and consumer welfare. Industrial action is one such disruption that causes significant loss to participants along the supply chain (see chapter 9, box 9.13 for evidence from submissions). This also suggests that the impacts of port disruptions are not born evenly across the economy.

There are also those that would be indirectly affected by disruptions at ports. For example, disruptions to imports of goods that are critical to the local production of essential goods and services (such as the

chemicals used in water treatment and personal protective equipment used in health care) and exports that provide a significant share of national income and employment could jeopardise the economy and the wellbeing of Australians (PC 2021b, pp. 2–7).

Well-functioning, efficient container ports help to ensure the dependability of the maritime supply chain and supply chains more broadly.



Draft finding 3.9

Improving container port productivity would deliver significant benefits

Inefficiencies at Australia's major container ports are estimated to directly cost the Australian economy around \$605 million a year. While this impost is small relative to the value of imports and exports, it is significant. And it is rising with growth in container trade.

Ports also have large indirect impacts on Australian businesses, consumers and the economy. Any sustained disruption to imports or exports has the potential to cause substantially larger economic impacts than the direct cost estimates suggest.

Well-functioning, efficient container ports help to ensure the reliability of the maritime supply chain and logistics systems more broadly.

4. Framework for analysing competition

Key points

- * Effective competition generates strong incentives for firms to seek the least cost way of supplying the goods and services that consumers want.
- * An enduring lack of effective competition can lead to a firm having market power. But this is insufficient to justify government intervention. Rather, it is the exercise of market power to the detriment of the community that may warrant policy action.
- * A firm in the maritime logistics system with market power could exercise it by setting unduly high charges, operating inefficiently or making inefficient investment decisions. Any such action would have economy wide effects as the system, through its role in import and export activity, is essential to many parts of the economy. And any exercise of market power would reduce community wellbeing.
- * Analysis of the presence and exercise of market power involves two steps:
 - definition of the market of interest including identification of any constraints on firms' behaviour imposed by competition such as low barriers to entry to a market, the availability of substitute products and the ease with which consumers can switch providers
 - consideration of other constraints including whether other market participants are able to exert countervailing power or whether regulation constrains participants' actions.
- * The maritime logistics system is comprised of vertically separated markets, meaning the analysis potentially must take into account the wielding of market power by firms in multiple parts of the system.
- * Government intervention to address the exercise of market power can be costly. The test for any policy change is whether it would generate the greatest increase in the welfare of the Australian community compared with other options, including the status quo.

The terms of reference for this inquiry ask the Commission to have regard to cost drivers and their impact on the overall competitiveness of Australia's ports. The Commission has therefore considered the state of competition in the various markets that make up the maritime logistics system.

Competition between firms can lead to lower prices and greater responsiveness to the needs of consumers. Conversely, an enduring lack of effective competition can lead to firms holding market power which, if exercised, can reduce community wellbeing.

As argued by the OECD:

Where market power exists, there are typically a number of competition concerns relating to potential abuses of that power. These abuses can lead to various types of consumer harm, but fundamentally there is a net welfare detriment, which can arise from higher prices, reduced output, reduced service quality, reduced innovation or other factors. (2011, p. 26)

The OECD went on to comment, with respect to maritime logistics, that:

Given the scale of port activities, and the scale of the maritime industry more generally, any harm from anti-competitive practices in the industry could have a large impact on end-users and in turn an impact on the wider economy. (2011, p. 26)

This chapter sets out why market power matters (section 4.1). It then outlines a framework for analysing whether market power exists in the maritime logistics system and is being exercised (section 4.2), and whether policy reform is needed (section 4.3). This framework is applied to port services and to the rest of the system in chapters 5 and 6, respectively. The general reader could skip this chapter and head straight to chapter 5.

4.1 Why market power matters

Effective competition has many benefits

Competition has been demonstrated repeatedly, in both Australia and abroad, to generate strong incentives for service providers to seek the least cost means of producing what consumers want. The many benefits of effective competition include lower prices, innovation and higher quality services.

Effective competition can also support stability in a system. Preventing excessive concentration in the maritime logistics system (such as dependency on a very small number of providers) can lead to a more resilient system. Anticompetitive behaviour does nothing for system stability and can potentially undermine it.

A lack of effective competition leads to market power

Market power arises where firms operate without effective competition, that is, where competitive constraints from actual or potential competitors, or from consumer substitution, are missing.

A lack of effective competition can arise where:

- a market has the characteristics of a natural monopoly, meaning that one provider can service demand from existing and foreseeable customers at a lower cost than multiple providers
- a market has the characteristics of a natural oligopoly, meaning that only a small number of players can efficiently service demand
- a firm controls access to a good or service that is an essential input for production, and is able to deny access to potential competitors
- a single or small number of firms are protected from potential new entry and competition, for example, due to government rules that prevent such entry.

Infrastructure assets commonly display natural monopoly or natural oligopoly characteristics because they involve high fixed costs and relatively low operating (marginal) costs until they reach capacity. For example, the costs of building a large port are high and the costs of servicing an additional ship are relatively low.

There are cases where market power can be transitory. For example, in the case of a natural monopoly, demand might grow to the point where congestion causes rising costs and entry of a competing supplier becomes viable.

An enduring lack of effective competition is required for a firm to retain its market power.

A firm exercising market power is a concern

Australian law has provisions to deal with abuses of market power

The fact that the exercise of market power can cause detriment to the community is reflected in Australian law. For example, the *Competition and Consumer Act 2010* (Cth) (CCA) targets the misuse of power that lessens competition and unconscionable conduct.

- Section 46 of the CCA prohibits a firm with substantial market power from exercising it with the purpose, effect, or likely effect, of substantially lessening competition in a market. Some of the actions a firm may take to contravene section 46 are refusal to deal, restricting access to an essential input, predatory pricing and margin/price squeezing (ACCC 2018e, p. 8).
- Section 20 of the Australian Consumer Law¹ prohibits someone using their market power in the bargaining process to engage in conduct that is unconscionable. The ACCC (2022b) noted 'Business behaviour may be deemed unconscionable if it is particularly harsh or oppressive, and is beyond hard commercial bargaining'.

Economists are particularly concerned about community wellbeing

Economists have a different way of thinking about the detriment stemming from the use of market power to lawyers. From an economic standpoint, a firm exercising market power reduces community wellbeing because it operates inefficiently. Economic efficiency prevails when three requirements are satisfied: allocative, productive and dynamic efficiency (box 4.1).

Box 4.1 – Components of economic efficiency

An efficient firm (or industry, sector or economy) satisfies three requirements.

- Allocative efficiency — the type and mix of goods and services produced are of the highest value for consumers compared with any alternative use of the resources used in production. A lack of effective competition can see firms reduce supply and raise prices above the level that would prevail in a competitive market. This reduces allocative efficiency as it results in an underproduction of the goods or services most preferred by a community.
- Productive efficiency — goods or services are produced at the least possible cost for a given quantity or quality. For services with natural monopoly characteristics, a single service provider can achieve greater productive efficiency than multiple providers. An inefficient firm reduces productive efficiency, for example, by allowing costs to rise or not adopting new technology.
- Dynamic efficiency — productive and allocative efficiency are achieved over time.

Source: PC (2019, p. 69).

¹ *Competition and Consumer Act 2010* (Cth) sch. 2 ('Australian Consumer Law').

A firm exercising its market power could price services at levels higher than its supply costs in order to increase profits (box 4.2). If this happens, the community is worse off in two ways. First, some consumers are priced out of the market — a loss of potential benefits (an allocative inefficiency). Second, those that remain pay higher prices.

The higher profits earned by a firm exercising its market power are termed monopoly rents — and they stem from revenue in excess of the costs of production (defined to include the opportunity cost of the owners' investments in the firm).

Lack of competitive pressure can also lead to inefficient investment decisions and operating approaches, leaving the community worse off than it would otherwise have been. A firm with market power might underinvest in capacity in order to increase its profits meaning that over time, service availability or quality decline. For example, insufficient port investment could lead to congestion and disrupt supply chains. Or the firm might make operational decisions that reduce its costs but lower service quality below users' reasonable expectations for a given price.

In reality, no market is perfectly efficient. The concepts of economic efficiency can inform an assessment of the extent to which a market generates outcomes that are in the best interests of the community and the case for government intervention.

Box 4.2 – How the exercise of market power leads to inefficiency

Comparison of the pricing decisions of a monopolist versus firms in a competitive market shows how a monopoly can lead to an economically inefficient outcome, that is, one where community wellbeing is lower than it would otherwise have been.

The figure below shows:

- a demand curve which represents consumers' willingness to pay for different quantities of a good or service
- a monopolist's marginal revenue curve which represents the change in their total revenue from selling one more unit of a good or service
- a marginal cost curve which represents the change in cost to a firm of producing one more unit.

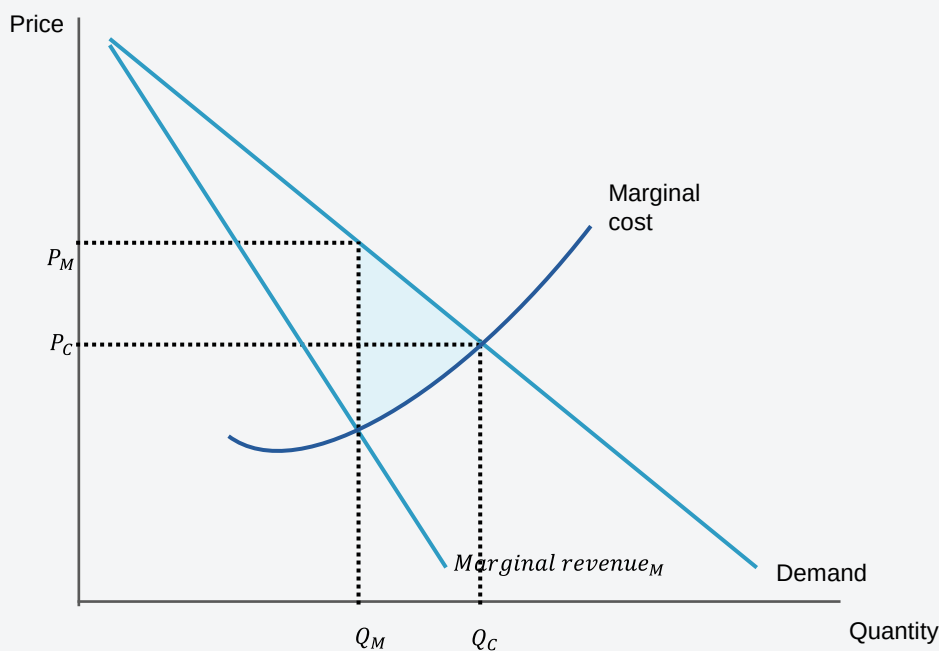
In a market characterised by competition, firms will produce up to the point where the marginal cost of production equals consumers' willingness to pay (that is, quantity Q_c and price P_c). At any quantity less than Q_c there are consumers willing to pay more than the cost to firms of producing those units. At any point above Q_c the costs of production exceed consumers' willingness to pay. Community wellbeing (and, therefore, economic efficiency) is maximised at Q_c .

A monopolist would maximise its profits by producing at Q_m (where marginal cost equals marginal revenue). Production of any quantity above Q_m would involve an increase in cost that exceeded the monopolist's increase in revenue. And an increase in production at any quantity below Q_m would deliver an increase in revenue above the cost of producing those additional units. The monopolist charges what consumers are willing to pay for Q_m — that is, P_m . And they produce less and charge more than firms in a competitive market.

The blue triangle shows the cost to community wellbeing (or deadweight loss) from a monopoly. This loss arises because there are consumers who would be willing to pay more for additional output (shown by the height of the demand curve) than the cost of producing that output (shown by the height of the

Box 4.2 – How the exercise of market power leads to inefficiency

marginal cost curve). In simple terms there is ‘money left on the table’ because the monopolist can only convince consumers to buy more output by lowering the price — but this would lower their profit.



4.2 A framework for analysing market power

The Commission’s framework for analysing market power is similar to that used by the Victorian Essential Services Commission (2020) in their market rent inquiry into the Port of Melbourne, and to the approach developed by King (2001) and used by the Commission in analysing market power in airport services (PC 2019).

Step 1: define the market and identify any competitive constraints

The first step in the framework for analysing market power (figure 4.1) involves identification of the good or service to be examined and consideration of the market that encompasses it. (Markets are always defined with respect to specific goods or services rather than particular producers.)

Market definition involves an analysis of both demand- and supply-side substitution. For example, if two services are strong substitutes such that any attempt to raise the price of one would lead to significant substitution by consumers to the other, then the two services would be deemed part of the same market because of demand-side substitution.² Alternatively, if a small but significant rise in the price of a service led producers of a different service to switch their production, and this did not require significant re-gearing, then the two services are in the same market due to supply-side substitution.

² The relevant ‘small but significant’ price increase for the analysis of demand- and supply-side substitution is usually considered to be 5 to 10 per cent. However, this is only a guide as individual goods and services can involve very different production processes and ‘competitive margins’ for suppliers.

Identifying demand-side substitutes requires an analysis of any constraints on consumers switching between alternative goods or services. A product is likely to be a demand-side substitute if it:

- has characteristics similar to the product that had an increase in price (this is referred to as the product dimension of the market). A product does not have to be identical to be a demand-side substitute
- is within a location that customers can access (this is referred to as the geographic dimension of the market). (ACCC 2008, pp. 14–15)

Identifying supply-side substitutes requires an analysis of any barriers to entry to, or exit from, a market that may limit supply-side substitution. A supply-side substitute is a product for which, in response to an increase in price of another product:

- the production facilities and marketing efforts can be switched to supply a demand-side substitute of that other product
- the distribution network can be modified quickly and without significant investment to enable supply to customers
- it is profitable for a firm to make the above changes. (ACCC 2008, p. 16)

Once the market is defined it can be ‘populated’ with the relevant actual or potential consumers and suppliers.

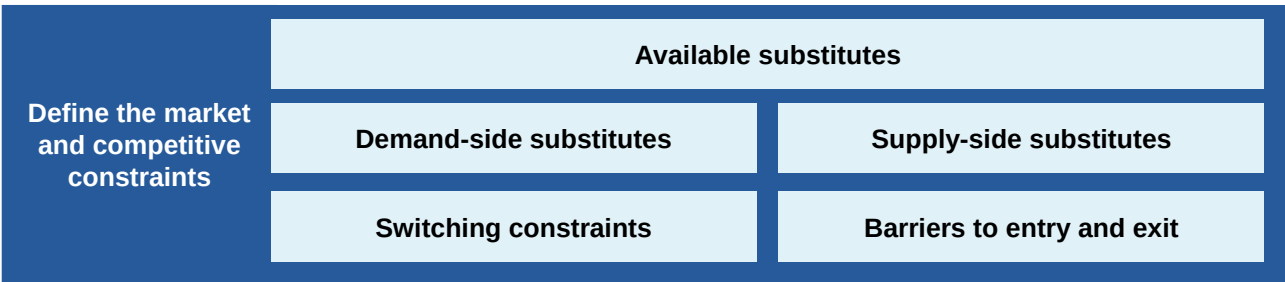
Suppliers are then analysed to determine the availability of substitutes and the ease with which consumers can move between them. As noted by the Trade Practices Tribunal:

It is the possibilities of such substitution which set the limits upon a firm’s ability to “give less and charge more”. (*Re Queensland Co-operative Milling Association Limited and Defiance Holdings Limited* (1976) 8 ALR 481; (1976) ATPR 40–01 at 17 248)

Barriers to entry can also be analysed to determine how easily a new supplier could enter the market. The potential for entry often provides an important element of competition.

This step of the framework both identifies the market and reveals whether a firm has market power.

Figure 4.1 – Step one: define the market and competitive constraints



Definition of markets in the maritime logistics system

The maritime logistics system consists of a suite of services such as port services, shipping and stevedoring. Each has unique features. For instance, shipping lines operate globally while port services are often provided at a ‘local’ level. Further, these services are generally not substitutable. Indeed, they are often complements.

This suggests that a number of markets are likely to be relevant to this inquiry, differing in terms of services provided, geographic scope and position in the vertical supply chain that forms the maritime logistics system. For example, there will be a market for international shipping services if:

- shipping lines operating on different routes are substitutable from a cargo owner's perspective (demand-side substitution)
- shipping lines are able to change routes in response to small but significant economic incentives (supply-side substitution)
- shipping services for moving cargo are distinct and different from other transport modes (such as airfreight). If alternative transport modes were strong substitutes for shipping services, then a broader cargo shipping market could be defined that included, for example, transport by ocean vessel or aircraft. (The evidence before the Commission strongly indicates that this is not the case.)

Similarly, there will be separate port services markets. The geographic extent of these markets will depend on the degree of inter-port (demand-side) substitution. For example, there may be a 'Sydney and Newcastle market for container port services', if shipping lines consider the services offered at Ports Botany, Kembla and Newcastle to be effective substitutes. Moreover, strong substitutability between container port services offered by Port Botany, the Port of Brisbane and the Port of Melbourne might mean that there is a broader geographic market that encompasses eastern Australia. However, information provided to the Commission strongly indicates that the relevant container port services markets are narrower, and likely state based. Geographic market definition may, however, differ for other types of port services, such as those provided for bulk cargos like grain.

Step 2: identify any constraints on the exercise of market power

The second step in the framework (figure 4.2) is to consider constraints on a firm's ability to exercise market power that arise from sources other than competition. Such constraints could include countervailing power held by other market participants or incentives that might prevent a firm from sustainably raising prices above the efficient long-run average cost. (Long-run average cost is the Commission's preferred conceptual benchmark for assessing whether the pricing of infrastructure services is efficient. But in practice, relevant data are often not obtainable.)

Figure 4.2 – Step two: constraints on the exercise of market power



Countervailing power can be an effective constraint

A customer has countervailing power when they can credibly threaten to bypass a firm or reduce demand for its services. This power will be stronger if they:

- are commercially significant to their suppliers
- can more credibly threaten to move their business in response to any changes that a supplier proposes, for example, to service offerings or prices
- can engage in lobbying to achieve a more favourable outcome, for example, by making a case for governments or regulators to conduct an investigation into the conduct of the counterparty. (ACCC 2008, pp. 44–45; PC 2019, p. 105)

A customer's size may also provide them with negotiating leverage. But this alone is not sufficient to have countervailing power, they usually need at least some of the characteristics listed above as well (ACCC 2008, p. 44).

Regulation can also play a role

Regulation enables governments to try to correct for market failures that harm community wellbeing such as a lack of competition and potential abuse of market power.

Economic regulatory regimes have several elements. They typically establish:

- institutional arrangements, such as the role of government institutions and any relevant legislative instruments
- how a price for the good or service should be determined
- requirements for information collection, analysis and publication
- constraints on parties' behaviour (such as a price or revenue cap)
- a credible threat of consequences (such as a move to implement additional regulation) if regulatory goals are not met. (PC 2019, pp. 83–84)

Regulation, the role of government and the case for intervention in a market are discussed in more detail below.

Barriers to entry and exit over the longer term

While barriers to entry and exit might preclude supply-side substitution in the short run, they might be less important over time. Step one of the framework involves considering whether there are supply-side substitutes that can relatively *quickly* be supplied to the market. But step two of the framework takes a longer-term perspective and involves asking: 'if a producer raises its price, will new businesses come into the market over time?'.

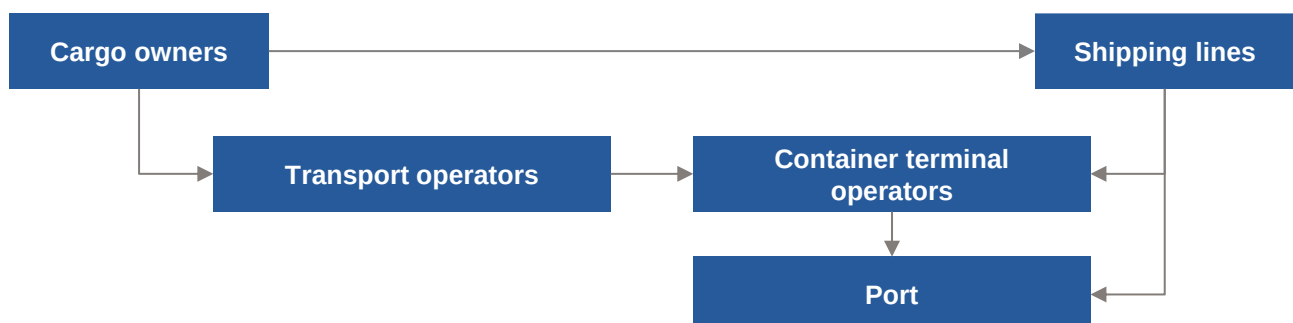
Additional factors to consider when analysing vertical relationships

When applying the framework for analysing market power in cases such as the maritime logistics system, additional factors need to be considered.

The system consists of vertically separated markets (figure 4.3), and there is not always a clear distinction between 'consumers' and 'providers' — some providers of services are consumers of other services. Container terminal operators, for example, provide services to shipping lines and landside transport operators and consume port services. A participant may have market power, or countervailing power, in one market, but not another.

Figure 4.3 – The maritime logistics system

Arrows show the flow of payments for services in the system



Each participant's influence over the price paid by the final customer (cargo owners), and community wellbeing, will vary with their market power. If all markets in the system are strongly competitive then the prices paid for different services will reflect marginal costs and this is an efficient outcome. If there is at least one firm exercising monopoly power and pricing above marginal cost, production will be below the economically efficient level. If there are multiple firms with market power, the analysis is more complex and depends on the specific nature of the interactions between relevant businesses. For example, it is possible that having multiple layers of market power in a vertical production process can compound any monopoly effect, leading to even less quantity available for the final customer and even higher prices (a situation of 'double marginalisation'). Alternatively, multiple participants with market power in a vertically separated chain of production may use sophisticated contracting and non-linear pricing to maximise total profits (effectively acting like an integrated monopoly) and split that profit amongst themselves. This, however, requires complex negotiations and contracts between participants.

These characteristics are important considerations in how to regulate a vertically separated market (box 4.3).

Box 4.3 – Regulating vertically separated markets

If a firm has market power and it is in one market in a vertically separated chain, it will not necessarily want to act in a way that creates a deadweight loss. Rather, it may want to act in a way that maximises economic surplus and then seize as much of that surplus as possible, such as through sophisticated contracting. These actions can harm other parties, such as consumers, in the sense that they do not get as much surplus, but they do not necessarily create an economic inefficiency.

Non-linear pricing and sophisticated contracting are two ways to get to this type of outcome. However:

- designing different pricing for each customer may be too expensive to be worthwhile if a firm is dealing with many small customers (leading to allocative inefficiency)
- sophisticated contracting can change the investment plans of customers if they risk being 'held up' by the business with market power at a later date meaning they cannot earn a fair return on their investments (opportunism that leads to dynamic inefficiency).

This means care needs to be taken before regulating a business with market power. Regulation has costs and should only be undertaken when the net regulatory benefits are clear. Care is particularly important where the business with market power engages with other sophisticated and well-resourced firms who can protect their own interests, and where long-term contracting between these businesses is possible.

Source: King (2021).

4.3 When should government intervene in a market?

Assessing the case for policy reform

A significant level of market power creates a prima facie case for government intervention, but this case can be weak if:

- there are constraints on the use of the market power (such as countervailing power)
- the exercise of the market power is unlikely to lead to inefficiency (box 4.3)
- the costs of appropriate regulatory intervention outweigh the likely benefits.

But the mere fact that a firm has market power is, by itself, insufficient to justify government intervention. Rather it is an exercising of market power to the detriment of the community that may warrant intervention, which typically takes the form of regulation.

The goal of economic regulation should not be competition in and of itself — it should be better outcomes for consumers.³

Moreover, regulation is not a golden bullet, and it has costs. In particular, there is potential for regulation to distort firms' incentives for investment, innovation or efficiency improvements. Regulation can result in:

- regulatory error — costs that arise due to inherent uncertainties faced by regulators, as they are required to make decisions with imperfect information about changes in the market and how the affected parties may respond
- compliance costs — direct costs incurred by firms in complying with the regulatory arrangements
- administration and enforcement costs — costs incurred by the regulator for compliance with regulation
- implementation and transition costs — costs associated with implementation of and transition to different regulatory arrangements. (PC 2019, p. 88)

The test for any policy change is whether it would generate the greatest increase in the wellbeing of the Australian community compared with other options, including the status quo. Since government interventions involve compelling firms to undertake certain activities or the public bearing certain risks, they need to be justified to ensure the benefits outweigh the costs. This test is particularly important in the maritime logistics system as there is already a range of regulation in place (chapters 5 and 6).

Regulation should achieve its intended objectives

A fit-for-purpose regulatory regime that is well designed and implemented should enable governments to achieve their objectives. It should also benefit the community by promoting efficient operations and investment, facilitating commercial outcomes and minimising unnecessary compliance costs.

Where governments decide to intervene, the design and implementation of the policy is critical to its success. The design of a regulatory regime depends on the nature of the market, the good or service in question and the policy objective of government. For example, in some regulatory regimes, a regulator directly sets prices (or total allowable revenue) based on the data it has collected from firms, with options for recourse in legislative provisions if a firm does not comply.

Governments should also ensure that any policies or regulation and their objectives remain fit-for-purpose over time.

³ Competition law sometimes distinguishes between 'protecting the competitive process' and 'protecting competitors'. While regulation that protects the competitive process will generally benefit consumers, interventions to protect competitors may harm consumer interests and are often undesirable.

5. Market power of port operators

Key points

- ✱ **Ports have a central role in Australia's maritime logistics system and decisions made in relation to them can echo through the entire system.**
 - While demand for a port's end product (movement of freight) is driven by importers and exporters, port operators' main interface with the system is via contracts with shipping lines and container terminal operators.
- ✱ **Container ports have some characteristics of 'natural monopoly technology' meaning that a single port may be the most efficient way to serve a market. However, some ports — particularly in Melbourne and Sydney — use high value land and are subject to capacity limitations. Growing demand for container port services will mean that the development of new ports to replace or compete against existing ports in some markets, most notably Melbourne and Sydney, will be economically efficient.**
- ✱ **Privatisation processes in New South Wales have conferred protection on port lessees that limits competition and is likely to impede economically efficient outcomes in the long term.**
- ✱ **The presence of only one container port in each of the five major Australian markets suggests that port operators may have market power. The evidence indicates that:**
 - container ports in Brisbane, Sydney, Melbourne, Adelaide and Perth have market power with regards to shipping lines. The ability to use this power is not constrained by countervailing power
 - container ports enter long-term contracts with container terminal operators and both parties have competitive alternatives so that no container port has market power with regards to container terminal operators. That said, long-term lease contracts cannot cover every contingency and, given container terminal operators make sunk, port-specific investments, a port may be able to behave opportunistically over time towards a terminal operator tenant. This may be exacerbated by privatisation and the associated change from state to for-profit ownership, but evidence of such opportunism is limited, and appears not to be a significant issue for any container port, with the possible exception of the Port of Melbourne.
- ✱ **No case has been found for further regulation of container ports.**
 - The Commission received few complaints about port pricing to shipping lines, consistent with regulation acting as a constraint on the ability of each port to exercise market power over shipping lines.
 - In the case of port tenants, the mechanisms that exist in New South Wales, Queensland, Western Australia and South Australia that enable closer regulatory oversight if concerns arise about ports' use of their market power appear to be adequate. Review of the Port of Melbourne's adherence to the Tenancy Customer Charter, alongside land rents, in 2025 appear to be a next logical step in addressing the Port's reported misuse of its market power.

Ports occupy a unique place in Australia's maritime logistics system. Their importance to the functioning of the system, monopoly characteristics and ownership status make them a logical first stop when considering the role that market power plays in the system.

This chapter uses the framework set out in chapter 4 to analyse whether port operators have market power, and if so, whether they exercise it. While port operators have many customers, this chapter focuses on the relationships of greatest systemic importance, those with shipping lines and container terminal operators, and briefly reviews evidence on ports' relationship with tug operators.

The chapter first overviews port ownership models (section 5.1), then defines the market that port operators work within and narrows the scope of the analysis to Australia's major container ports (section 5.2). It then assesses whether those ports are natural monopolies (section 5.3), and whether constraints curtail their use of market power (section 5.4). The chapter then considers the question of whether there is any case for further regulation of port operators (section 5.5), and concludes with a brief discussion of evidence on market power in the relationship between ports and tug operators (section 5.6).

5.1 Port ownership models vary

Port ownership models differ around the country. Some ports are state owned (such as the Port of Fremantle), some are leased on long-term contracts (such as the Port of Melbourne) (table 5.1), and some are privately owned (such as the ports of Geelong and Portland).

Table 5.1 – Major container port privatisations from 2001

Year	Port	Type	Price (\$bn)
2001	Port of Adelaide ^a	99-year lease	0.19
2010	Port of Brisbane	99-year lease	2.10
2013	Port Botany and Port Kembla	99-year lease	5.07
2014	Port of Newcastle	98-year lease	1.75
2015	Port of Darwin	99-year lease	0.50
2016	Port of Melbourne	50-year lease	9.70

a. Includes six regional ports.

Sources: Chen et al. (2017); Dr Greig Taylor and Dr Matthew McDonald (sub. 35).

Ports operate under state-based regimes (more on these in section 5.4). As such, there are differences in the bundles of services that operators provide, based on lease agreements, regulation and legislation in each jurisdiction. Lease agreements often establish a set of core responsibilities (but these documents are not in the public domain).

The dominant model among privatised ports may be described as a private/public landlord model (Chen, Pateman and Sakalayan 2017). Under this model, a private entity (the lessee) takes on the role of landlord and looks after infrastructure and planning. Other private entities run the terminal operations, while the public sector retains control of certain regulatory and service functions (table 5.2). For example, the port licence holder in Melbourne (Port of Melbourne Operations Pty. Ltd.) is responsible for:

- the development and operation of wharves and berths (except for Station Pier)
- maintenance and operation of shipping channels

- managing about 510 hectares of land used for commercial purposes (leased to tenants) (ESC 2017, p. 7).

The state-owned Ports Victoria is responsible for:

- providing a harbour master
- vessel traffic service and navigation
- dangerous goods oversight
- waterside emergency management
- marine pollution response
- management of anchorage and towage regulation
- operations at Station Pier (ESC 2017, pp. 6, 7).

Similar relationships exist in New South Wales, with commercial operations at the ports of Botany, Kembla and Newcastle working alongside the public sector functions of the Port Authority of New South Wales.¹

Some states have no separate port authority for their privatised ports and regulatory and safety functions are instead split between the port operator and a state or territory government department. Such an arrangement can be seen in Brisbane where Maritime Safety Queensland (under the Queensland Department of Transport and Main Roads) house regional harbour masters and operate Queensland's vessel traffic service.

Table 5.2 – Responsibility for selected port services

Monitored services shaded in blue

	Brisbane	Botany	Melbourne	Burnie	Adelaide	Fremantle	Darwin
Wharfage (Cargo-based)	Lessee	Lessee	Lessee	TasPorts	Lessee	Fremantle Ports	Lessee
Time-based dock occupation charge^a	Lessee	Lessee	Lessee	TasPorts	Lessee	Fremantle Ports	Lessee
Channel/Navigation Fees/Harbour Dues	Lessee	NSW PA ^c	Lessee	TasPorts	Lessee	Fremantle Ports	Lessee
Pilotage	MSQ ^b	NSW PA ^c	Private companies	TasPorts	Lessee	Private companies	Lessee
Vessel Traffic Service	MSQ ^b	NSW PA ^c	Ports Victoria ^c	TasPorts	Lessee	Fremantle Ports	Lessee
Towage	Private companies	Private companies	Private companies	TasPorts	Private companies	Private companies	Private companies

a. For example Site Occupation Charge, Berth Hire, Port Access, Cargo Service. **b.** Maritime Safety Queensland. **c.** Port Authority.

Sources: ESC (VIC) (2017); ESCOSA (2020); Flinders Ports (2021); Fremantle Port Authority (2018, p. 50); Landbridge Darwin Port (2021); NSW Ports (2021b); Port Authority of NSW (2022); Port of Brisbane (2021); Port of Melbourne Operations (2021b); Ports and Maritime Administration Act 1995 (NSW), Tasmanian Ports Corporation (TasPorts) (2021a).

¹ Lease agreements require terms relating to the state of assets at the expiration of the lease. These terms can impact investment decisions of a private port lessee. However, given that all leases still have at least 40 years to run, this issue is unlikely to impact investment in the short term and has been ignored for this inquiry.

5.2 A port is in a market for freight movement²

Focusing on international freight movement, as a group, maritime ports are participants in a market that facilitates the shipment of goods between overseas markets and a specific geographic area on behalf of an importer or exporter. There are, therefore, two major participants on the supply side of this market: ports (via maritime freight) and airports (via airfreight). While airfreight can facilitate freight movement in a shorter timeframe than maritime shipping, it comes at a substantial price premium and with significant weight restrictions. The market for freight movement can therefore be viewed as a continuum between time-sensitive movements where price is not so important, to price-sensitive movements where time is not so important, with overall weight or bulk providing a limiting factor.

In the short run, shocks such as shipping congestion or a natural disaster can make it temporarily profitable for an importer or exporter to shift modes, but in the long run, products will naturally shift back to the mode that yields the greatest profit or convenience. That said, products within a substantial band of this continuum (for example, iron ore and live lobsters) cannot substitute one mode for another.

Using the hypothetical monopolist test (box 5.1), a port would be deemed capable of exercising market power if it could increase prices by more than five per cent without losing so much freight to air services as to make this price rise unprofitable. For example, a shipping container might weigh 15 tonnes and cost about \$8000 in blue water charges to ship from Europe to Sydney (using COVID-19 era prices, chapter 6). In this instance the shipping might cost about \$533 per tonne. By comparison, shipping 100 kilograms by air might cost about \$885 (estimate via online calculator³), meaning the cost per tonne is about \$8850. As such, a 10 per cent rise the price of a shipping container (to \$586 per tonne) would be insufficient to induce a container freight customer to substitute to air.

Box 5.1 – The hypothetical monopolist test

The Australian Competition and Consumer Commission's 2008 Merger Guidelines set out a hypothetical monopolist test to determine a 'market' for the purpose of competition analysis. This is the smallest geographical space in which a monopolist can exercise its market power. In theory, the monopolist should be able to apply a small but significant and non-transitory increase in price (thought to be at least 5 per cent) without losing enough market share to alternative suppliers or products so as to make the move unprofitable.

In reality the hypothetical monopolist test is rarely strictly applied to merger reviews because data requirements make it impractical. However, it serves as a useful intellectual tool in considering market power and how consumers might behave within a market where market power is present.

Source: ACCC (2008, p. 15)

In line with these relative costs, imports and exports via maritime routes are characterised by larger volumes, lower costs, longer lead times and fewer weight restrictions than airfreight, making maritime a more suitable conduit for the bulk of Australia's international trade.

² Passengers can also be moved but they are outside the scope of this inquiry.

³ Such as <https://www.freightshop.com.au/freight-cost-calculator/>.

Moreover, the relative costs of freight movement by sea and air indicate that Australia's ports could, in theory, exercise market power over a significant range of the continuum of freight movements.

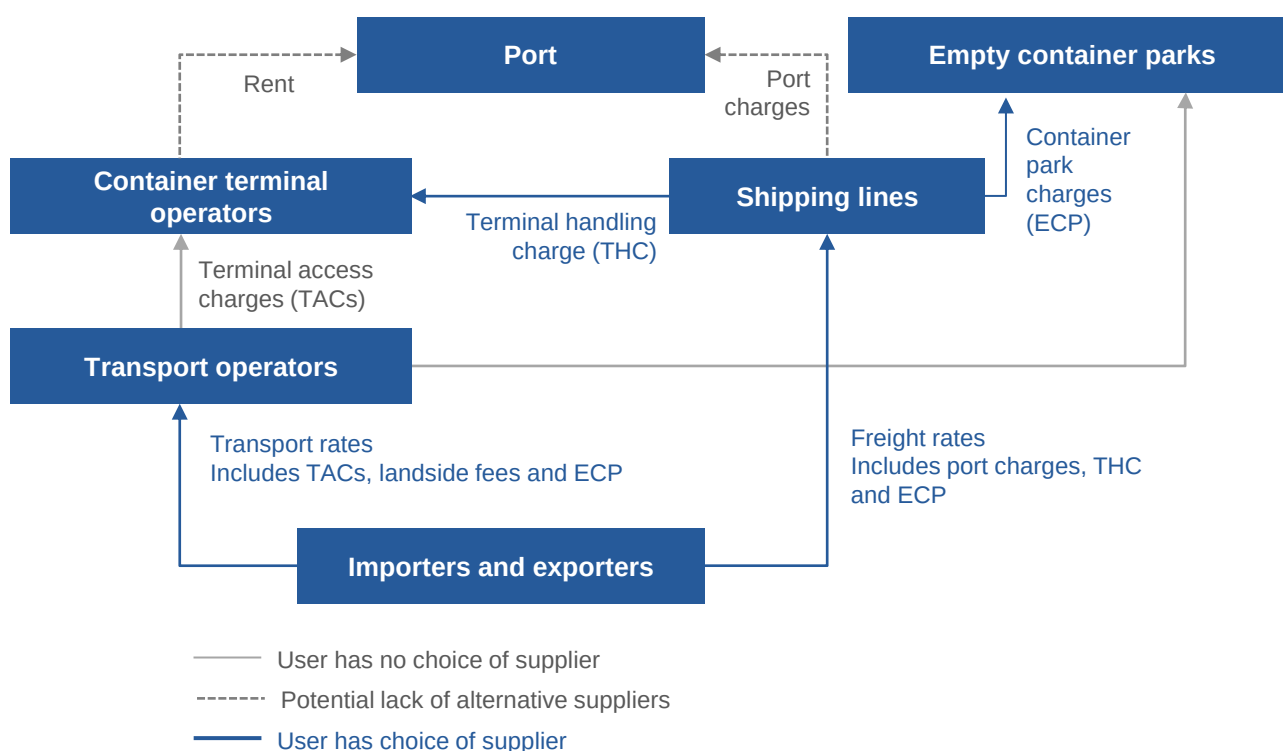
While some submissions to this inquiry have highlighted market power issues in other seaborne transport sectors (for example the Federal Chamber of Automotive Industries on roll-on, roll-off (sub. 23, p. ii), the focus here is on market power issues with major ports with a container terminal, chiefly because the vast majority of issues raised by inquiry participants relate to containerised shipping (chapter 1).

Ports have a central role in the container logistics system

Ultimately those who determine the demand for a port's services are the importers and exporters who need a conduit through which to transact their business, but there are several levels of separation between a port operator and these clients (figure 5.1). Port operators occupy a position where changes in charges flow through to the rest of the system.

Figure 5.1 – Port decisions affect the entire system

A simplified depiction of the maritime logistics value chain



Source: adapted from ACCC (2021a, p. 4).

While ports have a number of clients, the two main, direct customers of container ports are shipping lines and container terminal operators.

- Ports provide shipping lines with channels, quays and berths, and charges for these services are often monitored or controlled in some way (section 5.4). This comes despite recent consolidation in the container shipping market that has seen the market power of shipping lines increase substantially (chapter 6).
- Container terminal operators are provided with land, by way of a long-term lease, with which to carry out their operations.

In theory, both shipping lines and container terminal operators have choices about which ports they visit and operate within. In reality the market for movement is complicated — characterised by market power issues, high setup costs, limited substitution options and complicated switching constraints.

Geographic scope of the market: can shipping lines easily substitute between container ports?

Supply substitution is the extent that a consumer can switch to different suppliers of the same product. Having narrowed the market of interest to the movement of containerised goods to and from a particular geographical area, it is worth considering the extent to which clients of major container ports can substitute between one another.

Could a shipping line that wants to move cargo originating in, or destined for, one part of Australia skip the local port and use another?

Shipping lines work on behalf of exporters and importers transporting freight to and from international markets and access to ports is a key input to this process. An exporter or importer will be indifferent between two ports if the:

- infrastructure at each is suitable for the good being traded
- blue water (shipping line) charges are similar
- terminal handling charges (from container terminal operators to shipping lines) are similar
- landside costs (including terminal access charges) involved in transporting their cargo to or from the port stack up.

On the first point, containerisation has led to some standardisation in equipment, so there is no impediment to a container being loaded or unloaded at any of the major Australian ports. On the second point, shipping lines levy similar blue water charges for Brisbane, Sydney and Melbourne. And assuming active competition between container terminal operators (chapter 6), with marginal costs driving prices, terminal handling and access charges would likely be similar in all major Australian ports.

Landside transport costs are therefore likely to be the primary factor determining which port a shipper uses, and data suggests that they create a strong preference for local ports — Australian container ports have large, effectively exclusive catchment areas.

- In 2013, over 90 per cent of import containers through the Port of Brisbane were unpacked within 100 km of the port and approximately 75 per cent of export containers were packed within 100 km of the port (Queensland Transport and Logistics Council and Port of Brisbane 2013, pp. 11, 16).
- In 2012, for NSW Ports, 94 per cent of container volumes were moving to or from metropolitan Sydney with only 6 per cent going to or from regional areas. This split is forecast to continue for the next 20 years (Australian Competition and Consumer Commission v NSW Ports Operations Hold Co Pty Ltd [2021] FCA 720, p. 33).
- In 2020, 94 per cent of import containers arriving at the Port of Melbourne were delivered within the metropolitan Melbourne area. Export containers from the same area accounted for about 64 per cent of port traffic (Port of Melbourne, GHD, and Victorian Department of Transport 2021, p. 38).

While these freight movement statistics are indicative of a lack of substitution possibilities between major container ports, the key question is whether these movements would change if there were a small but significant change in prices. The extent to which landside transport costs would need to change to make substitutability between ports feasible is unknown but one participant to this inquiry considered that landside charges increasing by another \$300 per container (approximately) in Melbourne might make it worthwhile for

a Melbourne-bound container to be berthed in, and railed from, Sydney (Victorian Transport Association, pers. comm., 23 May 2022).⁴

With combined terminal access and handling charges being similar in Sydney and Melbourne (about \$700 per container, chapter 6), an application of the hypothetical monopoly test (box 5.1) would raise these charges 10 per cent to \$770. An increase of \$70 is unlikely to induce an importer to road or rail a container, which can cost between \$800 to \$3000 per container (Raman 2021).

In summary, any shipping line that wants to provide services to cargo owners in any of Australia's major population centres will need to call at the container port servicing that population centre. The shipping line cannot substitute away from that port at this point in time and expect their customers to follow.

Shipping lines skip ports, and this particularly hurts exporters

While opportunities for substitution between the five major container ports appear limited, shipping lines have been known to skip ports in Australia. Container shipping operates to schedules with set ports of call. Ships are sometimes instructed to skip ports to avoid disruption to that schedule, or to make up for lost time due to a previous disruption. In recent years ships have also skipped major ports such as Port Botany to avoid congestion caused by industrial action, with import cargos instead delivered to the Port of Melbourne and moved to their destination via land freight.

The National Farmers Federation (sub. 14, p. 8) listed some effects of port omissions:

- perishable agricultural commodities have missed the opportunity to export;
- their products that have been left at ports to rot;
- delays involving livestock can cause significant animal welfare concerns;
- additional cost to dispose or find alternate uses for the products; and
- farm inputs, such as machinery and fertiliser, ending up at the wrong port and being freight[ed] over land at millions of dollars in additional cost.

In theory, where this happens (and depending on the destination contained on the bill of lading) a shipping line will pick up the landside transport costs to get the cargo to its final destination. However, the Commission has heard of cases where the importer has been left paying for this final leg of this journey.

Can a container terminal operator substitute between landlords?

As discussed in chapter 2, container terminal operators Patrick Terminals and DP World have a national presence, operating out of Brisbane, Sydney, Melbourne and Fremantle. Other container terminal operators do not: Hutchison operates in Sydney and Brisbane and Victoria International Container Terminals in Melbourne. Container terminal operations at the Port of Adelaide are handled by the port owner.

Container terminal operators face constraints to establishing operations at a port.

- The number of onsite container terminals is decided by the port owner.
- Some states (such as New South Wales and Victoria), have policies or arrangements that in effect limit which ports can operate container terminals (section 5.4).

Once established at a port, the existence of potentially significant switching costs has the potential to diminish the position of container terminal operators in negotiations with port operators. Container terminal

⁴ It should be noted that Covid led to some abnormal prices and movements — but these are unlikely to continue in the long term as there has been no fundamental shift in technology that would drive longer-term price changes.

operations require large investments in plant and equipment that are tied to their operating space, and this operating space is leased from the port owner.

Container terminal operators typically protect against the risk of their investments being held to ransom by engaging in long leases. For example, Patrick Terminals' lease on the Port of Melbourne runs until 2066 (46 years) (Coles 2020) while DP World (signed in 2015) runs until 2065 (Saadi 2015).

This analysis establishes five markets for examination

There are five markets, each of which has one significant container port operator.

- The Melbourne market: a market for general container freight transport into and out of the Melbourne metro area, broader Victorian regions and Tasmania and the only active participant in this market is currently the Port of Melbourne. The market does not include bulk commodities such as grain that is moved by container.
- The Sydney market: a market for general container freight transport into and out of the Sydney metro and surrounding New South Wales region. NSW Ports and the Port of Newcastle currently participate in this market, although the Port of Newcastle shifts very small volumes of container freight and faces penalties if it expands its container operations. The Port of Melbourne is relevant for some parts of southern New South Wales (Port of Melbourne, GHD, and Victorian Department of Transport 2021, p. 14) but is not a competitive supplier for the vast majority of container freight in the Sydney market. The market does not include bulk commodities such as grain that is moved by container.
- The Adelaide market: a market for general container freight transport into and out of the Adelaide metro and South Australian region. Flinders Ports currently participates in this market and the Port of Melbourne has a role as a minor competitor (Port of Melbourne, GHD, and Victorian Department of Transport 2021, p. 14). The market does not include bulk commodities such as grain that is moved by container.
- The markets for general container freight in and around Queensland and Western Australia are dominated by the Ports of Brisbane and Fremantle respectively. Neither faces significant competition in their respective markets. The market does not include bulk commodities such as grain that is moved by container.

5.3 Are Australia's container ports natural monopolies?

Recapping chapter 4, a natural monopoly occurs when it is less costly for one firm to produce all the output in a market. Typically, this means that provision of a service comes with high setup costs and relatively low running costs, meaning the average cost of provision decreases with increasing custom. Normally, having a monopoly provider in a market is undesirable as it leads to higher consumer prices and reduced output. However, putting aside concerns about the misuse of market power by a monopoly operator, there are some instances where it may be beneficial to allow a monopoly to develop within a market.

When there is a natural monopoly technology, a monopoly, if properly constrained, can exploit economies of scale (where long-run average cost declines as output increases) to pass on cost savings to consumers as volumes increase. Where this happens, the potential efficiency gains or cost savings brought on by price competition with a new entrant can be swamped by the inefficiencies of each operator servicing a smaller customer base. In this situation, competition can result in higher average costs and potentially unstable competition as two firms, each with economies of scale, attempt to gain shares in the one market.

Finally, it may just be a more efficient use of scarce land area where a single facility can service a market. Multiple ports require more rail and transport connections, administration buildings or shipping channels and may take up a bigger footprint than a single facility properly set up for that market. However, the desirability

of a single (monopoly) operator may diminish over time. As population centres grow the alternative use value of that land becomes greater, which can lead to inefficient land allocation.

Having a natural monopoly technology does not mean that there cannot be competition, it means competition does not minimise production costs. A natural monopoly will quite often have a monopoly provider because entry by another firm can lead to price wars and bankruptcy for the entrant.

Setup costs indicate the existence of some natural monopoly characteristics for major Australian ports

The Australian coastline has relatively few natural harbours suitable for large ships and building ports requires high, upfront infrastructure costs⁵. For example, a channel may have to be dredged to a significant depth to allow ships to approach and manoeuvre. Estimates of the cost of establishing new port infrastructure in Western Australia, for example, range from \$4 – \$5.6 billion (Westport Taskforce 2020, p. 84). For context the Port of Fremantle moved approximately \$31 billion worth of goods in 2020-21, with a before-tax profit of \$77.8 million (Fremantle Ports 2021, p. 4). The scarcity of suitable sites and high setup costs are a significant barrier to new entrants.

Port operators can also face significant ongoing fixed costs. For example, the Port of Melbourne Channel Deepening Project, carried out between early 2008 and 2009 moved 22.9 million cubic metres of material at a cost just over \$717 million (Victorian Auditor-General 2012, pp. xii, 35).

In contrast with the high costs of establishing port infrastructure, the costs of servicing a ship are low. One might conclude, therefore, that at least in the short term and where a port is not capacity constrained, Australia's major ports satisfy key characteristics of natural monopoly technology. In this sense, competition is not impossible but entry by another party may mean that the lowest production costs might not be achievable.

Capacity constraints are a big check on long-term port monopolies

Over the longer term, however, many of Australia's major ports will face capacity constraints — often driven by geographic (space) constraints. Demand for port services is growing (chapter 2) and ports will need to grow their footprint to meet this demand, which will be problematic without the ability to create new land.

While the Port of Brisbane is situated on an island which, through reclamation, can expand out into the surrounding bay, expansion options are more limited for other major Australian ports. All are in close proximity to major commercial centres, meaning:

1. a port may wish to expand but cannot because the land is already in a (higher value) use
2. as the commercial operations of the surrounding environment change, so too does the value of the surrounding land. Economic theory suggests that the market, through the pricing mechanism, will decide the best use of a parcel of land and as the value of surrounding land increases, so too does the alternative use value of port land. In the long run it may be uneconomic to maintain port operations in such an environment.

At some point, the economic case for new ports is likely to become compelling in Melbourne, Sydney and Perth, but less so in Brisbane and Adelaide. A port will leverage economies of scale while it can expand its operations within its existing footprint. As space becomes a constraint efficiency suffers and costs increase. A provider that faces ongoing congestion and is unable to expand capacity may not be able to produce at least cost compared with two or more providers. In this case, the current port no longer has natural monopoly characteristics, and development of a second port would produce a more efficient outcome.

⁵ More detail on upfront costs can be found in chapter 2.

That said, the time frames involved in building new ports are often very long.

Using national and international benchmarks, it is reasonable to assume that once a decision on a new port location is made, it will take between 10 and 15 years to plan, design, gain approval for, and construct the port. (Infrastructure Victoria 2017, p. 30)

In sum, Australia's major container ports currently have some natural monopoly characteristics. If they are natural monopolies then, economically, it is more efficient to only have a single container port operate to service the relevant market, subject to that port not taking advantage of any market power that it may have to increase prices (without increasing efficiency). However, it is far from clear that having the existing single container ports in a number of Australia's cities — including Sydney and Melbourne — will continue to be economically efficient in the future (and possibly even today) due to capacity constraints and alternative uses of the land occupied by and neighbouring the port. In such a situation, the long-term provision of maritime freight services in the relevant markets will be best served by either having multiple alternative container ports or replacing the existing container port with an alternative that occupies lower value land and does not face the capacity constraints faced by the existing port. The movement to this situation of multiple container ports, however, will depend on a range of factors including government regulation and planning restrictions and other barriers to entry and exit.



Draft finding 5.1

Major container ports are currently regional monopolies

Major Australian container ports in the short to medium run may involve a natural monopoly technology, where a single port can best serve the relevant market. However, this situation may not hold over time as demand is increasing and space for expansion is constrained. Indeed, it is far from clear that it is economically efficient to have a single container port in some Australian cities including Melbourne and Sydney either today or in the near future.

Do incumbent ports have sustainable market power ...

... over shipping lines? Yes

In the market for movement of containerised cargo in and out of a discrete geographical area, it is clear that the five major container ports (Brisbane, Botany, Melbourne, Adelaide and Fremantle) act as significant gatekeepers to the economic activity that goes on outside the port gate. If shipping lines want to engage with Australian customers, they can really only access them through these five ports.

Individually these ports (mostly) do not compete with each other for visits by shipping lines. Import cargo destinations are overwhelmingly local to each port and landside transport costs combined with vast distances between port facilities mean shipping lines would struggle to play one port off against another for commercial gain, so there is little or no opportunity for substitution. As such, major container ports do have some degree of market power over shipping lines.

... over container terminal operators? In theory — no

While it is tempting to view container terminal operators as captive clients of port owners, terminal operators are adept at protecting their position on the docks. Container terminals operate significant infrastructure as tenants of the ports, have large setup costs and large sunk assets that can be held captive by a port in the

event of expiry or renegotiation of a lease. As such, switching costs appear to be significant and the prevalence of local port monopolies mean there is often little to switch to.

However, a terminal operator's presence on a dock is the result of a negotiation between two parties, and the operator can choose not to service a port if initial terms are not favourable. Assets are also protected by long-term leases (running to the mid-2060s in the case of the Port of Melbourne), so there is no issue of sustained market power between ports and container terminal operators.

There are four caveats to this conclusion. First, when initial contracts are negotiated under public ownership, and then the port is privatised, the original contracts may not cover all commercial issues associated with private port ownership. Arguably, this problem has underpinned on-going pricing disputes at the Port of Newcastle (for example ACCC (2018d)). Second, when a contract is renegotiated, a port may be in a stronger bargaining position than an individual terminal operator. After all, there are generally multiple terminal operators but only one port in each of the relevant markets. This may allow the port to exploit its position in contract renegotiations if the expiring contracts have not made appropriate provisions, for example, to compensate the container terminal operator for investments in the case of failure to renew a lease. Third, no contract covers every contingency over time. In some circumstances one party to the contract may be able to take advantage of a situation that has not been fully covered by the contract to behave opportunistically and 'hold up' the other party's sunk investments. Of course, such opportunism could be exercised by either the port or the container terminal operator, depending on the exact circumstances. Finally, the evidence collected by the Essential Services Commission (Vic) for the Port of Melbourne (section 5.5) as well as other evidence (figure 5.2) shows that post-privatisation rents have increased significantly for container terminal operators at Brisbane, Sydney and Melbourne.

While these caveats suggest caution, at this stage the Commission has not seen evidence to show that the ports have significant and sustained market power over the individual container terminal operators.

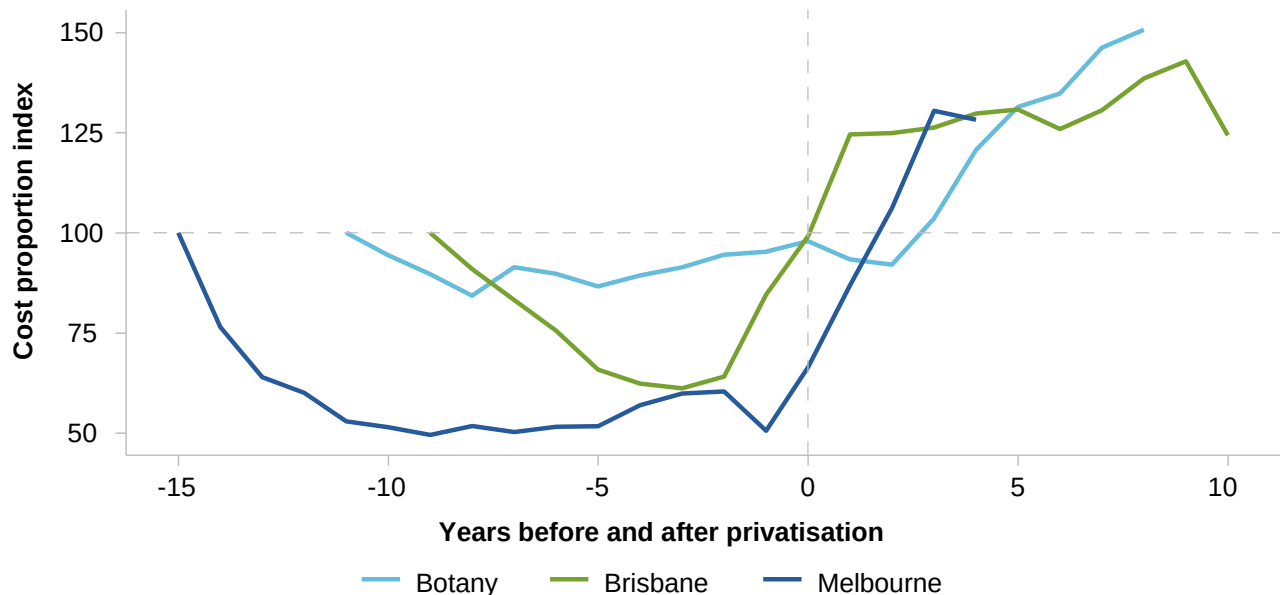


Information request 5.1

The Commission invites container terminal operators and other port tenants to respond (with evidence) if they think there is a market power issue with a port operator.

Figure 5.2 – Property costs have grown more important since privatisation

Terminal operator^a per lift costs (as per cent of total costs) attributed to property, indexed to 2001-02 (against labour and equipment)



a. Average of figures reported by DP World and Patrick Terminals.

Source: ACCC *Container Stevedoring Report 2020-21* supplementary tables.

5.4 Assessing constraints on market power for container ports

An operator with market power faces three major checks on how they might exercise that power:

1. the possibility of entry by potential competitors
2. the countervailing power of its clients
3. regulation or government actions designed to curb the exercise of market power.

Some port privatisation processes have impeded future competition

In previous reports, the Commission has advocated for the privatisation of public infrastructure (PC 2014a, p. 89, 2016b, p. 388). Specifically with respect to major ports, the Commission argued that privatisation:

... has the potential to increase economic efficiency, provided the public interest is protected through structural separation, regulation or sale conditions. Increasing the sale price of ports by conferring monopoly rights on buyers is not in the public interest. (PC 2016b, p. 388)

In contrast, the privatisation processes adopted for Port Botany and Port Kembla, and the Port of Melbourne, have included contracts with provisions that have limited competition. These clauses have two potential detrimental impacts on the Australian community. First, they increase the market power of the existing (monopoly) container ports in the Sydney and Melbourne markets potentially leading to higher prices and, therefore, consumer harm. Second, given the location of the relevant ports and the discussion on natural

monopoly technology above, such clauses may inefficiently prevent the entry of new, lower cost, container ports, raising import and export costs across the container logistics chain, even if the incumbent ports are not exploiting any market power.

Port Botany and Port Kembla

There are three main ports in New South Wales: Port Botany, Port Kembla and the Port of Newcastle. Port Botany is the primary container port and in 2020 handled 2.6 million 20-foot equivalent units (TEUs) (BITRE 2021c, p. 13). Port Kembla and Port of Newcastle are primarily bulk ports (ACCC 2019e, p. 2). While they do not have container terminals, they can offload if necessary, though this takes longer than at dedicated container terminals.

In 2001, the Port of Newcastle was given development approval for a container terminal to handle up to 350 000 TEU per year, and from 2009, the port's operators have taken steps to develop a container terminal (ACCC 2019e, p. 2).

In 2011, the New South Wales Government announced its intention to privatise Port Botany. During this process bidders expressed concerns that if a container terminal was built at the Port of Newcastle or at Port Kembla, they would be a competitor to Port Botany (Australian Competition and Consumer Commission v NSW Ports Operations Hold Co Pty Ltd [2021] FCA 720, p. 20). It was suggested that Port Botany and Port Kembla be privatised as a package, and that the State not approve the container terminal element of the development of the Port of Newcastle to counteract bidders' perceived risk of competition from a government-owned Port of Newcastle (Australian Competition and Consumer Commission v NSW Ports Operations Hold Co Pty Ltd [2021] FCA 720, p. 21). There was also a cap on container movements at Port Botany. Bidders argued for its removal and noted that there may not be a need for another container port once the cap was lifted.

In 2013, the New South Wales Government privatised Port Botany and Port Kembla using a 99-year lease. The Port Commitment Deeds included a clause that the State was to compensate the port operators (NSW Ports) if the following conditions were satisfied for two consecutive financial years:

- containers volumes through the Port of Newcastle exceeded 30 000 TEU per annum (plus natural growth) (this is referred to as the PoN threshold)
- the Botany or Kembla operator demonstrated to the reasonable satisfaction of the State that the container traffic through the Port of Newcastle exceeded the PoN threshold and caused a reduction in containers imported or exported through Port Botany or Port Kembla. (ACCC 2019e, p. 3; Public Works Committee 2019, p. 6)

The Port of Newcastle was privatised in 2014 for a period of 98 years. Its Port Commitment Deeds require that if the State must compensate Port Botany or Port Kembla, then recompense will be sought from the Port of Newcastle. This requirement applies for the first 50 years of the lease.

The ACCC stated that this has made it 'uneconomical to develop a container terminal at the Port of Newcastle for the 50 year term of the deed' (ACCC 2019e, p. 4). This effectively limits the possibility of the most likely competitor (Newcastle) entering the container market in New South Wales.

Some argue that Port Kembla is the more logical choice as the next container port rather than the Port of Newcastle. A 2012 report noted that: 94 per cent of container volumes were moving to or from metropolitan Sydney and Port Kembla is closer to metropolitan Sydney; the cost of a container port at Port Kembla was \$4.1 billion compared with \$12.2 billion for Port of Newcastle; and moving containers by road or rail was cheaper for Port Kembla than for Port of Newcastle (Australian Competition and Consumer Commission v NSW Ports Operations Hold Co Pty Ltd [2021] FCA 720, pp. 33–34). Regardless, the existence of provisions that prohibit competition in the long term distort the market and limit the benefits of privatisation.

The Port of Melbourne and Bay West

When the Port of Melbourne was privatised, the legislation precluded development of a second port within the first 15 years of the lease. This clause has little effect as planning and construction of a new container port is expected to take about 15 years in any case. With the Port of Melbourne expected to reach capacity around the year 2055 (based on current projections), Infrastructure Victoria has highlighted Bay West as the preferred candidate for the next Victorian container port (chapter 7).

Can the market attract new (or existing) container port entrants?

One of the biggest constraints on an operator exercising market power is the threat that supernormal profits will attract new entrants into that market. While section 5.3 established that there are significant barriers to entry for new container port operators in certain geographical areas in Australia, landside capacity constraints mean that economies of scale may have their limits. Where this occurs, the market may be better served by new facilities either replacing or competing with existing services.

As such, future volume increases in maritime traffic may offer a pathway to potential alternatives to existing container port services. The new container terminal proposed at Bay West in Victoria, for example, has the potential to provide competition to companies operating in the Port of Melbourne. Infrastructure Victoria (2017, p. 18) recommends detailed planning for a new port begin around 2040⁶ to coincide with the Port of Melbourne reaching capacity.

Similar moves towards substitutability appear unlikely for container ports in other states and territories for some time. While many lack traffic volume and population (that provide scale), New South Wales has restricted the potential for competition among container ports in the state by bundling and privatising the ports of Botany and Kembla into a 99-year lease (see above), and effectively barring the Port of Newcastle from developing a competing container terminal until (at least) 2064.

It should be remembered that the borders of each market are porous, moveable and not necessarily confined to state boundaries. In 2019, 7.3 per cent of container exports from the Port of Melbourne came from New South Wales and the Australian Capital Territory, while 1.4 per cent came from South Australia (Port of Melbourne, GHD, and Victorian Department of Transport 2021, p. 15). While these numbers are small when compared with imports going locally to Melbourne's surrounds, it shows the Port of Melbourne operating (on a small scale) in regions dominated by the ports of Botany and Adelaide. While Melbourne's share in each of these markets is not significant, the presence of Australia's largest container port in these markets can act as a restraint on any power NSW Ports and Flinders Ports may have in their own markets.



Draft finding 5.2

Privatisation in New South Wales has impeded efficient outcomes

Privatisation processes in New South Wales have conferred protection on port lessees that are impeding economically efficient outcomes in the development of the state's ports system.

⁶ Land reservations for the port and connecting transport corridors are already well underway (chapter 7).

The countervailing power of shipping lines has been increasing but has had little effect on port operators

Countervailing power can be an effective constraint on a port's efforts to exercise its market power if a shipping line can increase its bargaining position by credibly threatening to bypass and reduce demand for the port's services. For example, if a port is only visited by one shipping line, that line could bypass the port, resulting in the port's customers having to look elsewhere to carry out their business.

On a port-by-port basis, a shipping line's countervailing power rests on the likelihood that the line can bypass a port where terms are unfavourable. A shipping line will only bypass a port if the value of foregone shipments and reputational damage (if any) is less than the costs of making the visit.

The Commission has seen no evidence of shipping lines choosing to skip a port to bargain down port charges. In Australia, where ports (particularly container ports) are monopolies geographically tied to areas of significant economic activity, the potential costs of boycotting a port are likely to exceed the gains from bargaining over portside arrangements. Therefore, shipping lines' countervailing power at major Australian ports does not appear to be material.

However, when it comes to Australian ports, the shipping lines buy services from both port operators and container terminal operators, and while the port operators remain relatively protected by their monopoly status, the same cannot be said for container terminal operators (chapter 6).

Container terminal operators have little countervailing power over port landlords

A container terminal operator's countervailing power is largely determined by its ability to credibly threaten to bypass a landlord port, while continuing to do business. However, there are three reasons why terminal operators are not likely to be able to make a credible threat.

1. The markets defined in section 5.2 contain just one port landlord per market.
2. While some port tenants may have opportunities to switch their operations to non-port land, container terminal operations are tied to the waterfront.
3. With high start-up costs for new port facilities (section 5.3), opportunities for backwards integration (a container terminal operator funding or sponsoring a new port entrant) are very limited.

If it exists, any countervailing power of container terminal operators over port landlords would presumably be leveraged in combatting rent increases on port operations. But assessing if and how the relative bargaining power of port operators and container terminal operators influences rents is difficult as lease terms are commercial in confidence.

One rare example of a container terminal operator fending off a substantial rent increase involved DP World resisting a proposed 767 per cent jump in rent on renegotiation of its lease at the Port of Melbourne in 2015 (Saadi 2015). Whether this represents an example of a successful deployment of countervailing power is questionable: Victoria International Container Terminal (VICT) (2019) viewed this result as a poor use of market power by the port (in not letting the lease go out to tender), rather than a good use of countervailing power by the terminal operator.

In the end, while it seems fairly clear that container terminal operators lack countervailing power when it comes to ports, a lack of pricing transparency means it is difficult to assess what effect, if any, this is having on productivity in the maritime logistics sector.



Draft finding 5.3
Ports face little countervailing power

There is little countervailing power from either shipping lines or container terminal operators constraining the use of market power by port operators at Australian container ports.

Regulation is typically light touch but designed to escalate

Pricing and access to ports are regulated at State and Commonwealth levels, with the states mostly focussing on prices through monitoring regimes and the Commonwealth concerned in the main with access and competition.

Ports' services can be prescribed (monitored) or non-prescribed (non-monitored), with those services prescribed varying by the lease agreements and regulation in each state. Typically, services provided to shipping lines are prescribed while services provided to container terminal operators are non-prescribed. More specifically, services provided to shipping lines are monitored for the ports of Sydney, Melbourne and Adelaide; services provided to tenants are monitored for the Port of Melbourne.

The regulatory regimes in each state are heavily influenced by local port ownership structures and, where privatisation has taken place, the privatisation process. Some privatisations were undertaken leaving very little regulatory oversight; elsewhere there are views that oversight has been traded off to enhance the sale value (Dr Greig Taylor and Dr Matthew McDonald, sub. 35, p. 30), while some regulation appears to have been added late in the privatisation process, meaning the regime has been difficult to administer and comply with.

Price monitoring dominates

The dominant mode of regulation across all markets where services are regulated is price monitoring. Price monitoring can offer some element of transparency to the pricing decisions of monopoly operators. For ports around Australia, price monitoring can require:

- publication of prices (for example, charges to shipping lines in Victoria)
- notifying a regulator, minister or department of a coming change to pricing and justifications for the change (for example, in New South Wales)
- providing prices to a third party for compilation into a monitoring report (for example, in South Australia).

Regulators sometimes use periodic (usually five-year) price monitoring reports to decide on the future course of regulation — whether to continue with the current regime or to tighten the settings. Some regimes, such as those in Victoria and South Australia, report on price movements for services to shipping lines with an eye to keeping them within changes to the consumer price index.

Price monitoring can be a useful, light-touch regulatory tool that provides some level of transparency without overburdening the port or its regulator. However, as a standalone regulatory tool, it is not without critics. In 2016 the ACCC noted that as a general point price monitoring is not effective regulation. According to (then) chair, Rod Sims (2016):

... price monitoring can be useful to increase transparency and address a high level of community concern, or where policy-makers are seeking to understand the impact on a market of a change in policy. But it does not amount to any form of regulation. Without competition, simply monitoring prices will not provide any discipline on pricing.

In another speech, Sims (2015) elaborated further on how price monitoring affects a monopolist:

The incentives of a monopolist are such that they are unlikely to be substantially affected by the largely non-financial impact of monitoring regimes. They will effectively be able to act in an unconstrained manner with little incentive to undertake efficient investments and operation of infrastructure services. In these circumstances something more than price monitoring is required.

In the context of ports, DP World (sub. 49, p. 12) observed that privatisation of the economy's primary economic gateways, subject only to light price monitoring, has brought about significant changes in the dynamics of Australian container supply chains; not all of them positive.

Most regimes are designed to escalate, if the need arises

While states and territories use price monitoring to reduce the risk of container ports developing monopolistic behaviour, they have mostly reserved for themselves the right to impose more comprehensive economic regulation. This regulation could apply to services provided to shipping lines and / or tenants.

- Although prices are accessible on the port's website, no specific price oversight regime applies to the Port of Brisbane, but the Queensland Competition Authority has potential power to monitor prices and report to the Queensland Government if directed to do so (ACCC 2021a, p. 28).
- In New South Wales, the Independent Pricing and Regulatory Tribunal (IPART) plays no part in the price monitoring regime of Port Botany but can do so if requested by the relevant minister. IPART can also be directed to undertake a review of the effectiveness of the price monitoring regime and report to the New South Wales Government (NSW Treasury 2015, pp. 10–11).
- In Victoria, the Essential Services Commission (ESC) produces five-yearly reports on the Port of Melbourne's land rents and the port's adherence to its pricing order (regulations on what it can charge for prescribed services). After the port was found to be misusing its market power in the setting of (non-prescribed) land rents, the ESC recommended the regime be upgraded to include a legislated, enhanced negotiate–arbitrate mechanism (ESC 2020, p. 56). The response from the Victorian Government did not go so far, instead opting for a voluntary 'Tenancy Customer Charter' designed to provide additional dispute rights to current and prospective tenants, and the ESC will report on the Port's adherence to the charter when it next reviews land rents in 2025 (Andrews 2021). DP World (sub. 49, p. 68) noted however that the charter will only apply to leases signed after the port's privatisation in 2015, effectively excluding container terminal operators DP World and VICT.
- In South Australia, the five-yearly Ports Pricing and Access Review, published by the Essential Services Commission of South Australia (ESCOSA) lays out what the regime will entail for the next five years. At this point ESCOSA can tighten or loosen the conditions under which the Port of Adelaide can operate (ESCOSA 2017, p. 36), but the current regime does not include land rents.

5.5 Should there be extra regulation to stop port operators from exercising their market power?

In most markets, a situation where one party, such as a port, has substantial market power that is not constrained by countervailing power or strong regulation, would be a cause for concern. While the ports do not have significant market power regarding container terminal operators due to the existence of long-term contracts, as noted above there are still some risks in this relationship. Ports do have market power over other market participants such as shipping lines.

However, the Commission discovered little by way of complaint about the conduct of the ports operating under lighter-touch regimes (Brisbane, Sydney, Adelaide and Fremantle), either with respect to shipping lines or tenants. This does not mean issues do not exist, however, as aggrieved parties may simply lack an avenue for complaints to be aired.

In contrast, the Port of Melbourne is both the most heavily regulated and most commonly complained about container port in the public domain. The port has been found to be exercising its market power over tenants (including container terminal operators) in the setting of rents (ESC 2020) and was most recently found (on its first five-year review) to be in breach of its pricing order (ESC 2021a). (The Commission is not aware of any complaints from shipping lines.)

The Port of Melbourne is Australia's largest container port and given its systemic importance it is not clear that arrangements working well for the Port of Brisbane (for example) would work for Melbourne. The Port of Melbourne is the most recent of the major container ports to undergo a privatisation process. New arrangements need a period of adjustment for both the port and regulator, and it appears the arrangement in Melbourne is yet to reach maturity.



Draft finding 5.4

No case has been found for further regulation

In the case of shipping lines, prices for services provided by ports are typically monitored (or face the threat of further regulation). The Commission received few complaints about port pricing to shipping lines, consistent with this regulation acting as a constraint on the ability of each port to exercise market power over the shipping lines.

In the case of tenants, given only one container port has been found to be exercising market power there is no case for tighter regulation at this time on all ports. The threat of further regulation appears to be constraining the conduct of ports operating under 'light touch' regulatory regimes (Brisbane, Sydney and Adelaide). The mechanisms that exist in Queensland, New South Wales and South Australia that enable closer regulatory oversight if concerns arise about ports' use of their market power appear to be adequate. For the Port of Melbourne, the current arrangement of reviewing the Port's adherence to the Tenancy Customer Charter alongside land rents in 2025 appears to be a next logical step in addressing issues around the Port exercising its market power over tenants.

5.6 Market power issues have been raised with tugs

While this chapter has focused on the major ports and their relationship with container terminal operators and shipping lines, legal cases have raised issues with some ports' treatment of tug operators. The commission did not receive direct submissions on these matters.

Exclusive dealing and the notification provisions

In 2000 there was a case between Stirling Harbour Services Pty Ltd and the Bunbury Port Authority. The Port of Bunbury (PBA) had tendered for operators to provide towage services by way of an exclusive licence for a five to seven year term. The incumbent (Stirling), and sole provider under a non-exclusive licence

granted by PBA, argued that the Port of Bunbury was using its market power to exclude Stirling by granting an exclusive licence to a competitor.

Justice French at first instance distinguished between statutory power and market power,:

... the exercise by [BPA] of a statutory power to licence the provision of towage services in the Port of Bunbury is not an exercise of market power but rather the discharge of a regulatory function conferred upon it by the legislature in the public interest. (*Stirling Harbour Services Pty Ltd v Bunbury Port Authority* [2000] FCA 38 at 124).

The Full Federal Court agreed with this approach (*Stirling Harbour Services Pty Ltd v Bunbury Port Authority* [2000] FCA 1381).

Additionally, the notification provisions in the *Competition and Consumer Act 2010* (Cth) (CCA) (section 93) allow operators in cases of exclusive towage contracts (which are not unusual and have been used at smaller ports such as Gladstone and the Port of Cairns) to advise the ACCC of their intentions and for the ACCC to assess whether the conduct will substantially lessen competition and whether it will result in a likely public benefit which outweighs the likely public detriment. Notifications can also be revoked subject to the ACCC conducting an inquiry (ACCC 2017, p. 6).

Market power — section 46

The ACCC instituted proceedings against TasPorts in December 2019 based on section 46 of the CCA. Section 46 prohibits a firm with substantial market power from engaging in conduct with the purpose, effect or likely effect of substantially lessening competition.

The Federal Court declared by consent that TasPorts had breached section 46 (CCA) by imposing a new port access charge on iron ore exporter Grange Resources Ltd, after Grange notified TasPorts that it was going to switch to Engage Marine Tasmania Pty Ltd, a new provider of towage and pilotage services.

The ACCC also obtained a court-enforceable undertaking:

... requiring TasPorts to ensure that Engage Marine has access to berth space for tug boats at Inspection Head in northern Tasmania on reasonable commercial terms, and that charges imposed by TasPorts on Grange for regulatory functions at Port Latta are reasonable. Importantly, the undertaking also provides that TasPorts will spend at least \$1 million on the wharf infrastructure at Inspection Head. (ACCC 2021e)

These cases highlight two issues in the market for towage services: exclusive dealing and misuse of market power on the part of port authorities. They appear to demonstrate that the law is working as intended and no evidence has been presented to the Commission to the contrary. Indeed, the Commission notes that in one case a party took private action under the CCA and in the other the ACCC took regulatory action.

6. Market power in other markets

Key points

- * The maritime logistics system for containers (excluding ports) contains three main markets: the market for moving containers where shipping lines provide services to cargo owners; the market for packing and unpacking ships where container terminal operators provide their services to shipping lines; and the market for moving containers to and from the port where cargo owners engage landside operators to go to container terminal operators.
- * Competition is robust in the market for shipping lines' services. Multiple lines service Australia and cargo owners can easily switch between them. Before the COVID-19 pandemic, competition between lines resulted in declining prices. Recent increases in blue-water charges reflect market responses to pandemic-related pressures. Evidence on trade volumes and orders for new ships suggest that rates will fall as markets normalise.
- * Part X of the *Competition and Consumer Act 2010 (Cth)* exempts shipping lines from other parts of that Act. Part X should be repealed and, like companies in other sectors, shipping lines should show that their agreements provide a net public benefit.
- * Container terminal operators compete vigorously to provide services to shipping lines. Together with an increase in lines' bargaining power and increasing port rents, this has contributed to declines in operators' profits over the past decade.
- * Container terminal operators have significant market power over landside operators such as freight companies but appear not to have exercised this market power through significant fee increases until 2017. It is unclear what has led to this change in strategy.
- * The Commission recommends that any fixed fees for delivering or collecting a container from a container terminal operator cannot be charged to transport operators. These fees could be charged to shipping lines if the container terminal operator negotiates with the lines for such payments. Other fees charged to transport operators should be monitored.
- * The substantial bargaining power of some parties has given rise to allegations of unfair contract terms. The ACCC has taken action against three container terminal operators to have terms removed. The current provisions exempt shipping contracts which is an issue in relation to detention fees being incurred in instances where the container is unable to be de-hired.

This chapter applies the framework for assessing market power developed in chapter 4 to the maritime logistics system excluding ports (which were analysed in chapter 5). The first step in the framework is to

define the market of interest and identify any constraints to competition (such as a lack of substitutes and high barriers to entry for competitors). The second step, if that analysis indicates that a firm has market power, is to identify constraints on the exercise of that power (including countervailing power held by customers and regulation).

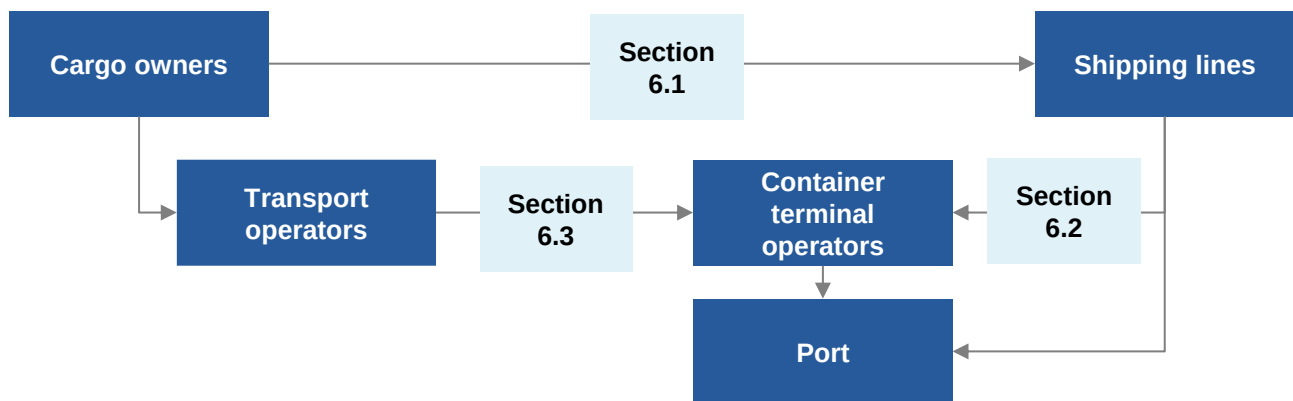
This chapter focuses on the container supply chain (figure 6.1), and assesses the state of competition in relationships between:

- shipping lines and cargo owners (section 6.1)
- shipping lines and container terminal operators (section 6.2)
- container terminal operators and transport operators (section 6.3).

The chapter concludes with an analysis of the use of potentially unfair contract terms (section 6.4).

Figure 6.1 – A simplified depiction of the maritime logistics system^a

Arrows capture the flow of payments within the system



a. Transport operators include trucks and trains.

6.1 Shipping lines operate in a market for container freight

Shipping lines are one participant in the market that moves containerised cargo to and from Australia; the other is airlines. But, as noted in chapter 5, air freight is not a good substitute for sea freight and does not provide a competitive constraint on shipping. It is therefore excluded from analysis of this market.

Cargo owners are the direct customers of shipping lines. They vary in size. Some ship as little as one container a year; others ship thousands. Smaller cargo owners have the option of using a freight forwarder who organises the movement of containers on their behalf. Larger customers typically have an in-house logistics group that liaises with shipping lines.

Geographic dimensions of the market: how easily can new lines enter and customers substitute between markets?

Many container line shipping operators that service Australia have a hub-and-spoke network (chapter 2):

Shipping services calling Australian ports operate on a 'North-South' route (typically from hubs or large trans-shipment ports in Asia) and are not as high volume as those that service the major 'East-West' trade routes between Asia, the United States and Europe. (DP World, sub. 49, p. 29)

Routes to and from Singapore and China are the biggest routes servicing Australia (chapter 2).

Economies of scale¹ create a potential barrier to entry for lines looking at offering new, competing services on Australian trade routes. They occur when average costs decline as the volume of cargo carried on a vessel increases, up to capacity. In the shipping line market, economies of vessel size arise through capital, crew and fuel costs — costs that have to be incurred whatever the size of the cargo carried (PC 2005a, p. 43).

Economies of scale mean that the addition of a vessel to a trade route will lead to all competitors operating with lower per ship container volumes, and at a higher average cost per container, than in the absence of such entry. For example, if one container ship is operating at full capacity on a route, then that vessel's per container operating costs will be lower than if that same cargo were split between the incumbent and a new entrant vessel.

Customers' desire for service regularity can also act as a barrier to entry. Container shipping is not a homogeneous service from the perspective of cargo owners. Different cargo owners have different needs — for example, just-in-time supply chains have meant they value dependable, scheduled shipping, not just low costs (Taylor 2017, p. 218). Disruptions from the COVID-19 pandemic have reinforced cargo owners' desire for dependable shipping. A new stand-alone entrant would generally need multiple ships to be able to offer even a weekly service to the major ports in Australia (chapter 2). While entry may be possible without a regular scheduled service, an irregular or infrequent alternative may not have much appeal to cargo owners.

In short, both economies of scale and the desirability of a 'regular' service can make it hard for a shipping line to enter a market. While entry is not impossible it would likely take a significant and non-transitory increase in freight rates to incentivise shipping lines to enter the Australian market by adding capacity. That would only occur if demand increased such that capacity became constrained and prices were bid up. And it appears that rates would have to increase substantially. For example, when COVID-19 pandemic disruptions led to increases in Australian freight rates, at least one other shipping line entered the Oceania market (Zim (DP World, sub. 49, p. 30)). But freight rates had to increase by about 117 per cent to induce this new entry (DAWE 2022b).

Entry barriers can be reduced by use of agreements that enable cooperation on ship use, schedules (timetables), containers, use of terminals and freight rates (box 6.1). These are a feature of the container shipping industry for services to and from Australia. For example, shipping lines could respond to an increase in price by entering into a vessel sharing agreement or slot charter agreement on a route. Some shipping lines have argued that vessel sharing agreements and slot charter agreements allow lines to enter a new route and increase competition.

Sometimes parties to a [vessel sharing agreement/joint service agreement] may also sell or charter their slots to non-vessel operating third party ocean carriers. These may be small to medium shipping lines, or carriers that are interested in exploring a new market positioning. Such co-operative arrangements allow these carriers — which would not otherwise be able to establish themselves as independent scheduled services providers — entry into [a] specific shipping market with relatively low initial capital investment, leading to a higher number of active competitors available for customers. (ANL 2020, pp. 4–5)

These agreements increase the number of participants in the market and may eventually lead some to deploy their own vessel on a route once they have built up enough of a client base to have a lower average cost per container. But initially, these agreements do not increase capacity in the market so do not increase supply. Further, agreements between shipping lines can facilitate coordinated behaviour (including coordinated pricing) and may be used as a tool to limit competition between incumbent shipping lines.

¹ Economies of scale are also important for productivity, for example, in bringing about improvements in productivity through techniques of mass production (PC 2009, p. 8).

Box 6.1 – Alliances, conference, consortia and more

Shipping line agreements can be focused on price and / or operational cooperation.

- Conference: a route-specific agreement between carriers on conditions for the carriage of cargo. Under a conference, shipping lines agree to: apply uniform or common freight rates; coordinate the scheduling of sailings and ports of call; regulate capacity; and allocate cargo and revenues. A conference agreement differs from other agreement types because the objective is cooperation on rates, while the others have operational cooperation as their objective.
- Slot charter agreements: an operator buys a fixed percentage of capacity on another line's vessel for a fixed amount of time and markets the slots as its own. A slot hire agreement is similar, but slots are hired rather than bought.
- Vessel sharing agreements and consortia: agreement to provide a service on a trade lane between a number of lines with each providing a share of vessels. For example, for a service requiring six vessels, one line might provide three vessels, another line two vessels and the last line one vessel. The agreement also stipulates what proportion of each vessel each line gets. A consortium is the name of the service and the vessel sharing agreement outlines how lines contribute resources (vessels).
- Alliance: an agreement between shipping lines cooperating on global trade routes, usually involving use of ships, schedules and use of joint terminals. An alliance is a bundle of vessel sharing agreements.

Vessel sharing agreements and slot charter agreements are the main agreements used by shipping lines in their services to and from Australia. The Commission is not aware of any conference agreements operating in the Australian market.

Sources: DITRDC (2020, p. 3); PC (2005a, p. 31); ITF (2018, pp. 10–11).

In summary, characteristics of the market indicate that there are regional markets for container shipping. Each region can be considered a separate market as there is not strong substitution between regions for cargo owners (because shipping lines use hub and spoke networks) and shipping lines will generally not transfer vessels between regions unless there is a significant economic incentive. While different shipping lines can 'enter' a market via an agreement, the total supply of container shipping capacity in each region is determined by the number of ships (and the associated capacity) operating in that region.



Draft finding 6.1 Shipping lines compete in regional markets

There is not strong substitution between regions for cargo owners, and shipping lines will only transfer vessels between regions if there is a significant economic incentive.

Competition between shipping lines for cargos appears to be robust

Inquiry participants have raised concerns that increasing mergers and acquisitions, and the use of agreements are hindering competition between shipping lines (box 6.2). Shipping line consolidation has been occurring for at least the last three decades. In 1986, the twenty largest lines' share of total global shipping capacity was 35 per cent, and in 1998 this share sat at 53 per cent (PC 1999, p. 13). By 2017 the

top five lines accounted for 64 per cent of the market (McKinsey & Company 2017, p. 18). DP World (sub. 49, p. 24) also noted the decline in the number of shipping lines in Australia means that ‘the number of shipping lines servicing the Australian market has fallen by approximately 50%, from 23 to 12 shipping lines’.

Despite the fall in the number of shipping lines operating in the Australian region, at least 20 container shipping brands operate to and from Australia (Shipping Australia 2021) (chapter 2). Some are owned by the same company (DP World, sub. 49, p. 25) and this number also includes lines operating under slot charter arrangements which, as discussed above, reallocates rather than increases shipping capacity. Even with these considerations, there are still multiple lines for Australian cargo owners to choose from: as noted in chapter 2, most services are delivered through shipping consortia involving between two to six lines.

Shipping lines’ fees have increased significantly during the COVID-19 pandemic potentially suggesting a decline in competition. However, this was not due to a lack of competition, but instead to a number of factors such as a demand shock and COVID-19 disruptions that led to rates increasing (ACCC 2021b). Skyrocketing prices during the COVID-19 pandemic reflect the market at work. And a new line has entered Australian trade routes in response (Zim, as mentioned above).

Some parties have raised concerns that shipping lines were not behaving competitively before the COVID-19 pandemic. For example, FTA and APSA noted that:

... while the international shipping lines are receiving more competitive quayside rates, they are not generally passing on those savings to their [customers]. In fact, in many cases, shipping lines have increased the Terminal Handling Charges [THCs] that they are charging [customers], at a time when Australian [cargo owners] are now also paying the [container terminal operators] for the same in-terminal services via landside Infrastructure Surcharges. (2020, p. 10)

Box 6.2 – Concerns about shipping line consolidation and use of agreements

The ACCC:

... has found that over the past decade or so, shipping lines have increased their bargaining power through consolidation, alliances and cooperation agreements. Industry analysts expect shipping consolidations to continue. This means that the bargaining power of shipping lines is likely to grow further and may put them into a stronger position to control shipping capacity in the market.

With the shipping industry becoming more concentrated, there is a growing risk that shipping lines could use Part X of the CCA [*Competition and Consumer Act 2010* (Cth)] to artificially elevate freight rates in the future. (sub. 26, p. 3)

The Port of Newcastle:

With the consolidation of shipping lines and Australia’s currently limited port choice, Australian importers and exporters may soon be faced with a limited selection of shipping lines, which could increase the cost of containerised transport. (sub. 62, p. 21)

Box 6.2 – Concerns about shipping line consolidation and use of agreements

FTA and APSA:

Australian exporters, importers and freight forwarders fear that increased consolidation may mean fewer shipping line choices and less competition, making it more burdensome for Australian [cargo owners] to negotiate rates and service levels. (sub. 31, p. 9)

MUA:

Neither Australian government policy nor regulation has kept up with these developments – either in the direct regulation of the international container shipping companies, or in how these supply chains are integrated into planning and management of Australian ports and logistics. The companies operating across these supply chains have been left to pursue their own self-interest – little wonder the public has lost out. (sub. 59, p. 6)

AMIC:

Industry experts expect that high prices will not be resolved ... as consolidation in the industry and retiring of older ships in the fleet will keep the market balanced, certainly for the next few years. The Wall Street Journal highlights that global consolidation between 2016 and 2018 has led to 6 container operators controlling more than 70% of all ship space. This means fewer small ports, alternative routes, and smaller ships are available to provide flexibility and price competitiveness. (sub. 41, p. 5)

There is evidence that shipping lines have not been passing through declines in THCs. Container terminal operators charge shipping lines THCs to load and unload containers and these charges have been declining from about 2005 (this is discussed below in section 6.2). Shipping lines pass these charges on to cargo owners, but the THCs paid by cargo owners have not been declining in line with the charges levied by container terminal operators on shipping lines (table 6.1).

Table 6.1 – Cargo owners are being charged higher terminal handling charges
Export THCs for trade between Australia and New Zealand in 2022 dollars for a 20-foot dry container

	2014	2015	2018
Sydney	457	479	475
Melbourne	467	489	525
Brisbane	467	489	478
Adelaide	444	465	458
Fremantle	450	471	467

Sources: ANL (2014, 2015, 2018).

Despite THCs not declining, shipping lines were competing on other rates that they charge cargo owners, and these rates are of greater value than THCs.

In particular, before the COVID-19 pandemic, evidence suggests that shipping lines competed fiercely on blue-water rates.² Each line can take custom from a rival as long as the total capacity on a route is not being used. And given the marginal cost of an additional container is very low, each line has an incentive to compete until their capacity on a ship is full. There are also minimal costs to cargo owners for switching between shipping lines. Shipping lines publicly advertise their routes and timetables. And, while some cargo owners have contracts with shipping lines, they can switch when recontracting or engage a shipping line through the spot market.

Falls in blue-water rates before the COVID-19 pandemic are consistent with robust competition between lines (figure 6.2). These blue-water rates comprise the majority of costs from shipping lines. Other charges include port charges such as wharfage and pilotage which are less than blue-water rates. Wharfage at Port of Melbourne, for example, for a full container being exported is \$106.17 per 20-foot equivalent unit (TEU) (Port of Melbourne 2021c, p. 5).

Falls in blue-water rates also suggest that, while THCs might not have fallen despite container terminal operators charging shipping lines less, the more competitive rates negotiated between shipping lines and terminal operators were passed on to customers indirectly via an overall decline in the cost of shipping a container.

It is likely that shipping rates will decline as the disruptions wrought by the COVID-19 pandemic ease. Trade appears to be declining — figure 2.9 shows a decline in TEUs at each port for quarter 2 of 2021 (the most recent quarter available). Shipping lines also have orders for new (typically larger) ships (table 2.1). Both of these factors indicate that capacity in the market will increase and rates will likely decline as a result. This view is also held by the chief executive of Maersk, Søren Skou.

Skou said that container shipping could soon be hit by a sharp reversal of the factors that have led to it booming since the end of the first wave of the coronavirus pandemic. He added that there could be a “bullwhip effect” where demand contracts and supply increases, after almost two years of the opposite phenomenon during which shipping groups were unable to respond to a surge in consumer spending. “When it happens, it could go quite quickly,” he added.

He said it was unlikely to happen at the beginning of the second half of the year [2022] — as Maersk had previously assumed — but could happen in August or later in the year. “I don’t want to say I’m afraid of it,” he said, pointing to an increase in long-term contracts in container shipping and a rapidly growing logistics business on land. (Milne and Hollinger 2022)

Moreover, in normal (non-COVID-19 pandemic) times, cargo owners likely have some power in negotiations over rates. As the ACCC (2021a, p. 27) noted:

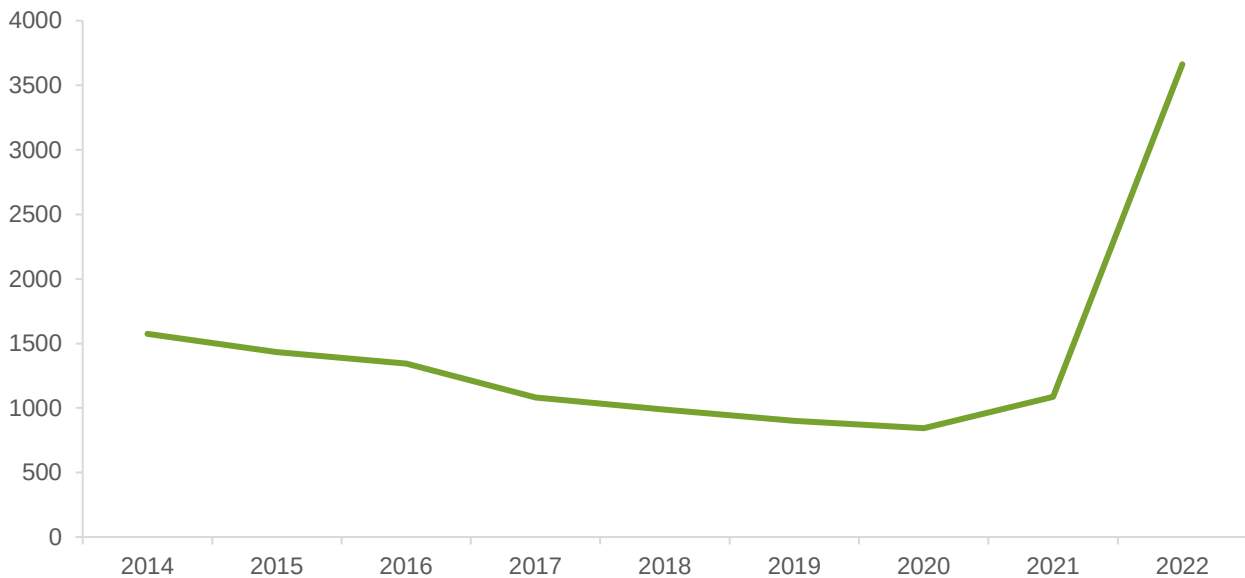
Larger customers may be able to enter long-term contracts with shipping lines to access lower prices in return for a commitment to provide a minimum amount of cargo for a negotiated period of time.

While smaller cargo owners do not have as much bargaining power in their own right, they can use a freight forwarder, potentially accessing the benefits of that party’s bargaining power. Freight forwarders take contracts from many cargo owners and negotiate on their behalf, potentially providing an incentive for shipping lines to price competitively.

² Rates negotiated between the cargo owner and the shipping line for transportation between ports. These rates do not include ancillary charges levied by a shipping line, such as port specific ‘terminal handling charges’.

Figure 6.2 – Shipping rates were relatively low and decreasing prior to the COVID-19 pandemic

Average blue-water rate (real \$US) of shipping a 20' container from Europe to Sydney, 2014–2022



a. These are contracted rates for a medium-sized importer.

Source: confidential data.



Draft finding 6.2

Competition is a constraint in the shipping line market

There appears to be robust competition in the shipping line market. Multiple shipping lines service Australia and cargo owners can easily switch between them. Prior to the COVID-19 pandemic, terminal handling charges charged to cargo owners by shipping lines were not declining despite these charges to shipping lines from container terminal operators declining. But blue-water charges fell markedly, and these are a greater component of shipping costs than terminal handling charges.

Regulation enables the ACCC to act against any cartel behaviour

While price competition appears to be robust, lines could act in concert (collude) to negate it.

Where lines engage in what are alleged to be cartel behaviours, the ACCC can investigate and take civil or criminal proceedings against the relevant shipping lines under the *Competition and Consumer Act 2010* (Cth) (CCA). The ACCC has done this before. Three roll-on, roll-off lines have been convicted of criminal cartel behaviour and fined (box 6.3).

Box 6.3 – Shipping companies convicted of criminal cartel conduct

Over the past five years, the Federal Court has convicted three shipping lines of cartel behaviour and fined them a total of \$83.5 million.

- In August 2017 Nippon Yusen Kabushiki Kaisha (NYK) was fined \$25 million.
- In August 2019 Kawasaki Kisen Kaisha Ltd (K-Line) was fined \$34.5 million.
- In February 2021 Wallenius Wilhelmsen Ocean AS (WWO) was fined \$24 million. (ACCC 2021d)

NYK and K-Line pleaded guilty to a single charge of giving effect to cartel provisions, such as the fixing of freight rates, from 24 July 2009 to 6 September 2012. The judgement for NYK noted that it is:

... likely that the anti-competitive effect of the offending conduct resulted in higher freight rates on the subject shipping routes to Australia and that, one way or another, those higher freight rates were passed through to Australian consumers in the form of higher prices for the imported cars and trucks. (Commonwealth Director of Public Prosecutions v Nippon Yusen Kabushiki Kaisha (2017) FCA 876 at 6)

From about 1 June 2011 to 31 July 2012, WWO gave effect to cartel provisions. The judgement noted that:

The arrangement or understanding involved or included what was said to be a “rule of respect” or “guiding principle” the effect of which was that the parties to the arrangement or understanding would seek to allocate certain customers between themselves on certain international shipping routes, including routes to Australia, and would not attempt to win each other’s existing business. They thereby sought to ensure that their existing market shares were not altered. (Commonwealth Director of Public Prosecutions v Wallenius Wilhelmsen Ocean AS (2021) FCA 52 at 5)

Remedies exist if other anti-competitive outcomes emerge

If shipping line mergers continue, what can Australia do?

Shipping lines are global companies and mergers often impact markets in many countries. In these situations, international competition agencies independently conduct their own investigations into the likely effects of the merger on competition in their country. At the same time, international competition agencies may coordinate the timing of their merger clearance processes if possible and informally discuss relevant competition issues, subject to the specific laws in their jurisdictions (box 6.4). Not all international agencies will decide on the same course of action as the relevant market features and laws may differ: box 6.4 is an example where the European Commission did not object to a merger after the companies proposed remedies, but the agencies in the United Kingdom and the United States opposed it. In some cases, a decision by one international competition agency to oppose a merger, including where a suitable remedy is not available to address the competition concerns, may result in the parties abandoning the merger in all jurisdictions (as box 6.4 shows).

There can be situations where competition agencies in other countries do not oppose a merger and it can harm competition in Australian markets, for example, a merger may involve shipping lines that mainly compete on Australian routes. The ACCC has jurisdiction to investigate mergers and take action if a merger is likely to substantially lessen competition in any Australian market, even if the merging shipping lines are domiciled overseas. The Australian courts have made it clear that the ACCC has jurisdiction in such

situations because relevant customers (cargo owners) are Australian so the lines do business in a market in Australia and are therefore subject to Australian competition laws.³

If the ACCC has competition concerns in relation to a merger, then the merging parties may decide to offer court enforceable undertakings to the ACCC in order to address those concerns (s. 87B of the CCA). If satisfied, the ACCC can accept these undertakings and not oppose the merger subject to the undertakings being in place. Alternatively, if the ACCC considers that the merger will substantially lessen competition, regardless of any proffered undertakings, then it will oppose the merger. If the parties do not agree to modify or abandon the transaction, the ACCC may decide to seek an injunction in the Federal Court to stop the merger (ACCC 2008, pp. 53, 58, 2018c, p. 14).

Box 6.4 – An example of international agencies investigating the merger of international companies

In 2021, two shipping equipment companies — Cargotec and Konecranes — proposed to merge. This merger had global impacts and was scrutinised by a number of international competition agencies.

- The European Commission investigated the merger and noted concerns about a lack of competition. On 24 February 2022, the Commission reported that the two companies had proposed remedies which addressed their competition concerns and it had approved the merger (European Commission 2022).
- In late March 2022, the US Department of Justice found that if the merger went ahead, it would lead to less competition in markets that are already concentrated and it would harm American consumers. The US Department of Justice informed the companies that they intended to take legal action to oppose the merger (U.S. Department of Justice 2022).
- Also in late March 2022, the UK Competition and Markets Authority investigated the merger and found that the merger would lead to a substantial lessening of competition in relevant markets (CMA 2022, p. 38). They concluded that the only effective remedy was to prohibit the merger (CMA 2022, p. 7).

All three of these international bodies acknowledged consulting with each other and with other international agencies. For example, the United Kingdom noted it consulted with the European Commission, Australia and the United States 'both in relation to the substantive assessment of competitive effects and the assessment of potential remedies' (CMA 2022, p. 144). The European Commission noted they had regular contact with other competition agencies including those in the United States, the United Kingdom, Australia, New Zealand, Singapore and Israel (European Commission 2022).

After the UK Competition and Markets Authority and the US Department of Justice announced their decisions, the two companies decided to not proceed with the merger (ACCC 2022a). At the time, the ACCC had raised preliminary competition concerns but had not made a final decision. The ACCC discontinued its investigation after the companies announced they were no longer proceeding (ACCC 2022a).

³ See *Air New Zealand Ltd v Australian Competition and Consumer Commission*; *PT Garuda Indonesia Ltd v Australian Competition and Consumer Commission* (2017) HCA 21 S245/2016 & S248/2016 at 11.

Shipping lines are buying into other parts of the maritime logistics system

Shipping lines sometimes buy into other parts of the supply chain, referred to as vertical integration, and this could either lead to more efficiency or more market power. In other countries, lines have bought into container terminal operators (ITF 2018, p. 45). In Australia, some lines own empty container parks (ECPs) and some have been buying logistics services such as freight forwarders. For example, in 2019, shipping line MSC bought Integrated Container Logistics a WA-based logistics firm (Thompson, Macdonald and Boyd 2019). And shipping lines including COSCO, CMA CGM ANL and MSC own ECPs or exclusively use specific ECPs in Melbourne (ECP ownership is discussed more in chapter 7) (NineSquared 2021, p. 29).

The ACCC (2021a, p. 34) noted that it:

... does not regard vertical integration of itself as a competition concern. It can lead to greater efficiencies and lower costs for customers due to synergies in related services. However, where there is an absence of sufficient competition in the upstream or downstream market, vertical integration can provide the incentive and ability for a firm to establish and maintain a dominant position.

The potential effects of shipping lines undertaking further vertical integration are unclear. It could make the supply chain more efficient. Or it could lead to more market power and misuse of that power, such as tying shipping services to the use of shipping lines' freight forwarders.

The concern of IFCBAA and its membership is that the way in which the carrier market is using its substantial market power could result in the freight forwarders and customs brokers being unable to compete as they are unable to influence or control sea freight, priority access pricing, priority equipment access, priority loading on vessels in the same way that a vertically integrated carrier offering freight forwarding services through a related entity is able to do. (IFCBAA, sub. 34, p. 5)

If the latter outcome did arise, then there may be a case for regulatory action by the ACCC, for example through its merger powers under s. 50 of the CCA or its powers to prevent a misuse of market power under s. 46 of the CCA (ACCC 2008, p. 3, 2018b, p. 2).

Regulation permits lines to cooperate via agreements

Part X of the CCA, provides a regime that exempts certain types of registered agreements between shipping lines from parts of Australia's competition laws.

The historical argument for exempting liner shipping from competition law is that, without collaborative conduct among operators, the market would not deliver an efficient supply of liner cargo shipping services to Australia. The industry is characterised by lumpy investment, high fixed costs and low marginal costs ... without co-operation among shipping companies, prices and service levels would be excessively volatile, owing to cycles of entry and exit creating periods of excess and under capacity. (Harper et al. 2015, p. 381)

Part X provides for parties to a conference agreement to apply to the Registrar of Liner Shipping at the Department of Infrastructure, Transport, Regional Development and Communications for registration of the agreement and if registered it exempts shipping lines from other parts of the CCA (note, the definition of a conference agreement under Part X differs from that used in this report)⁴. It allows companies providing liner

⁴ Section 10.02 of the CCA defines a conference as 'an unincorporated association of two or more ocean carriers carrying on 2 or more businesses each of which includes, or is proposed to include, the provision of outwards liner cargo shipping services or inwards liner cargo shipping services'.

cargo shipping services to: 'agree on prices; pool or apportion earnings, losses or traffic; regulate capacity; and coordinate schedules' (ACCC 2021a, p. 25).

To register a conference agreement under Part X there is a three-step process.

1. **Provisional registration.** Parties must apply for provisional registration within 30 days after making a conference agreement. This involves completing a form that summarises the agreement and notes whether there is a restrictive trade practice provision. If there is a provision, then the parties must provide reasons why it is necessary for the operation of the agreement and why it is of overall benefit to Australian exporters or importers. A copy of the agreement must also be provided. After the application is submitted, the Registrar of Liner Shipping has 14 days to either provisionally register the agreement or not (DITRDC 2021e, 2022a).
2. **Negotiation with designated shipper body.** Once the conference agreement is provisionally registered, the parties must negotiate with a designated shipper body about the minimum level of shipping services (DITRDC 2021d). Minimum levels of shipping services can include frequency of sailings, cargo carrying capacity and ports of call.
3. **Final registration.** Parties must submit a form that includes similar information to what is included when they provisionally register, such as a summary of the agreement and whether there are restrictive trade practice provisions, but also includes whether there were changes to the provisional agreement and which designated shipper bodies the parties met with. The Registrar must also be satisfied that the agreement specified minimum levels of shipping services and that these were negotiated. Once these requirements and a few other administrative ones are met, the final registration is complete (DITRDC 2021a, 2022b).

In the absence of Part X (and any replacement, such as a class exemption by the ACCC which is discussed below), shipping lines that want to cooperate would have to adhere to Part VII of the CCA. One major difference in this process is that lines would have to prove that their agreements have beneficial effects for the community and not just consider the overall benefit to Australian importers or exporters as the current process does (box 6.5). Part VII is the process that other industries must go through.

Box 6.5 – The CCA allows for protection if the benefits outweigh the costs

Part VII of the CCA allows parties to apply to the ACCC for authorisation to engage in conduct which is not allowed under Part IV of the Act (which covers restrictive trade practices such as cartels, exclusive dealing, and other actions that restrict or affect competition).

Part VII is in the CCA because legislators recognised that, in some circumstances, anticompetitive market conduct can have beneficial effects for the community.

While the specific criteria differ between the type of conduct to be authorised, broadly speaking, the ACCC can only authorise conduct where the public benefit from the conduct outweighs any anti-competitive detriment arising from the conduct.

Part X should be repealed

The industry-specific competition exemptions provided to shipping lines under Part X are broad and may result in agreements that harm the Australian public. As noted earlier, the shipping line industry is characterised by economies of scale so that coordination between shipping lines may improve service.

However, under Part X, agreements could be registered even where they unnecessarily limit competition. For example, if two or three shipping lines cooperate in a (registered) slot charter agreement when just one line can operate a route, shipping lines may avoid fighting for the single efficient market slot with immunity from Australia's competition laws. This will hurt consumers who would benefit from that competition but helps shipping lines as they avoid competition and lines leaving the market.

Part X should be repealed. It could be replaced by a class exemption, of the type currently being considered by the ACCC. If the government pursues a class exemption, exemptions should be evaluated. Given the industry is changing rapidly, particularly in response to the COVID-19 pandemic, the evaluation period should be no more than five years. Alternatively, once Part X is repealed, shipping lines could rely on the standard authorisation processes under Part VII of the CCA. Under either alternative, and unlike the current approach under Part X, shipping lines would need to show that their arrangements provide a net public benefit to Australia.

The calls to repeal Part X are not new. In 2005, the Commission concluded that Part X should be repealed and shipping lines be subject to Part VII of the CCA (PC 2005a, p. 180). The Commission also recommended that Part X be amended if the government decided against repeal (PC 2005a, pp. 201–202, 207–208). The government did not support repeal but agreed to amendment (Treasury 2006). Some of these amendments were to:

- focus the objectives of Part X to emphasise the importance of competition in the shipping market
- exclude agreements that allowed lines to discuss and share commercial information on trade routes and agreements on route prices (discussion agreements) (Treasury 2006).

However, none of these amendments were implemented.

In 2015, the Competition Policy Review (the Harper review) analysed competition in shipping and Part X and also supported repealing Part X because:

No other industry enjoys legislative exemption from Australia's competition laws. This is despite the fact that other industries have similar economic characteristics to the liner shipping industry, particularly the international airline industry. If participants in other industries wish to make agreements that would otherwise contravene the competition law, they are required to seek authorisation from the ACCC. (2015, p. 39)

The Harper review recommended repealing Part X and granting a block exemption (in practical terms referred to as a class exemption) for agreements that meet a minimum standard for pro-competitive features. A class exemption is:

... a way for the ACCC to grant businesses an exemption from competition law for certain 'classes of conduct' that may otherwise carry a risk of breaching competition laws, but:

- do not substantially lessen competition, and/or
- are likely to result in overall public benefits. (ACCC 2019d)

A class exemption was recommended because it was thought that subjecting shipping lines to individual authorisation 'might lead to unnecessary compliance costs for some operators' (Harper et al. 2014, p. 29).

In its response to the Harper review, the then Australian Government noted that it 'remains open to' this recommendation. The response also:

- stated that a general class exemption power would be introduced into the CCA

- committed the Government to working with the ACCC and relevant stakeholders to investigate application of a class exemption to 'ensure that shipping routes to and from Australia continue to be reliably and competitively serviced and that the costs to obtain a class exemption are not burdensome' (Treasury 2015, p. 6).

In 2019, the ACCC conducted public consultation on an ocean liner shipping class exemption and received submissions. However, the ACCC has noted that it:

... is yet to recommence this work, in part, because there is limited merit in the ACCC developing a class exemption without a firm commitment that Part X will be repealed; as a class exemption is unlikely to have any significant effect while Part X continues to operate alongside it, and cause the administrative inefficiencies ... (sub. 26, p. 5)

In summary, the Government should repeal Part X.

- No other industry has an exemption like Part X, even though there are industries with similar characteristics to the shipping industry.
- Shipping lines should be required to show that their agreements provide a net public benefit before exemption is granted from the relevant competition laws. The Commission is not aware of any price cooperation agreements registered under Part X, agreements have covered vessel sharing and slot charter arrangements (DITRDC 2020, p. 3). But repealing Part X would ensure that any anticompetitive avenues for price cooperation are only available to the shipping lines when the cost of reduced competition is outweighed by other public benefits.

Inquiry participants were also supportive of repealing Part X (ACCC, sub. 26, p. 3; AFGC, sub. 21, p. 4; Ai Group, sub. 60, p. 3; DP World, sub. 49, p. 15; FTA and APSA, sub. 31, p. 4; GTA and AGECC, sub. 4, p. 5; HIA, sub. 40, p. 4; MUA, sub. 59, p. 17; Road Freight NSW and ATA, sub. 52, p. 2; VFF, sub. 32, p. 2).



Draft recommendation 6.1 **Repeal Part X**

The Australian Government should repeal Part X of the *Competition and Consumer Act 2010* (Cth) (CCA).

- No other industry has an exemption like Part X, even though there are industries with similar characteristics to the shipping industry.
- Shipping lines should show that their agreements provide a net public benefit.
- Either a class exemption or the existing provisions under Part VII of the CCA could deal with shipping line agreements under a net public benefit test once Part X is repealed.

6.2 Shipping lines and container terminal operators

Geographic dimensions of the market mirror the markets for ports

At each port, shipping lines typically contract one container terminal operator to load and unload containers for a vessel call. The link between ports and container terminal operators means that the markets for port services are also the markets for container terminal operators. The analysis from chapter 5 shows that there are five markets for container ports: Melbourne; Sydney; Adelaide; Queensland; and Western Australia.

Competition between container terminal operators for shipping lines is fierce

As noted in chapter 5, container terminal operators face barriers when establishing operations at a port, including long-term, sunk, port-specific investments. Entry of new terminal operators also depends on the port providing infrastructure for the new operators. But once an operator is established and has a terminal, they can compete for work from all shipping lines.

There are multiple container terminal operators in most of the markets (chapter 2) and they have been competing fiercely for market share by offering lower rates to shipping lines (discussed more below).

Minimal switching constraints also mean that shipping lines can easily move some (and potentially all) their business between terminal operators at the same port.⁵ Contracts between shipping lines and container terminal operators run for two to three years (DP World, sub. 49, p. 22).

Prior to 2012-13, the ACCC commented in its reports that it was rare to see shipping lines switching [container terminal operators] in Australia, reflecting the lack of competition at the time. However, this has changed after 2012-13. Several [container terminal operators] have reported that they won or lost around 20 shipping contracts over the last 5 years. (ACCC 2021a, p. 37)

Multiple available substitutes and low switching constraints imply that the container terminal operator market for services to shipping lines is highly competitive.

Shipping lines' bargaining power is increasing, and they are using it to pay lower charges

As discussed above, shipping lines have been consolidating. This, along with the use of agreements, has meant that shipping lines' power relative to container terminal operators has increased. Regulation — s. 10.24A of the CCA — also allows shipping lines to collectively bargain with container terminal operators.

Competition between container terminal operators also increased following the entrance of new operators: Hutchison opened new terminals in Brisbane and Sydney in 2013; VICT entered the Port of Melbourne in 2017 (ACCC 2021a, p. 35). Increased competition from new entrants led incumbents to offer discounts to shipping lines to try and maintain their business (ACCC 2021a, p. 37). This also led to an increase in capacity in the market.

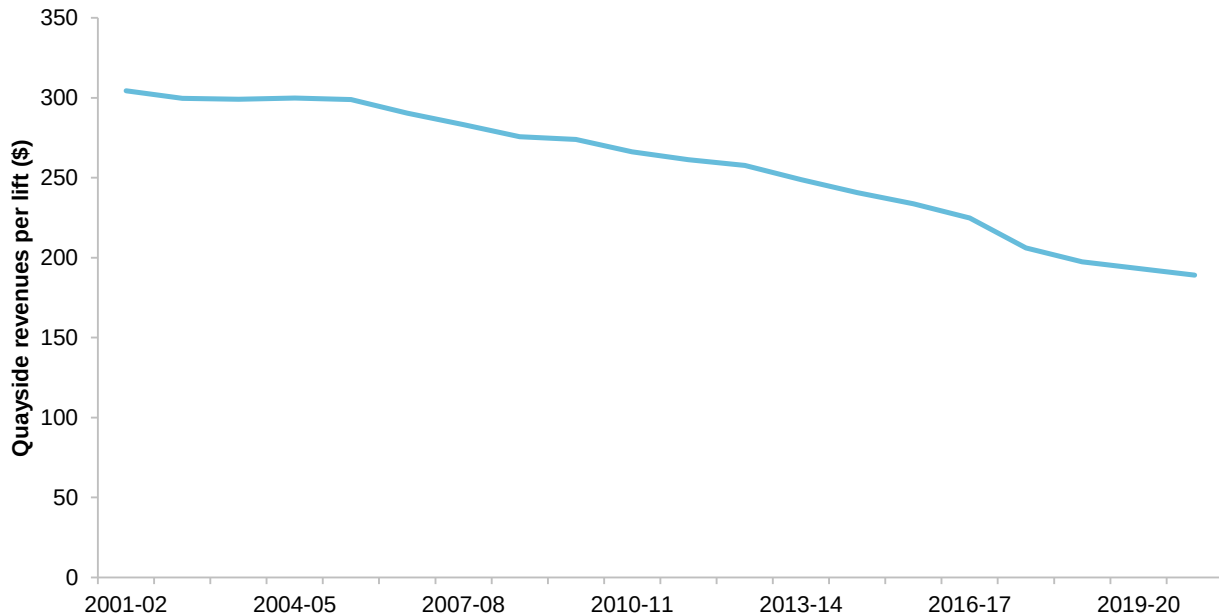
It is at the discretion of the shipping lines to choose from the various [container terminal operators] at each port, who have significant bargaining power as the market for international container stevedoring services is currently characterised by substantial overcapacity, with [the] majority of terminals also operating individually at less than their operational capacity. (DP World, sub. 49, p. 22)

These factors have led to container terminal operators charging lower THCs and has contributed to a decline in container terminal operators' revenue from shipping lines — referred to as quayside revenue (figure 6.3).

⁵ For major shipping lines, moving all their business to one terminal operator may not be possible as that operator would face capacity constraints. However, competition can work effectively by shipping lines threatening to move, or actually moving, some of their business between terminal operators.

Figure 6.3 – Quayside revenue has been decreasing

Aggregated quayside revenue per lift for Patrick, DP World and FACT, 2002–2021



Source: ACCC (2021a, fig. 5.2).



Draft finding 6.3

Shipping lines have increasing bargaining power

Greater competition between container terminal operators and consolidation of shipping lines over the past decade have increased shipping lines' bargaining power relative to container terminal operators. This has contributed to declining quayside revenue for container terminal operators.

Why are container terminal operators not charging late fees?

Most container ships operate to schedules that set out their expected arrival and departure times. Shipping lines provide this information to container terminal operators who then, along with the harbourmaster and the shipping line, plan the delivery of services to a ship (such as allocating berths and providing pilots, tugboats, line boats, mooring gangs, cranes, workers and fuel).

Ships missing windows has become a problem worldwide since the onset of the COVID-19 pandemic. Inquiry participants noted that ships arriving on time declined during this time (figure 3.3) (DP World, sub. 49, p. 33; FPH, sub. 55, p. 8; MUA, sub. 59, p. 43 and sub. 72). The ACCC (2021a, p. xiii) also commented:

One [container terminal operator] told the ACCC that during the 12 months to June 2021, only 10% of the vessels calling into its terminal had arrived within the scheduled window.

Shipping lines missing their window can be costly, as the services the container terminal operators have organised to either unload or load the ship need to be rescheduled.

It raises the question: why have container terminal operators not implemented fees on shipping lines for arriving outside of their window given the significant costs? These fees would incentivise reliability and efficiency in the system and help container terminal operators recoup their costs.

The analysis in this section implies that it might have to do with the increasing bargaining power of shipping lines, and the additional competition from new container terminal operators. It is also possible that shipping lines are already facing significant costs for missing a window. And that this could be a temporary phenomenon brought about by the COVID-19 pandemic. Furthermore, it is unclear what role the harbourmaster plays in the process of determining arrival windows and whether they could have some responsibility for any late arrivals or are in a position to charge fees to incentivise more timely arrivals.



Information request 6.1

The Commission seeks information on why container terminal operators do not charge shipping lines fees for arriving outside their windows.

6.3 Container terminal operators and transport operators

Concerns have been raised about the potential for container terminal operators to have market power in their interactions with transport operators, and how this market power is reflected in the fees charged by the container terminal operators, particularly terminal access charges (TACs).

The market consists of a monopolist container terminal operator and many transport operators

Container terminal operators in each of the relevant ports provide services to transport companies in order to move containers into and out of the port. The transport companies are either rail and road operators, but, as noted in chapter 5, road transport is the main mode via which containers move to and from ports. As a result, this section focuses on road operators.

Cargo owners hire transport operators to pick up and drop off their containers. But neither of these parties directly determine who handles the container at the port; shipping lines choose the container terminal operator. When importing, neither cargo owners nor transport operators may have limited foreknowledge of which container terminal operator a container will go to. When exporting, the cargo owner is more likely to know. If the cargo owner has a long-term contract with a shipping line, the container terminal operator may change. In both situations, neither the transport operators nor the cargo owners can directly shift their business if they are dissatisfied with the cost or quality of service from a container terminal operator. Therefore, at each port, each container terminal operator is a monopolist supplying a service to many transport operators.

In theory, indirect competitive pressure could temper container terminal operators' market power

The transport operator sector is comprised of many players with little if any power against the monopoly container terminal operators. (This may differ for larger transport operators, but evidence for this has not been presented to this inquiry.) As a result, in the very short term, transport operators bear the brunt of any

fee increases or new fees from container terminal operators. In the longer term, transport operators pass those costs to cargo owners (ACCC 2018a, p. 24).

Instead of transport operators applying competitive pressure to the monopoly container terminal operators, indirect competitive pressure could come through the broader maritime logistics system as a whole. For example, cargo owners may be able to indirectly pressure container terminal operators by changing shipping lines based on container terminal operators' fees. Shipping lines would then have an incentive to choose a container terminal operator that has lower fees. However, this form of competition would only work if cargo owners had clarity over the terminal operators used by different shipping lines and if the relevant charges levied by container terminal operators on transport operators were transparent to cargo owners when choosing their preferred shipping line.

Alternatively, if cargo owners are in a strong position to bargain with shipping lines, then competition may result in container terminal operator fees that are passed through to cargo owners by transport operators being 'rebated' to the cargo owners by the shipping lines. Such rebates have been seen in other industries, ATM fees are one example, although they are not common (ING 2022). The rebates would, however, provide an incentive for shipping lines to choose container terminal operators that set lower fees.

This indirect competition could, in theory, limit container terminal operators' market power over transport operators over time. However, it is unlikely to arise in the short term, particularly if there are other factors (such as the COVID-19 pandemic) disrupting the container logistics system. Further, the Commission has received no relevant evidence to suggest this form of competition has been happening.

The market structure and the lack of effective direct or indirect constraint on the fees charged by container terminal operators to transport operators means that the container terminal operators have substantial market power with regard to transport operators.

Container terminal operators' fees have been increasing

Container terminal operators can exercise their market power through fee increases or the introduction of new fees.

Landside operators pay a range of fees to each container terminal operator, including:

- annual registration fees
- TACs
- long vehicle fees
- no show fees
- vehicle booking system fees.

Over recent years, container terminal operators have increased existing fees or introduced new fees. For example, DP World's vehicle booking system fees across all their terminals increased from \$5 per booking in July 2013 to \$28.45 in 2021 and Patrick's fee in Fremantle went from \$6.18 per container in August 2016 to \$29.50 in 2021 (ACCC 2021a, p. 52). DP World introduced overweight fees (where a container's actual weight differs from the weight listed in documentation) in Brisbane in 2017 and Melbourne in 2019 and Patrick introduced these fees in 2021 (ACCC 2021a, p. 53).

Some of these charges, most notably TACs, are not based on incentives but simply represent a fixed charge by a container terminal operator to receive or deliver a container.

Other fees, however, are incentive-based and, if set at an appropriate level, could improve efficiency. For example, no show fees are charged when a landside operator fails to collect or drop off a container on time. This fee is charged because the container terminal operator must prepare the container prior to the landside

operator arriving, and a truck missing its time slot costs the terminal operator. These fees are avoidable as long as the truck arrives on time, and they ensure that containers are picked up and dropped off efficiently.

Most participants focus on the increase of TACs

The most debated fees are TACs. Originally called infrastructure charges, these fees were first introduced by Patrick in 2010 in Brisbane to cover increases in infrastructure costs (McKay 2010). They were subsequently introduced by other operators and have increased markedly at all capital city ports over the last five years (figure 6.4) (ACCC 2021a, fig. 5.1). Inquiry participants are mainly concerned about what they see as the lack of justification for increases and transport operators' inability to push back on them (box 6.6).

In response to criticisms of TACs, DP World (sub. 49, p. 85) argued that:

... [container terminal operator] charges are a very minor part of total freight charges and have remained relatively stable within the freight cost stack over the last decade.

Whilst there has been a noticeable increase in the proportion of [container terminal operator] revenue obtained from landside activities over the period since 2017, this trend has occurred as part of a 'rebalancing' of tariffs - and has not led to any material change in industry profitability. Multiple policy reviews, by the ACCC and others, have accepted that this shift reflects a competitive response by [container terminal operators] to market conditions and is evidence of neither market power nor excessive pricing.

Indeed, [container terminal operator] revenues (both landside and quayside) are fully transparent and [container terminal operator] costs, charges and margins remain some of the most reviewed, reported and scrutinised of any industry.

Why the increase in TACs?

Container terminal operators' market power with regards to transport operators is not new. However, TACs only rose markedly after 2017.

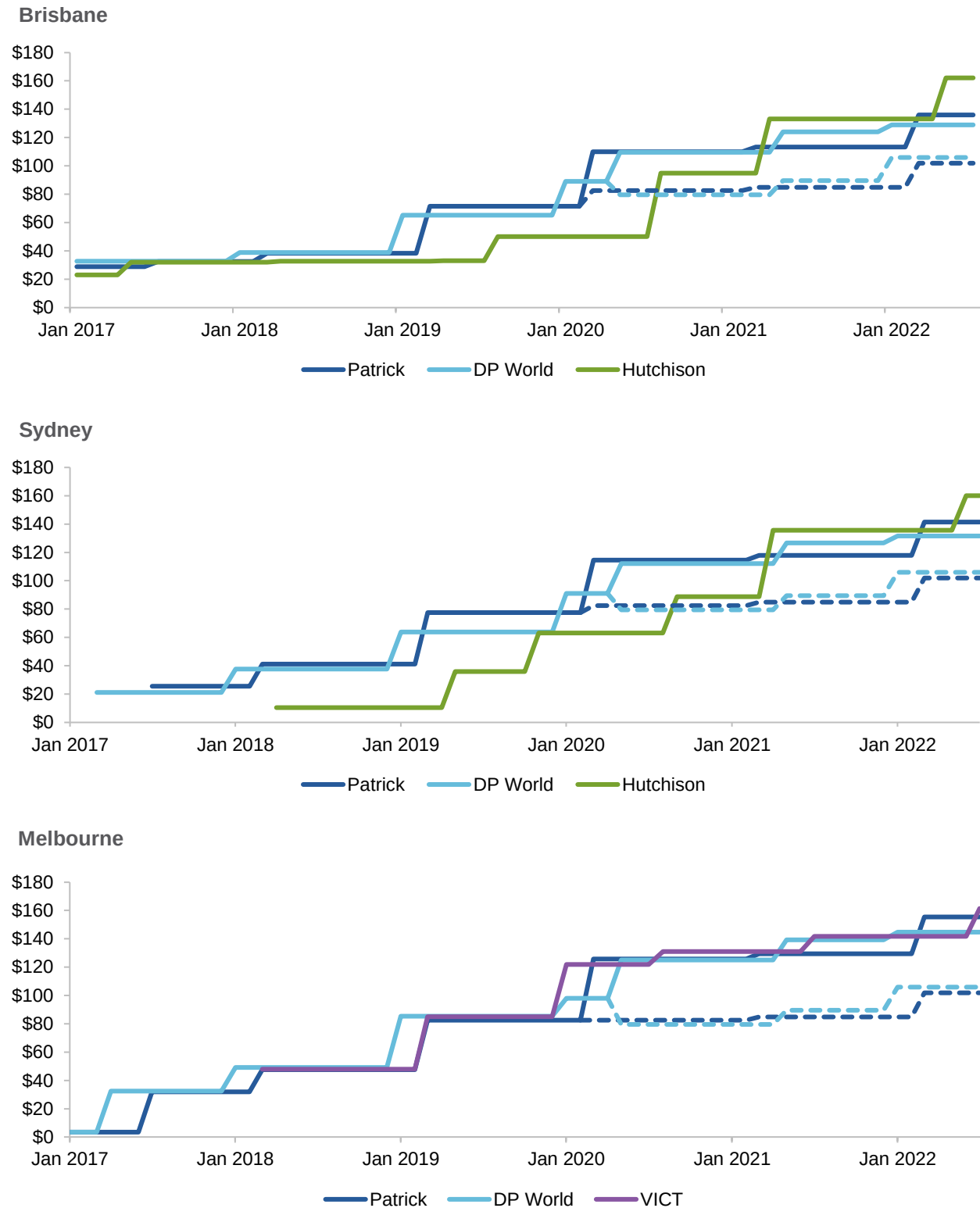
One explanation is that these fees are simply the outcome of recent competitive and cost pressures on container terminal operators. Container terminal operators' profitability declined from about 2012-13 to 2018-19 (figure 6.5) because of:

- declining revenue from shipping lines due to increases in competition between container terminal operators (figure 6.3)
- privatisation of ports which has been associated with higher container terminal operator rents (chapter 5)
- increases in labour costs, particularly from 2016-17 (ACCC 2020, fig. 4.6).

Container terminal operators may have responded by raising prices in the area where they have market power, which is landside fees. Therefore, the rise in TACs and other landside fees may be a response to increases in costs and decreases in other revenue sources. In other words, there might have been a rebalancing of charges, consistent with the type of behaviour that might be expected over the longer term, if container terminals were effectively constrained by indirect competition (discussed above). In this scenario terminal operators were charging shipping lines lower THCs then rebalancing their profit by increasing landside charges with the overall effect being no change in price for cargo owners.

Figure 6.4 – TACs have been increasing^a

TACs at Australia's three largest ports (nominal dollars), 2017–2022



a. Solid lines indicate 'import' or 'import and export' charges, dotted lines indicate 'export' charges.

Sources: ACCC (2021a, fig. 5.1); DP World (2021b, 2021c, 2021a); Hutchison Ports (2022a, 2022b); Patrick Terminals (2022b); VICT (2022b).

Box 6.6 – Inquiry participants have concerns about TACs

IFCBAA:

... has maintained the TAC is unjustified and a mechanism to shift reducing quayside revenue in the competitive shipping lines stevedoring market, to landside via a non-negotiable fee charged to transport companies. (sub. 34, p. 9)

AMIC:

[Container terminal operators] and empty container parks have also regularly increased terminal access charges overtime without negotiation and usually, with very little justification. (sub. 41, p. 10)

CTAA:

A major concern of transport operators, and in turn their import and export customers, is that Terminal Access Charges (TACs) and other landside fees are set and administered by the [container terminal operators] with no negotiation or input from landside customers (road and rail transport operators). This is due to the “standard form” contracts imposed by the [container terminal operators] on a “take it or leave it” basis ... Transport operators have become the “revenue collection agents” for the container stevedore companies. (sub. 50, p. 7)

FTA and APSA:

[Container terminal operators] and empty container parks know that transport operators are trapped into using their services and have consistently increased infrastructure / terminal access charges without negotiation and with little justification. (sub. 31, p. 13)

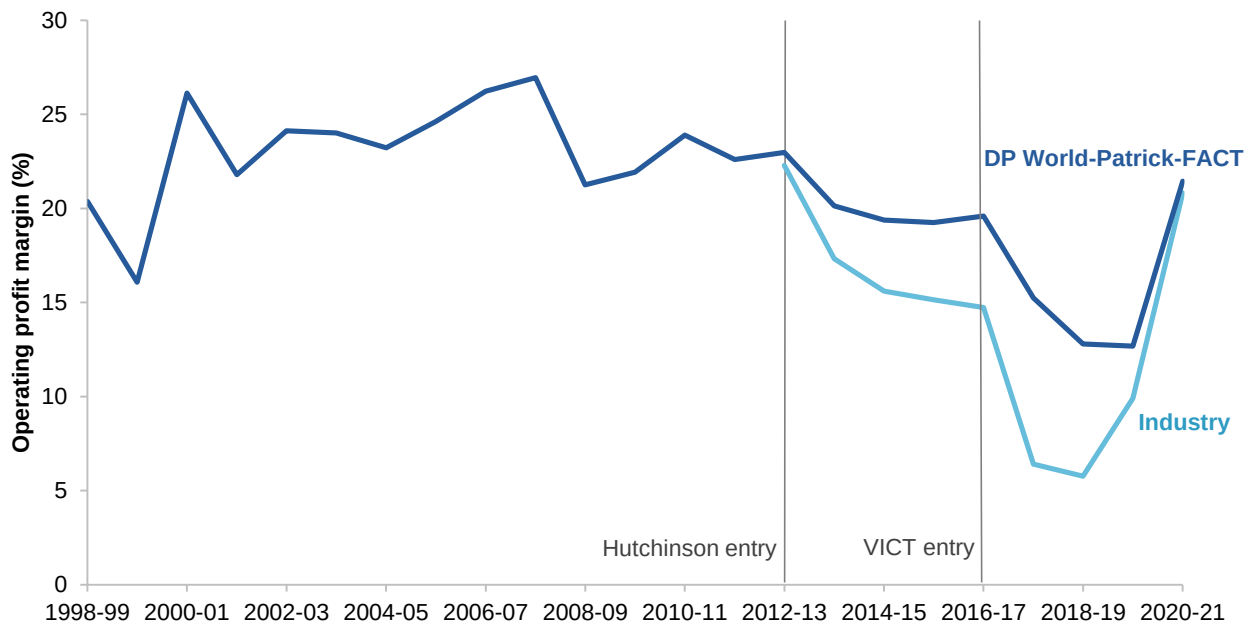
On the other hand, container terminal operators with market power and unconstrained by any indirect competition or regulation would not have needed to wait for profits to be squeezed before raising landside charges such as TACs. They could have lifted TACs and cargo owners would have faced higher overall prices.

As noted above, the Commission has received no information to support the existence of long-term indirect competition limiting container terminal operators’ market power.

Alternatively, container terminal operators may have only recently exercised market power to raise charges to transport operators due to the threat of increased regulation. As discussed below, existing regulation does not place a significant constraint on the ability of container terminal operators to raise TACs. However, an alternative explanation for the recent rise in TACs relates to regulatory threat. Container terminal operators may be concerned that simultaneous increases in both TACs and their profits could lead to more intrusive and costly regulatory intervention. The industry operating profit margin from 2000-01 to 2012-13 was between 22 and 25 per cent, and the ACCC considered this to be excessive (ACCC 2021a, p. 36). However, this profit margin was driven by revenue from shipping lines, not container terminal operators’ market power over transport operators. As profitability has fallen in recent years the threat of further regulation of container terminal operators has also reduced and this may have encouraged the container terminal operators to exercise their market power over transport operators by raising TACs and other fees. The increase in TACs has aligned with a decrease in operators’ profitability and helped to moderate that decline in profitability (figures 6.4 and 6.5).

Figure 6.5 – Container terminal operators' profitability has been declining

Container terminal operators' aggregate operating profit margins, industry vs 3 incumbents, 1998-99 to 2020-21



Source: ACCC (2021a, fig. 4.4).



Information request 6.2

The Commission is seeking information on why landside fees charged by container terminal operators have increased substantially since 2017 and not earlier. Is the increase in fees:

- a competitive response to declining profitability and container terminal operators responding by increasing fees where they can?
- because declining profitability has reduced the regulatory threat and allowed container terminal operators to increase their fees?
- a combination of the factors above?
- because of another factor not included here?

Regulation provides transparency over container terminal operators' fees

Container terminal operators are subject to a range of regulation relating to transport operators. However, this regulation has not prevented the container terminal operators from exercising their market power by raising TACs and other fees and charges paid by transport operators.

The ACCC monitors container terminal operators

The ACCC has monitored container terminal operators' prices, costs and profits since receiving a direction to undertake this work from then Treasurer, Peter Costello, in 1999 (ACCC 1999, p. vi). Under this regime:

... the ACCC monitors a range of matters, including the degree of competition between the stevedores, whether the stevedores' returns are indicative of excessive pricing, the level of investment by stevedores and other port operators, and the degree of productivity and efficiency at Australian container ports. (ACCC 2021a, p. 8)

This monitoring provides transparency and a threat of extra regulation if required.

New South Wales has the Port Botany Landside Improvement Strategy (PBLIS)

In 2010, New South Wales implemented the PBLIS to reduce port congestion and improve efficiency at the intersection of ports and landside operators. The PBLIS includes:

- a requirement that container terminal operators release a minimum number of slots (times to pick up a container) per hour every hour (with the aim to promote 24/7 operation). Penalties may be applied if container terminal operators fail to provide sufficient slots or cancel slots
- a requirement that transport operators pay container terminal operators a penalty if they are early, late or do not arrive
- targets for truck turnaround times with penalties paid by container terminal operators to truck operators if they do not make the targets. (TfNSW 2021a, pp. 14–18)

These requirements help ensure some of the fees from container terminal operators are reasonable. For example, transport operators do not pay fees if they miss their pick up time due to the actions of a container terminal operator.

The PBLIS also has restrictions on other container terminal operators' fees which provides transparency. For instance, Transport for New South Wales (TfNSW) monitors other fees to ensure they are not being used to offset any penalties incurred under PBLIS. Under this requirement, container terminal operators give 60 days' notice of fee increases and reasons for increases to TfNSW who can ask for additional information if needed. Container terminal operators, however, do not have to inform industry of fee increases (TfNSW 2021a, sec. 19).

The NSW Government is reviewing PBLIS and the *Ports and Maritime Administration Act 1995* (NSW) (the regulation covering NSW ports), with a final report due in September 2022.

Some inquiry participants were supportive of PBLIS and strongly advocated for its retention (Ai Group, sub. 60, p. 9; IFCBAA, sub. 34, p. 5).

Victoria implemented a pricing protocol to address fee increases

Victoria has acted to make container terminal operators' fees more transparent by giving industry warning of fee increases and also by trying to restrict fee increases to once a year.

In 2020, the Government implemented a Voluntary Pricing Protocol. The Protocol includes a preference that pricing changes occur no more than once a year and container terminal operators should adhere to the following process when implementing price changes.

- A terminal operator notifies the Executive Director of Freight Victoria in the Department of Transport of proposed pricing changes 60 calendar days prior to the proposed implementation date and provide reasons and supporting evidence plus a link to a public notice on their website.

- The Department of Transport emails the notice to an industry stakeholder list.
- Government and industry have 21 calendar days to provide feedback.
- The terminal operator issues a final notice to the Executive Director on the final change 30 calendar days prior to implementation. This notice should include a summary of themes from government and industry feedback and any response thereto from the terminal operator (Department of Transport 2022b).

The National Transport Commission (NTC) also developed voluntary guidelines

In 2022, the NTC released national voluntary guidelines for landside stevedore charges. These guidelines aim to provide a nationally consistent approach to container terminal operators' charges (NTC 2022b, p. 2). The guidelines are the same as the Victorian Pricing Protocol with the exception of the 21 days for government and industry feedback — the national guidelines allow feedback up until the final notice is released 30 days prior to implementation (NTC 2022b, pp. 4–5).

There are, however, limitations to the NTC and Victorian approaches because they are voluntary. Uptake is not guaranteed and container terminal operators that do take part may not strictly adhere to them. An inquiry participant noted that in their view container terminal operators were not adhering to the Victorian protocol (VFF sub. 32, p. 4). And another noted:

On each occasion when DP World, Victorian International Container Terminal (VICT) and Patrick have announced TAC increases, prescriptive detail has been sought as to whether increases are a measure to offset a further a reduction in quayside rates to the stevedore's commercial client shipping lines and / or necessitated by other specific operational factors.

In the absence of any commercial ability to influence the quantum of the TAC (being a 'take it or leave it' proposition as referenced by the ACCC) and in line with the intent of the [Victorian protocols], FTA / APSA also requested a further detailed explanation for the increases including disclosure, supporting information and data justifying the full cost structure of the total fees.

While constructive meetings were subsequently held with stevedore executives, follow up correspondence did not provide the specific data requested, instead provided a general commentary with a broad reference to activities and capital expenses. (FTA and APSA, sub. 31, p. 16)

In summary, the regulatory strategies facing container terminal operators provide some transparency over both the level of and increases in fees to transport operators. The regulation facing container terminal operators is however not punitive and does not place a significant constraint on the ability of container terminal operators to raise TACs and other charges to transport operators.

What have other reports said about TACs?

In their 2020-21 monitoring report, the ACCC argued there were justifications for TACs and they did not argue for further regulation. They noted that:

- the increase in fees was not leading to excessive returns (ACCC 2021a, p. 49)
- TACs do not breach the law:

The use of the charges did not appear to substantially lessen competition in a market, nor did it meet the high threshold to potentially be considered unconscionable conduct. Nor do the use of infrastructure charges in and of themselves raise concerns under provisions of the Australian Consumer Law ... (2018a, p. 25)

- container terminal operators provide landside services to transport operators and incur costs on the landside so can levy fees for these services (ACCC 2021a, pp. 48–49)

- container terminal operators have spent their capital on landside infrastructure projects which is in line with the original objective of TACs (ACCC 2021a, p. 49).

The Victorian Government's 2020 *Independent review of the Victorian Ports System* also reviewed TACs.

The Review concludes that the [container terminal operators] do have market power with respect to the levying of terminal access charges (TACs) on transport operators. Transport operators have no choice as to the terminal they must access to drop off or pick up a container.

The more important question is whether the [container terminal operators] are using this market power unfairly to inflate prices and profits. The evidence and analysis presented by [Deloitte Access Economics] leads them to the conclusion that, to date, this does not appear to be the case. (2020, p. 82)

Is further action needed on TACs and other landside fees?

The container terminal operators have market power with regards to transport operators. This market power has recently been exercised through an increase in fees and charges, such as TACs. Over the longer term, these increased fees and charges will be passed on to cargo owners and, for imports, to Australian consumers. While the container terminal operators' market power, in theory, could be constrained by indirect competition when cargo owners choose shipping lines, no evidence has been presented to the inquiry to support such an outcome. Further, existing regulation does not provide an effective constraint on the container terminal operators to prevent them from exercising their market power.

The Commission has considered three approaches to deal with this use of market power.

The first option is a status quo approach — continued price monitoring by the ACCC, together with relevant state-based initiatives, with no extra regulation at this time. The ACCC can both call for increased levels of regulation and recommend the form of this regulation in the future if it observes levels of landside fees and profits that are inconsistent with competitive behaviour. There are no costs under this approach. However, the last five years have seen significant increases to TACs and other fees and charges, such as the fee for a transport operator to use a vehicle booking system in order to collect or drop off a container, which have added to cargo owners' burden when dealing with highly disrupted supply chains. Further, while indirect competition through shipping lines, or the threat of further regulation, may act to moderate the use of market power by container terminal operators over time, it is far from clear that either of these mechanisms are limiting the ability to raise TACs, at least in the short term.

The second option is price setting together with regulatory oversight. State and territory governments could directly regulate container terminal operators' fees. This would ensure that there is a transparent process in relation to fees and any increases in fees would have to satisfy the relevant regulatory constraints, which could, for example, reflect container terminal operators' costs.

However, such regulation will have costs. As we have seen in other industries, such as electricity, it is difficult and costly for a regulator to set efficient charges. The regulatory process may be resource intensive and have high costs to industry participants and the taxpayer, as the regulator attempts to determine the efficient set of fees and charges. This is likely to be the case for TACs and other charges. These fees and charges include both fixed fees (like TACs) and incentive-based fees (such as charges if a transport operator arrives late to collect a container). A regulator would need significant information to set efficient incentive fees, and any regulatory error could lead to distorted charges that lower the efficiency of container terminal operations. The regulatory process to set these incentive-based fees would be likely to involve significant time and resources. However, a regulator could not simply ignore the incentive-based fees. If only fees that are not incentive-based are constrained, then container terminal operators may start to raise the

incentive-based fees to raise profits. This would be detrimental as the incentives would become distorted lowering the efficiency of terminal operations.

A third option recognises that container terminal operators operate in two linked markets: the quayside and the landside markets, but only have significant market power in the landside market. Such a situation, while not common, is observed in other areas of the economy such as for payment systems and for digital platforms. For example, a credit card network may have market power with regards to merchants, but not for card holders, and this asymmetry is reflected in the Reserve Bank of Australia's (RBA's) regulations over interchange fees and merchant surcharging (box 6.7).

Under this third option, any container terminal operator charges that are fixed fees for collecting or delivering a container, and are not incentive-based, such as TACs or charges for using a vehicle booking system, cannot be directly levied on transport operators, but must be collected from the shipping lines. This means that, if the fixed charges are unreasonable, the shipping lines are able to push back against these charges, unlike the transport operators. Further, having these fixed charges levied on shipping lines rather than transport operators will not create a distortion as all charges are eventually paid by cargo owners. Rather it simply moves the charges from the market where the container terminal operators have significant market power to the market where they lack such power.

While such a regulatory approach is not common, it has been used elsewhere. For example, an equivalent approach that redirected, rather than regulated, charges has been used for ATM charging with significant and desirable outcomes (box 6.7).

This redirection of charging has been put to this inquiry by some submissions. For example:

Importantly, a critical reform required for Australian [cargo owners] is to be protected from unfair pricing regimes imposed by foreign owned shipping line contracted [container terminal operators] and empty container parks. It is essential that these entities negotiate rates direct with their commercial client, the shipping lines, rather than imposing hundreds of millions of dollars in fees on transport operators who are held to ransom with no option to pay or are denied access to container collection / dispatch facilities. (FTA and APSA, sub. 31, p. 3)

Box 6.7 – Foreign fees, ATMs and how they mirror TACs

In 2009, industry (with pressure from the RBA) reformed ATM fees to make them more transparent and to improve competition in the Australian ATM system.

Prior to the reforms, customers who withdrew cash from another bank's ATM only saw the fee on their subsequent monthly statement. The customer's bank would pay an interchange fee to the ATM owner and the customer's bank would then pass that fee (and sometimes more) on to their customer as a foreign fee.

The 2009 reforms removed interchange fees and foreign fees. Instead, the reforms require ATM owners who wish to charge customers for withdrawals to do so with a direct charge disclosed clearly at the time and the customer given an opportunity to cancel the transaction at no charge. RBA analysis suggested that this transparency led to a significant drop in the number of ATM withdrawals. It also led to many of the major banks dropping this direct fee entirely.

Sources: Flood and Mitchell (2016, p. 32); PC (2018, p. 478); Remeikis (2017).

This third option would not directly deal with incentive-based charges. Any flexible fees and charges set by container terminal operators for transport operators would need to be monitored to ensure they are not being charged excessively to compensate for the reduction in revenue from fixed charges. This monitoring could occur at a state and territory level, similar to how fees are currently monitored in NSW under the PBLIS.

The Commission prefers the third option. It limits the regulatory costs associated with the second option, while recognising that a 'light handed' approach is justified given that, as noted by the ACCC, there is no evidence of excessive profitability for container terminal operators despite the clear evidence of significant market power regarding transport operators.



Draft recommendation 6.2

Terminal access charges and other fixed fees for delivering or collecting a container from a terminal should be regulated so that they can only be charged to shipping lines and not to transport operators

Regulations should be established that prevent container terminal operators from charging transport operators any fixed fees associated with delivering or collecting a container. Container terminal operators would not be prevented from charging these fees to shipping lines. This reform should be complemented by state and territory government regulators being empowered to monitor flexible fees charged to transport operators by container terminal operators to ensure that these fees are being used to create efficient incentives for transport operators and are not being used to offset any lost revenue from fixed fees.

6.4 Use of contract terms in the maritime logistics system as a form of market power

Use of potentially unfair contract terms

Unfair contract terms (or terms that contravene provisions in Australian Consumer Law⁶ (ACL)) are another way in which container terminal operators can exercise their market power over landside operators. Potential unfair terms have been raised by inquiry participants and the ACCC has investigated issues in contracts between:

- container terminal operators and transport operators
- container terminal operators and cargo owners (for example, in bulk port arrangements with grain growers).

The concern about unfair contract terms is primarily about equity. At the heart of unfair contract terms is one party being disadvantaged in a way that is not reasonably necessary to protect the legitimate interests of the other (PC 2008, p. 149). Another concern is about efficiency. Unfair contract terms lead to the inefficient allocation of risk in a contract. For example, removing liability for interruptions in supply may have the effect of inefficiently shifting risk from suppliers to consumers (PC 2008, p. 149). Risk drives decision making, so an inefficient allocation of risk could lead to an allocation of resources which reduces efficiency.

⁶ *Competition and Consumer Act 2010* (Cth) sch. 2 ('Australian Consumer Law').

What are unfair contract terms?

An unfair contract term is unfair if it meets three criteria. An 'unfair' term must:

- cause a significant imbalance in the parties' rights and obligations
- not be reasonably necessary to protect the legitimate interests of the party advantaged by the term, and
- cause financial or other detriment (such as delay) to a small business if it were relied on. (ACCC 2015)

Not all contracts are covered within the ACL. Section 23 of the ACL only prohibits unfair terms in contracts that were entered into or renewed on or after 12 November 2016 and:

- are a 'standard form contract' — these are typically prepared by a single party to the transaction and offered on a 'take it or leave it' basis, such that the other party has little to no scope to negotiate the terms
- are for the supply of goods or services or the sale or grant of an interest in land
- have been entered into by at least one consumer or small business (that is, a business that employs less than 20 people, including casual employees)
- provides for an upfront price that is no more than \$300 000, or \$1 million if the contract is for more than 12 months. (ACCC 2016b)

Some contracts between maritime logistics participants are excluded from the ACL altogether. Section 28(1) of the ACL exempts the unfair contract provisions from applying to:

- a contract of marine salvage or towage; or
- a charterparty of a ship; or
- a contract for the carriage of goods by ship.

The explanatory memorandum for the *Trade Practices Amendment (Australian Consumer Law) Bill (No 2) 2010* noted that these shipping contracts have been excluded from the unfair contract terms provisions of the ACL because:

These shipping contracts are already subject to a comprehensive legal framework (nationally and internationally) that deals with contractual terms in a maritime law context. (Parliament of Australia 2010, p. 73)

Where unfair contract terms are included in a qualifying standard form contract, an application can be made for a court or tribunal to render those terms void.

While the law does not currently impose penalties on businesses that impose, or seek to impose an unfair contract term, affected parties and the regulators that enforce the ACL can seek redress for any loss incurred as a result of a standard term contract that is declared to be unfair (Commonwealth of Australia 2016, p. 7).

Some contracts in the maritime logistics system have contained potentially unfair terms

Container terminal operators' contracts with landside operators have been investigated by the ACCC

In 2019, the ACCC announced that DP World, Hutchison and VICT had agreed to remove or amend terms in the standard form contracts they used for land transport operators which the ACCC concluded were likely to be considered 'unfair' (ACCC 2019a, p. 31).

DP World and Hutchison had contract terms that allowed a stevedore to unilaterally vary terms in the agreements without notice, including fees paid by the land transport operators.

DP World and Hutchison also had terms that limited their liability for loss or damage suffered by the transport businesses, while not offering the transport businesses the same protections. VICT's contract had a term requiring transport businesses to indemnify VICT for loss or damage, with no reciprocal obligation on VICT.

DP World's standard agreement also required the transport businesses to pay the stevedore's legal costs and expenses, in circumstances where such payments would normally be determined by court order. (ACCC 2019b)

The ACCC also entered into a court enforceable undertaking with Hutchison under s. 87B of the CCA. As part of this process, Hutchison acknowledged that two clauses contained within its Terminal Carrier Access Agreement from 1 January 2016 may contravene the small business unfair contract terms provisions of the ACL (ACCC 2019c) (box 6.8).

Hutchison undertook to:

- ensure, for a minimum period of three years, that its agreements did not include the two clauses or terms of similar effect
- not enforce or rely upon the two clauses, or terms of similar effect for customers that entered into the 2016 Terminal Carrier Access Agreement
- publish a corrective notice on Hutchison's customer portal and website
- develop, implement and maintain an ACL compliance program (ACCC 2019c).

Box 6.8 – Hutchison's two clauses covered by the court enforceable undertaking

There were two clauses in the Terminal Carrier Access Agreement that may contravene the unfair terms provision.

Terms and Conditions Validity and Acceptance

These Terms and Conditions are valid from 1 January 2016. HPA [Hutchison] may vary these Terms and Conditions at any time by placing a notice on the HPA Portal advising that the Terms and Conditions have changed. You will be deemed to have accepted and agreed to these and any revised Terms and Condition if you continue to use any login or the Truck Appointment System (TAS) area of the Portal after notice of the revised Terms and Conditions has been placed on the Portal including the 'Use of Information' provisions, 'Terminal Truck and Container Receiving and Delivery' procedures, and the payment terms. If you undertake any such actions on behalf of a Customer or Carrier, then you warrant and represent that you are able to do so on behalf of that Customer or Carrier (as appropriate).

Limitation on HPA's Liability

HPA and its associated agencies and companies will not be liable for any loss (including, without limitation, indirect, special or consequential loss or loss of profits, loss of business opportunity or loss of goodwill), expense, damage, personal injury or death which is suffered or sustained (whether or not arising from any person's negligence) in connection with Carriers' access to and use of the HPA Portal and the HPA Terminal services, except for any liability which cannot be excluded by law (in which case that liability is limited to the minimum allowable by law).

Source: Hutchison (2019).

The ACCC has also investigated companies in the grain supply chain

The ACCC has also investigated possible unfair contract terms in grain warehousing contracts between GrainCorp (a company that provides export, storage and port terminal services) and small business grain growers (ACCC 2021c).

The ACCC was concerned by several provisions, including a term which limited GrainCorp's liability to growers to \$100 000, even if the loss was caused by GrainCorp's negligent acts or omissions. The value of the grain stored on behalf of growers can at times be much higher than \$100 000, and the ACCC considered that it was unfair to limit liability to this amount if the loss was caused by GrainCorp's negligent acts or omissions. On 22 March 2021 the ACCC reported that GrainCorp agreed to amend 19 terms in its grain warehousing agreement (ACCC 2021c).

Legislative changes were in train before Parliament was prorogued

In 2018, after its action against the container terminal operators, the ACCC (2018a, p. 26) argued for more powers in relation to unfair contract terms, noting two key limitations of the ACL:

- unfair contract terms are not illegal, they can only be declared void by a court
- the ACCC cannot seek civil pecuniary penalties when a contract is declared unfair and void by the court.

In 2020, Commonwealth and state and territory consumer affairs ministers agreed to strengthen the existing unfair contract term protections in the ACL, with the intended reforms to include:

- making unfair contract terms unlawful and giving courts the power to impose a civil penalty
- increasing eligibility for the protections by expanding the definition of small business and removing the requirement for a contract to be below a certain threshold
- improving clarity on when the protections apply, including on what is a 'standard form contract'. (The Treasury 2019)

Amendments to the unfair contract terms regime were proposed in the *Treasury Laws Amendment (Enhancing Tax Integrity and Supporting Business Investment) Bill 2022* (Cth), which was introduced to the House of Representatives on 9 February 2022. This Bill includes amendments to the CCA, ACL and the ASIC Act to:

... strengthen and clarify the existing unfair contract terms provisions, to reduce the prevalence of unfair contract terms in consumer and small business standard form contracts. The amendments introduce a civil penalty regime prohibiting the use of and reliance on unfair contract terms in standard form contracts. The amendments also expand the class of contracts that are covered by the unfair contract terms provisions. (Parliament of Australia 2022, p. 3)

Importantly, the Bill proposed to strengthen the remedies and enforcement of the unfair contract terms regime by prohibiting the proposal of, use of, application of, or reliance on, unfair contract terms in a standard form consumer or small business contract and creating new civil penalty provisions for breaches of the prohibitions. The amendments would also expand the class of contracts that are covered by the unfair contract terms provisions by increasing the small business definition thresholds (so that the regime captures an expanded class of small business standard form contracts) and removing the contract value threshold for contracts under the ACL (Parliament of Australia 2022, p. 34).

On 11 April 2022 the 26th Parliament of Australia was prorogued (that is, the session of Parliament was terminated). The Bill has now lapsed and cannot be passed unless it is revived by the Senate.

What are the next steps?

The Commission is concerned that there may be other examples of potentially unfair contract terms that have not been the subject of complaint to the ACCC or brought to the Commission's attention through submissions. As such, the Commission is seeking information on whether there are other terms that it should be concerned about and whether other contracts between parts of the maritime logistics system might also have potentially unfair contract terms.



Information request 6.3

The Commission seeks further information on potentially unfair contracts within the maritime logistics system. Are there other terms to be concerned about that are not mentioned in this draft report? Are there other contracts that should be brought to the Commission's attention?

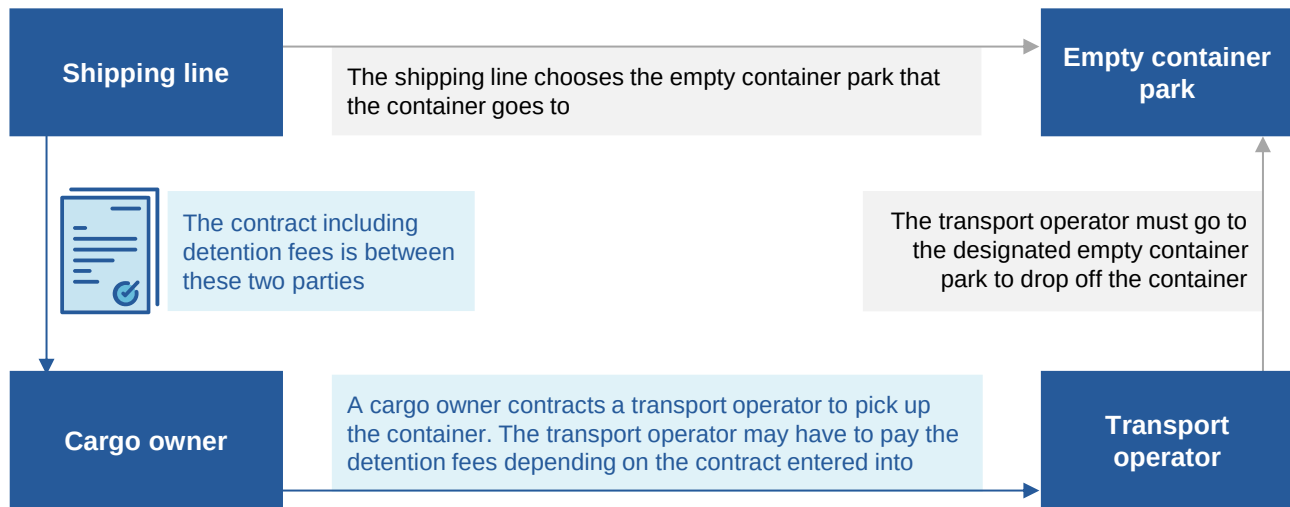
Shipping lines' detention fees are of particular concern

Another area of concern raised by inquiry participants is detention fees. Shipping lines and cargo owners enter into a contract to ship a container. Part of this contract covers the hiring of the container — shipping lines own containers and cargo owners hire them to ship their goods. The hire of a container usually includes 7–10 days (sometimes less, sometimes more) allowance for cargo owners to unpack a container once it has been unloaded from the ship (discharged) and return it either to the specified port terminal or an ECP for de-hire (Ai Group, sub. 60, p. 5). Detention fees are charged by shipping lines for the late return of containers. Therefore, detention fees incentivise the quick return of containers and promote efficiency in the system.

Transport operators play a key role in this process (figure 6.6). Cargo owners pay a transport operator to pick their container up from the ship and to drop it off at an ECP once it has been unpacked.

- Transport owners typically take responsibility for the container once it is available. This means after it has been unloaded from the ship (discharged) and has gone through the customs / biosecurity checks. The cargo owner has responsibility for the cargo during the customs / biosecurity checks. Therefore, when there is a delay in customs clearing a container and this leads to detention fees, cargo owners pay the detention fees.
- Once the container has been picked up, however, the contract for service between the transport operator and the cargo owner comes into play. Transport operators compete on avoiding detention fees and may bear responsibility for getting the container de-hired on time, depending on what they have agreed to in their contracts. As a result, if detention fees accrue because a transport operator cannot deliver a container at the agreed time, the operator compensates the cargo owner for those fees.

Figure 6.6 – How detention fees flow from party to party



Inquiry participants have raised detention fees as an issue

There have been a number of issues raised in this inquiry about detention fees, including that:

- full ECPs have been turning away empty containers leading to detention fees for cargo owners
- customs / biosecurity processes have been delaying when containers can be picked up by transport operators
- the time the cargo owner has to return the container often includes public holidays and weekend days, but ECPs are not usually open on these days
- shipping lines are providing fewer de-hire days. (Accolade Wines, sub. 29, p. 8; CTAA, sub. 50, pp. 11–12; IFCBAA, sub. 34, p. 11)

The issues identified by inquiry participants are concerning, particularly the cases where detention fees are incurred when an ECP is full. The role of transport operators in the contractual arrangements is also unusual, specifically because they are not a party to the primary contract that contains the detention fees but are still liable to pay them if their contract with the cargo owner specifies it (figure 6.6).

There are remedies, but they involve meeting some high bars

While the unfair contract terms regime might seem like an obvious remedy for unfair detention fees, shipping contracts are exempted from the relevant provisions of the ACL by the s. 28(1) rule mentioned above.

Cargo owners could try and use the unconscionable conduct provisions of the ACL. But for something to meet the unconscionable conduct threshold, it 'must be more than simply unfair — it must be against conscience as judged against the norms of society' (ACCC 2022b). This is a high threshold to meet.

Establishing unconscionable conduct has proved to be notoriously difficult because of the high threshold imposed by the courts that restricts a finding of unconscionable behaviour to only the most egregious instances of commercial dealing. (Webb 2015)

Another option for an owner would be to claim that the detention fees constitute penalties. Contracts can contain payments by way of damages (generally known as unliquidated damages) if there is a breach of contract. But if set too high, the payments can be deemed penalties:

A sum fixed by a contract is a penalty only if it is 'extravagant and unconscionable' in amount in comparison with the greatest loss that could conceivably be proved to have followed from the breach. (*Birdanco Nominees Pty Ltd v Money* [2012] VSCA 64 at 87)

Contractual clauses which seek to impose a penalty on the other party are unenforceable.

It could be argued that detention fees are a penalty because they are a significant amount that, in some instances, exceeds the greatest loss that the shipping line would face from the late return of their container(s) — the Commission has been informed that detention per container per day is in the order of \$300 a day and some cargo owners have paid total fees as high as \$50 000 (ANL 2021).

But one of the legal difficulties in establishing a penalty claim would lie in proving that the level of the detention fees is extravagant and unconscionable. For example, it might not be sufficient that a detention fee is greater than the cost incurred by the shipping lines for not having that container (see *Paciocco v Australia and New Zealand Banking Group Limited* [2016] HCA 28).

From an economic perspective, fees should reflect the cost incurred by the shipping lines for not having a container when it might be needed. This would typically take into account the cost of the container and the forgone revenue the shipping line could make from hiring it out to another cargo owner. If the container were not to be immediately hired out and instead sat idle in an ECP for some time, then the fee should not exceed the cost of the container. Courts in China have taken this approach and set the upper limit for a detention fee as the replacement price of a new container:

[t]he accumulative actual losses caused by the container detention charge should not exceed the replacement price of new containers in the same period in the market. (*CASA China Co Ltd v Foshan Jehong Logistics Co., Ltd* (2014) Guang Hai Fa Chu Zi No.505 at 12)

This upper limit would change if the shipping line did not own the container, as is the case for many shipping lines who instead lease them from a third party and then sublease them on to cargo owners. One estimate is that about 50 per cent of the global container fleet is owned by 13 leasing companies (xChange Solutions GmbH 2020). In these instances, the upper limit of the detention fee for the container could be set at a level up to the cost the shipping line would incur to lease a replacement container from a third party. In instances where a cargo owner cannot return a container because an ECP is full, it could be argued that the maximum detention fee that could be imposed should be lower to reflect the fact that the delay in returning the container will not inconvenience the shipping line and the cargo owner is effectively providing storage for the container (which the line would otherwise have had to pay for at the ECP). However, as noted above, one of the legal difficulties of establishing a penalty claim comes in proving that the level of the detention fees is extravagant and unconscionable, and the legal perspective might differ from the economic perspective.

Cargo owners who have incurred detention fees (or higher fees) because of actions taken by shipping lines may also have recourse through civil litigation. For example, if a cargo owner can demonstrate that they were owed a duty of care by the shipping line (in specifying the location for empty containers to be delivered to) which was not met when they specified a particular ECP (for example, because they knew that park was full, but specified it anyway), and this caused the cargo owner to incur the detention fee (or a larger fee), this could support a claim in negligence. The difficulty of this approach is that the cost of litigation is high and the risk and expense may discourage cargo owners from pursuing a remedy (Rockliffs Lawyers 2022). There may also be issue of international shipping law which play a role in this situation.

Existing provisions in the ACL render it difficult for the ACCC and aggrieved parties to bring actions for potentially unfair conduct involving shipping lines and do not allow for civil penalties to be imposed by courts, which limits the cost of contraventions to the damages suffered. There is also scope for affected cargo owners to take private action but, given the high cost of litigation and uncertainty as to the prospects of success (including issues of international law see below), it is likely that many potential contraventions will not be pursued. Because of these shortcomings, it is not clear that current laws pose an adequate disincentive for including unfair contract terms in standard form contracts concerning maritime logistics.

How to address the issues surrounding detention fees?

Inquiry participants have presented significant evidence for the issues surrounding detention fees.

Evidence from overseas also indicates that the comprehensive international legal framework that shipping lines must adhere to is not restricting unfair detention fees. Issues surrounding detention fees have also been raised in the United States. In response, the US Federal Maritime Commission (FMC) has made changes to how it will manage detention fees (box 6.9).

Box 6.9 – The United States also had trouble with detention fees

In 2018, the US Federal Maritime Commission (FMC) conducted an investigation after issues with detention fees were raised. Some of the issues raised included:

- inefficient dispute resolution processes
- inability to pick up or drop off a container
- lack of communication from carriers and marine terminal operators regarding vessel arrival delays or schedule changes.

This investigation led to an Interpretive Rule which sets out how the FMC will interpret the law in relation to detention and demurrage. The law in question is U.S.C. 41 102(c): Practices in Handling Property — A common carrier, marine terminal operator, or ocean transportation intermediary may not fail to establish, observe, and enforce just and reasonable regulations and practices relating to or connected with receiving, handling, storing, or delivering property.

The Interpretive Rule aimed to reflect three principles which were discussed in the investigation.

- Cases where charges are unable to incentivise fluidity in cargo movements.
- Importers to be notified when their containers are available for pick up.
- Clear and accessible policies around detention and demurrage.

Sources: FMC (2018, p. 8, 2020, p. 29638).

The Commission sees much merit in the views of the US FMC and their Interpretive Rule which outlines their approach to detention fees.

The rule states that absent extenuating circumstances, practices and regulations that provide for imposition of detention when it does not serve its incentivizing purposes, such as when empty containers cannot be returned, are likely to be found unreasonable. The Commission explained that such practices, absent extenuating circumstances, weigh heavily in favor of a finding of unreasonableness, because if an ocean carrier directs a trucker to return a container to a particular terminal, and that terminal refuses to accept the container, no amount of detention can incentivize its return. (FMC 2020, p. 29655)

Detention fees can play a role in incentivising parties to operate efficiently by introducing a financial motivation for containers to be returned quickly. And, by specifying which ECP containers should be delivered to, shipping lines can also encourage the delivery of containers to locations that will enable them to be put to their most productive use. However, when detention fees apply but circumstances will not permit that fee from being avoided, the financial penalty will no longer have any effect in encouraging efficient behaviour and just acts as a mechanism to transfer wealth to the shipping line.

The Commission considers that shipping contracts should not be exempt from the unfair terms provisions in the ACL and that their exemption under s. 28 should be removed. The evidence presented indicates that neither the national nor international legal frameworks are effective at restraining unreasonable and inefficient detention fees. Removing the exemption will provide cargo owners a remedy under the ACL for unfair instances of detention fees.

This remedy, however, might not address all instances of unfair detention fees. This is due to the complex legal arrangements between shipping lines, transport operators and cargo owners as outlined in figure 6.6. The primary contract to which the ACL provisions would apply is the contract between the shipping line and the cargo owner. If a cargo owner challenged and succeeded in an action over these fees then it is likely that such fees would not form part of their contract with a transport operator. However, as some of the fees are currently being borne by transport companies, cargo owners may have no incentive to challenge such fees.

In such circumstances it may be that the ACCC could play a very important role as a regulator in setting industry standards as it has done by pursuing the cases referred to previously.

Why international law and treaties, such as the *International Convention for the Unification of Certain Rules of Law relating to Bills of Lading* (the Hague Rules (1924)), should prevent the application of provisions of the ACL in landslide contractual relations is not clear to the Commission and is the subject of an information request below.



Draft recommendation 6.3 **Remove exemption for shipping contracts**

Shipping contracts should not be exempt from the unfair terms provisions in Australian Consumer Law. The Australian Government should remove this exemption.



Information request 6.4

The Commission invites feedback on draft recommendation 6.3, including any issues that might arise in relation to the international treaty arrangements.

7. Container port capacity and landside infrastructure

Key points

- * The growth of container ships is a topical issue: while bigger ships promise lower blue-water rates, they can increase costs in the rest of the maritime logistics system. They need deeper and wider channels. They need bigger and more cranes. They make the landside freight task 'lumpier'. And having more cargo on fewer, larger, ships increases risk from accidents.
- * Nevertheless, Australia's container port operators and other parts of the maritime logistics system have invested to accommodate bigger ships and will likely continue to do so as needed in response to growth in Australia's freight task and the global shipping fleet. There is no clear need for government intervention to either fund or coordinate expansions in port capacity to accommodate bigger ships at Australia's main container ports.
- * Over a long period of time, stated preferences for rail have diverged from the dominant use of road transport. Rail's low mode share is not surprising.
 - Rail works best when moving over long distances but containerised freight in and out of Australia's major ports mostly only needs to travel a short distance.
 - Most rail networks connecting to Australia's container ports also carry passenger services. That limits the availability of freight services, and passenger services are prioritised in any direct scheduling conflict. That risk can be avoided through the use of roads.
- * Increased use of rail is only likely to be achieved with significant investment in dedicated rail lines and intermodal terminals. That investment is potentially uneconomic and unnecessary.
- * In 2020, Australia imported 3.8 million full twenty-foot equivalent units (TEU) and exported 2.1 million TEU in containers. As a result, Australia needs to export around 1.7 million empty containers and these are stored at empty container parks during the process.
- * The surge in global demand associated with the COVID-19 pandemic contributed to a glut of empty containers in Australia and congestion at empty container parks. As demand normalises, pressures in the empty container supply chain should ease.
- * Urban encroachment is an issue — to differing degrees — at all of Australia's major container ports except Brisbane. Industrial land around some ports is gradually being redeveloped for higher value commercial and residential uses and this can create conflict with some port users. Planning decisions should support highest value land use — and this may involve rezoning and moving future terminal developments to sites that do not have the same issues of encroachment. Existing planning tools should be used to balance competing community demands.

Key points

- ✱ **State governments have overarching control of their state's planning schemes and they have each outlined how they are planning for ports and port infrastructure within their state to develop. It does not appear that any additional plans are needed, and evidence is yet to present itself that existing plans for port infrastructure will not be fulfilled.**

The Commission has been directed to assess infrastructure needs and constraints in the maritime logistics sector, and to identify the role of government and the private sector in meeting infrastructure challenges. Based on the specific issues identified in the terms of reference and stakeholder input, the Commission has focused on challenges relating to:

- port capacity and the use of bigger container ships (section 7.1)
- road and rail connections to ports (section 7.2)
- empty container imbalance and storage (section 7.3)
- planning and coordination (section 7.4).

Some of the other chapters in this report also address matters related to these topics. For example, the use of bigger ships is tied up with consolidation and competition between and among shipping lines (chapter 6) and technological solutions can facilitate the use of bigger ships (chapter 11). This chapter focuses explicitly on the physical needs and constraints in the maritime logistics sector and the rationale, or lack of rationale, for government intervention to address those needs and constraints.

7.1 Port capacity and the use of bigger container ships

Over time, Australia's growing containerised freight task will place demands on port capacity. These will be accommodated both through increases in the utilisation of existing capacity and by increasing port capacity.

A number of factors influence port capacity (often measured in terms of how many TEUs can be handled per year). Capacity can be increased by actions that increase how many ships a port can handle, how big those ships can be, and how efficiently freight moves through the port. This means that port capacity is determined by basic features of the port and marine environment like channel depth and quay length, as well as the equipment and labour available to move containers in and out of ports, and how that equipment and labour can be used. For example, in 2017 the Port of Brisbane noted that its capacity — how many TEUs could be handled per year given existing quay line and productivity levels — could accommodate expected growth in trade out to 2040, but increased productivity could push that well past 2050 (Port of Brisbane 2017, p. 5).

In practice, growth in the number of ships that a port can handle is usually accompanied by growth in how big those ships can be. For example, when the Webb Dock East container terminal was built it allowed bigger ships to visit the Port of Melbourne, and the port operator's planned Webb Dock North container terminal would do the same. This happens because building a new port, terminal or berth has relatively high fixed costs but the additional cost of building that infrastructure to accommodate bigger ships is comparatively small. Incurring that additional cost has historically been a safe bet given long run trends in ship size (discussed below).

As a result, discussions about growing port capacity often become discussions about the benefits and costs of investing to accommodate bigger ships — something the Commission has been instructed to investigate.

The growth of container ships

There has been a trend towards the use of bigger ships since container shipping began over half a century ago (DIRDC 2018b, p. 11). To carry more containers, ships have become longer, wider, taller and deeper (figure 7.1). For example:

- in 1956 the SS Ideal X first set sail from New Jersey. Widely regarded as the world's first container ship — though it was actually a converted oil tanker, and the standardised 20 (and 40 foot) container did not yet exist — the SS Ideal X was 160 metres long, 9 metres wide, and carried 58 containers (Cudahy 2006, pp. 27–31)
- as of April 2022, the biggest container ship operating in the world was the Ever Ace, the first of 14 within Evergreen Marine's A Class, which share the same carrying capacity and dimensions. The Ever Ace can carry up to nearly 24 000 TEUs, is 400 metres long, 62 metres wide and has a draught of nearly 17 metres (Teh 2021).

The trend towards bigger ships has produced recurring debates about whether and when to invest in port capacity to handle them. Twenty years ago, when contracts for the first 9000 TEU ships were being drawn up, industry commentators were asking whether terminals could cope with ships that big, and how much bigger ships would get (FreightWaves 2001). The same questions are now being asked as ships approach and exceed 24 000 TEU (Fickling 2021).

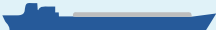
Container ships visiting Australia tend to be small by world standards, indicating the potential for ongoing increases in ship size in the future.¹

- In 2021, less than 50 per cent of all container movements in the rest of the world were performed using ships capable of carrying up to 8500 TEU, but ships in this size category accounted for nearly 80 per cent of container movements in and out of Australia (figure 7.2). Ships capable of carrying over 13 500 TEU do not visit Australia at this time, but they accounted for a quarter of all container movements in the rest of the world in 2021.
- At the same time as port operators at the bigger ports around the world contemplate the investments needed to accommodate 24 000 TEU vessels, Australian port operators are contemplating the investments needed to accommodate 14 000 TEU ships, smaller than the most popular ships currently on order, around 16 000 TEU (Hellenic Shipping News 2021). When new, bigger vessels are added to the highest volume shipping routes in the world, older, smaller vessels are 'cascaded' to service Australia and other lower volume destinations.

This all suggests that any theoretical limits or very long-term forecasts on how big container ships could get are practically irrelevant in the context of Australia's maritime logistics system.

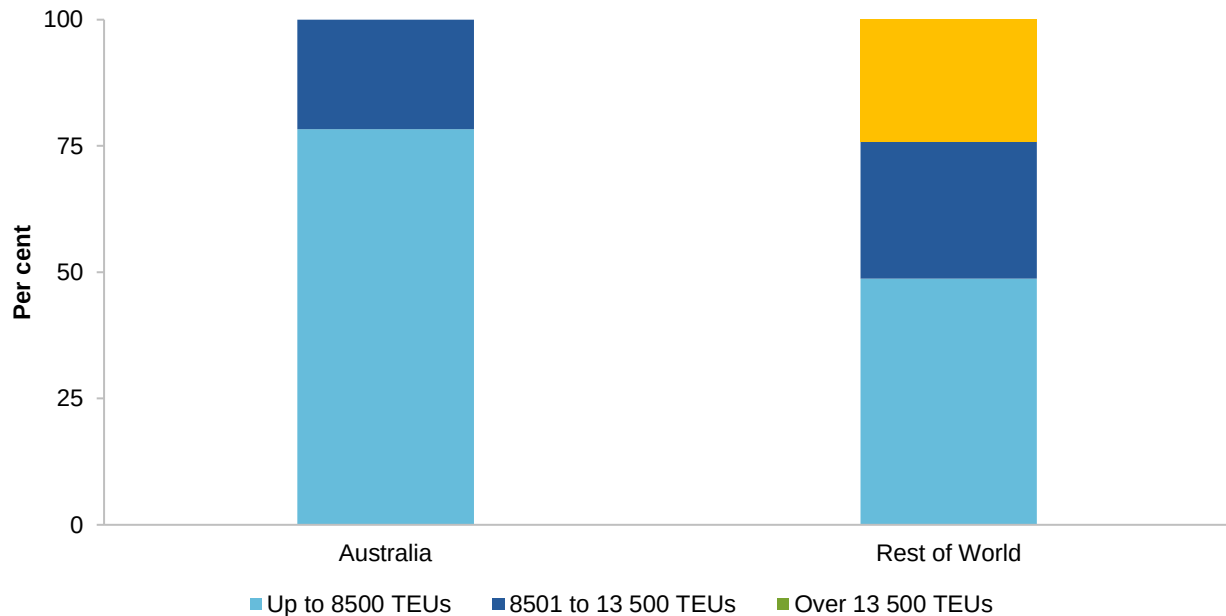
¹ While the container ships servicing Australia are small by world standards, the bulk vessels used to export Australian iron ore and other commodities are among the biggest in their class globally.

Figure 7.1 – Container ships have become bigger, and bigger and bigger
Container ship classes introduced over time

Total container capacity		Ship size: Length–Beam–Draft (metres)	
Early Container Ships (1956-) 500-800 TEU		137x17x9 m	
		200x20x9 m	
Fully Cellular (1970-) 500-800 TEU		215x20x10 m	
Panamax (1980-) 3000-3400 TEU		250x32x12.5 m	
Panamax Max (1985-) 3400-4500 TEU		290x32x12.5 m	
Post Panamax (1988-) 4000-6000 TEU		300x40x13 m	
Post Panamax II (2000-) 6000-8500 TEU		340x43x14.5 m	
VCLS (2006-) [Very Large Container Ship] 4000-6000 TEU		397x56x15.5 m	
New Panama (2014-) 6000-8500 TEU		366x49x15.2 m	
ULCS (2013-) [Ultra Large Container Ship] 18 000-21 000 TEU		400x59x16 m	
MGX-24 (2019-) [Megamax-24] 21 000-25 000 TEU		400x61x16 m	

Source: Adapted from Rodrigue (2020).

Figure 7.2 – There is room to grow in the size of ships calling on Australia
Share of container movements by vessel size category, 2021



Source: IHS Markit Port Performance Program data.

Bigger container ships have benefits and costs

Benefits — cheaper to build and operate, fewer emissions

It is cheaper to build and operate larger ships on a per TEU basis. Essentially, ‘you don’t need twice the amount of steel to build a ship twice the size, nor twice the crew to sail it, or fuel to move it’ (Haralambides 2019, p. 9). On a per TEU basis, construction and operating costs are in the order of 10 and 25 per cent lower for a 10 000 TEU ship compared with a 5000 TEU ship (Drewry Maritime Advisors 2017, p. 29; ITF 2015, p. 22; Murray 2015, pp. 10, 22).

Improved fuel efficiency is an important driver of bigger ships’ lower operating costs, and that improved fuel efficiency also translates into reduced carbon emissions. Analysis of shipping data has found that, on average, carbon emitted per tonne nautical mile of cargo decreased by 15 per cent as ship size increased from 5500–8500 TEU to over 8500 TEU (Lindstad, Asbjornslett and Stromman 2012, p. 390).

Costs — dredging, reclaiming land, infrastructure, pressures on landside operations, bigger risks

Accommodating bigger ships can entail a range of costs for the maritime logistics system.

Shipping channels may need to be deepened and widened to accommodate bigger ships. For example, the \$717 million Port Phillip Bay Channel Deepening Project increased the maximum allowable draft of vessels accessing Port Phillip Bay from 11.6 metres at all tides to 14 metres at all tides (Victorian Auditor-General 2012, p. 2). The project not only involved dredging; ‘landside improvements, protection of underwater utilities, enhanced navigational aids for ships, and environmental monitoring and management’ were also required (Victorian Auditor-General 2012, p. vii).

Land may need to be reclaimed, or removed, to give big ships enough room to berth and manoeuvre. The Webb Dock East container terminal, for example, was built to simultaneously berth two ships of up to 300 metres but ships over 300 metres are now visiting the terminal, which prevents a second large container ship berthing (figure 7.3). This decline in effective capacity can cause vessel queuing and delays, and means that a terminal designed to handle 1.2 million TEUs per year could potentially be limited to handling around 0.8 million TEUs per year (Port of Melbourne 2021a, p. 36).² To remove this constraint the Port of Melbourne plans to undertake the 'Webb Dock East Berth 4 & 5 Extension', which will involve extending Webb Dock East into Port Phillip Bay and removing the piece of land known as the 'knuckle'. These changes will provide a serviceable berth length of 746 metres (up from 660 metres), which will allow simultaneous berthing of a 350 and 366 metre vessel (Port of Melbourne 2021a, p. 35,46; VICT, sub. 7, p. 4-5). Also at the Port of Melbourne, the Swanson Dock Swing Basin — which ships use to turn and reverse when navigating the Yarra River channel — creates a constraint on vessel length and the port operator has flagged the potential need to remove land to widen the basin (AECOM 2017, p. 13; Port of Melbourne 2020a, p. 55).

Figure 7.3 – When two become one

Berths 4 and 5 at the Port of Melbourne, which can only be operated as a single berth when large ships visit



Source: Adapted from Port of Melbourne (2021a, p. 36).

Bridges may need to be modified to accommodate taller ships. At a cost of around USD\$1.7 billion, for example, the Bayonne Bridge was raised from 46 to 66 metres so that bigger ships could visit the Port of New York and New Jersey (Port Authority New York and New Jersey 2019). The height increase meant that the previous maximum vessel size and capacity of 9300 TEUs was increased substantially to an estimated 18 000 TEUs, allowing expanded access to port terminals in Elizabeth and Newark, New Jersey.

While the physical environment creates limits on what ships can be used, governments also create regulatory limits on port capacity. Those limits may be set with safety front of mind, but they do entail trade-offs between safety outcomes and efficiency (box 7.1).

² The Commission has not seen or produced estimates of the cost of queuing and delays caused by larger ships visiting Webb Dock East. The size of these costs is relevant to the evaluation of the Webb Dock East Berth 4 & 5 Extension.

Box 7.1 – There are regulatory limits on port capacity

Governments — mainly state governments, via harbourmasters — directly control port capacity by regulating what size of ship is permitted in ports.

- At Port Botany, there are height limits in place for port structures (referred to as an Obstacle Limitation Surface), which dictate a maximum allowable height of 51 metres for terminal cranes (NSW Ports 2003, pp. 1–2). While this does not specifically limit ships, any limits in crane size ultimately limit the size of ships that can be unloaded at the port. This height ceiling is employed due to the proximity of Sydney Airport, which has protected airspace under the Airports (Protection of Airspace) Regulations 1996.
- The height of ships going under the Tsing Ma bridge in Hong Kong was limited by regulation to 53 metres since opening in 1997, but in 2021 changes were made so that vessels up to 57 metres could pass under the bridge during specific hours (Marine Department 2021). It was estimated in a consultant report commissioned by the government that potentially a further 1 million 20-foot equivalent units could be allowed to pass through to the port of Hong Kong, leading to a possible value added of HK\$0.8 billion (Grinter 2020).

Harbour Masters also regulate *how* ships can operate, which impacts the efficiency and feasibility of shipping operations. For example, Harbour Master Directions set speed limits within port waters and rule on how many tugs need to be used. Svitzer (sub. 5, p. 6) have commented that:

Increasingly port authorities mandate more tugs in the port, more requirements for replacement tugs as well as larger and more powerful tugs. Such requirements should be balanced with considerations whether these are truly necessary for safety as increasing the number and specification of assets requires additional capex investment which ultimately has a knock-on effect on prices paid by consumers.

In some cases, technology and ship design can be used to overcome limitations of the port environs.

- For example, the Port of Brisbane's Nonlinear Channel Optimisation Simulator system (NCOS Online) uses real time environmental data to provide detailed and highly accurate estimates of vessels' under keel clearances (Port of Brisbane 2022). The system has added around half a metre to the allowable vessel draught for some vessels visiting the port, increased maximum vessel length overall by 13.6 per cent to 350 metres, and increased maximum vessel width by 11.1 per cent to 50 metres (Port of Brisbane, sub. 6, p. 3).
- At the Port of Melbourne, the 9500 TEU Maersk Skarstind avoided the air draught constraint imposed by the West Gate Bridge through the use of a collapsible mast (van Duyn 2019, p. 60). The availability of collapsible masts could mean that length and draught limits are more important constraints on the size of vessels that can visit Swanson Dock than the air draught limit created by the West Gate Bridge (Drewry Maritime Advisors 2017, p. 36).
- Historically, growth in ship draught has spurred investments in channel deepening, such as the work that took place in Port Phillip Bay in 2009 (Victorian Auditor-General 2012, pp. 2, 11). More recently, however, container ship capacity has tended to increase less through increased draught, and more through increases in vessel length, width and height (Garrido 2019). In the past, a draught of 14 metres — the maximum possible draught in Australia's container ports — entailed a maximum ship capacity of around 8000 TEU, but it is now expected that ships up to 14 000 TEU could operate within a 14 metre draught constraint (AECOM 2017, p. 72; Infrastructure Victoria 2017, p. 51)

Landside investments may be needed to handle bigger ships efficiently, or at all.

- As ships have become longer, stevedores have added cranes so that ships can be unloaded and loaded faster. A stevedore might use six cranes to process an 8000 TEU ship, but it may need to use seven or eight to maintain acceptable service levels when processing a 14 000 TEU ship (JOC Group 2014, p. 4).
- As ships have become wider, stevedores have had to invest in cranes with longer reach. For example, in 2015, the Flinders Adelaide Container Terminal installed two post-Panamax cranes at a cost of \$24 million (Davis 2015). (Post-Panamax cranes can reach across post-Panamax ships, so have a reach of around 50 metres.) The Port of Brisbane is already trialling the use of cranes that would let it handle very large container ships in the order of 14 000 TEU (Shipping Australia, sub. 11, p. 20).

Bigger ships take longer to unload. Analysis by the International Transport Forum at the Organisation for Economic Co-operation and Development (OECD) indicates that ships of capacity 13 300 TEUs or greater stay in port for 20 per cent longer than smaller ships (ITF 2015, p. 47). Across Australia's major east coast container terminals in 2019, cargo operations — time spent alongside loading and unloading containers — took at least 20 per cent longer on average for 5001-8000 TEU ships compared with 1500-5000 TEU ships (IHS Markit Port Performance Program data). Larger ships have the potential to complete more container moves per unit of time when combined with the use of more — and potentially bigger — cranes (chapter 3), but the trend towards *wider* ships may work against this, with cranes having to spend more time traversing the deck of the ship.

The use of bigger ships creates 'lumpier' port and landside operations (DP World, sub. 49, p. 31). Flinders Port Holdings Group (sub. 55, p. 4) have noted that the advent of larger vessels has created 'pressure [on most areas of terminal operations] to manage a larger exchange in the same timeframe as previous windows'. This 'places a heightened demand on port and terminal resources' (ACCC 2021a, p. xx), including the need for more flexible labour (ITF 2015, p. 54). The arrival of bigger ships can also create higher peaks in landside transport requirements, contributing to urban congestion, though the size of these impacts will depend on how quickly containers are moved off port and when those movements occur (ITF 2015, pp. 55–56).

Moving a given volume of containers on a smaller number of bigger ships entails a consolidation of risk, and responding to incidents involving bigger ships is more costly. Because they carry more cargo, bigger ships have a bigger 'value at risk', and collisions involving large container ships could create costs reaching into the billions of dollars (ITF 2015, p. 31). A grounding could block shipping channels entirely, causing cargo to be redirected to alternative ports and cargo land freighted. Refloating a large ship that ran aground in Australian port waters would likely require the use of crane barges and towage assets from other countries, which would be costly and time consuming (AECOM 2017, p. 47). Analysis of shipping losses and safety suggests that 'safety management systems and salvage capabilities do not always appear to have kept pace' (Allianz Global Corporate & Speciality 2022, p. 7) with the increase in the size of container ships.

History suggests bigger ships have been a net gain

The use of bigger and bigger ships has not been inevitable; it is always possible that smaller ships can be used. And this does happen where it meets shipping lines' and shippers' needs. For example:

- targeting the export of Australian agricultural products needing refrigeration, ZIM re-entered the Australian market in 2020, deploying six 2500 TEU vessels to operate the rapid 11-day transit China Australia Express (CAX) (Container News 2020). The service proved successful and ZIM has added two similar services that also incorporate Vietnam, Thailand and New Zealand (ZIM 2021)
- in March 2022, a conference of shipping lines launched the China-Australia-2 (CA2) service, utilising six ships ranging from 3500 to 3900 TEU (Li 2022).

However, inasmuch as the benefits and costs of bigger ships throughout the maritime logistics system are reflected in prices — of port services, stevedoring services and so on — the fact that ships have become bigger suggests that they have been a net benefit for the system's users, importers and exporters.

That said, using bigger ships can have unpriced effects that would drive a wedge between net benefits to the users of the maritime logistics system and the community as a whole. However, the clearest and likely biggest unpriced effect is to reduce carbon emissions, which only makes the use of bigger ships more beneficial to the community. Increases in the average size of container ships servicing Australia over the next decade could provide carbon reduction benefits worth in the order of \$45 million annually.^{3,4}

Port expansions do not need taxpayer funding

Port operators clearly understand the potential benefits, and costs, of investing to accommodate larger ships, and carefully consider what investments are needed and when.

- The Port of Brisbane's 50 year master plan includes plans to provide channel width and depth sufficient to accommodate larger vessels in the future (PBPL 2019, p. 74).
- NSW Ports' 30 year master plan, now over five years old, noted that 'forecast trade will be handled by larger vessels' (NSW Ports 2015, p. 28). In 2015, that meant preparing for an increase in ship size from 6500 to 10 000 TEU at Port Botany; by 2019 the port operator had prepared to service vessels up to 12 000 TEU, and the port's waterside infrastructure can now service vessels up to 15 000 TEU (NSW Ports 2019, p. 33; sub. 66, p. 7). That increase in capacity notwithstanding, NSW Ports have commissioned work that found the benefits of investing — throughout the maritime logistic system — to accommodate ships over 14 000 TEU would not outweigh the costs (sub. 66, p. 17).
- Reflecting on 'strong interest from shipping lines' to deploy larger ships, the Port of Melbourne's *2050 Port Development Strategy* (2020a, p. 7) anticipates that the port will be able to handle up to 14 000 TEU vessels at Webb Dock in the future.
- At Port Adelaide, the port operator has previously worked with the South Australian Government 'to complete major dredging campaigns to deepen and widen the Port Adelaide channel to ensure that the port remains a viable option for larger container shipping lines' (Flinders Port Holdings Group, sub. 55, p. 11). Master planning for Port Adelaide conceives of scenarios where 14 000 TEU ships visit the port (or even bigger if ships bypass Australian ports that would not be able to accommodate them) (FPH 2022, pp. 31–32).
- There is planning under way for a new port at Perth, and consultants engaged to analyse trends in the global shipping fleet to understand what ships would likely visit Perth in coming decades found that 15 000 TEU vessels could be deployed to Australia towards the end of the 2020s, with 18 000 TEU vessels potentially visiting by the early 2040s (Westport Taskforce 2020, p. 47).

Efficiency and equity arguments would both recommend that investments to accommodate larger ships are funded by port users. The direct users of expanded capacity are easily identifiable — the larger ships that call on

³ The \$45 million figure is based on estimates of container shipping's carbon emissions (Adamopoulos 2021), Australia's share of container shipping (DIRDC 2018b, p. 10), a 15 per cent reduction in the emissions intensity in the move to bigger ships (Lindstad, Asbjørnslett and Stromman 2012, p. 390), a social cost of carbon of \$84 per tonne (Robingstone Advisory Pty Ltd 2021, p. 7), and a 30 per cent increase in the volume of Australia's containerised maritime freight over the next decade (which the Commission regards as a plausible increase in trade volumes, and one that could make the use of larger ships feasible, based on previous increases in total trade and average ships size).

⁴ Another potential unpriced effect from the use of bigger ships is an increase in road congestion costs — because the marginal cost of congestion increases as a function of total traffic, moving a given number of containers using a smaller number of ship visits could increase the total cost of congestion overall. However, for that increase to offset the benefit of reduced carbon emissions would require a substantial increase in the added congestion costs for each additional TEU.

the port, and port operators can easily levy those ships to fund port expansions as they see fit. Ultimately, any such levy would be paid for by importers and exporters, but that is entirely appropriate. It is ultimately importers and exporters that would enjoy the benefits of lower freight rates that the use of larger ships can produce: analysis of Australian and global routes over the period 2011 to 2017 indicates that a 1 per cent increase in ship size produced a 1 per cent decrease in freight rates (Drewry Maritime Advisors 2017, p. 22).

The alternative to user funding of port expansions is taxpayer funding, which is potentially justifiable if it is needed to support the production of significant nonmarket benefits (that is, benefits not captured by users and so not reflected in prices). The only such benefit that the Commission is aware of is the reduction in carbon emissions associated with vessel upsizing. But it is not obvious that Australian taxpayer funding is needed to encourage an efficient level of carbon emissions in the shipping industry, given the industry has adopted legally binding energy efficiency measures and is currently targeting a 50 per cent reduction in emissions by 2050 (International Maritime Organization 2019). Some individual firms are decarbonising even more aggressively, with Maersk targeting net zero emissions by 2040 (Maersk 2022).

Governments should send clear signals about what projects, if any, warrant taxpayer funding. If port operators place even a small probability on the receipt of taxpayer funding they may put off investing themselves in the hope that taxpayers will foot the bill.⁵

There is another potential – though ultimately unconvincing — argument for taxpayer funding of port expansions to accommodate larger ships but it does not rely on the existence of nonmarket benefits. This argument relates to the fact that the investment decisions of one port can affect what ships choose to visit other Australian ports. The argument is explored below.

The Port of Melbourne is uniquely influential with regard to Australia's capability to host larger ships

Australia's big container ports' plans to accommodate larger ships are not coordinated but they are not made completely independently either. This is because Sydney and Melbourne are 'must call' destinations for intercontinental liner services (chapter 2). As a result, the smallest port⁶ between Port Botany and the Port of Melbourne limits the maximum size of ship that will visit Australia.

The Port of Melbourne is currently the limiting factor on the size of container ships that will visit Australia. The height of the West Gate Bridge and the dimensions of the Yarra River channel currently stop ships bigger than around 10 000–10 500 TEU from visiting Swanson Dock (Port of Melbourne 2021a, p. 39). Webb Dock can accommodate ships up to around 13 000 TEU (Port of Melbourne 2020c, p. 13).⁷

Understandably, this results in port operators making investment decisions based on what the Port of Melbourne does. For example, Flinders Port Holdings' master planning for Port Adelaide considers scenarios where Port of Melbourne constraints do and do not apply (FPH 2022, pp. 31–32). A previous Port of Brisbane CEO expressed the 'firm view that, in the future, Port of Brisbane will never be the limiting factor on the east coast of Australia' (Cummins 2016) but the port also does not need to invest to accommodate

⁵ Consider a \$100 million investment that would produce a 7 per cent internal rate of return over a 20-year payback period. An investor would be indifferent between making that investment themselves and a scenario where, ex ante, they make the investment themselves immediately with 95 per cent probability or government contributes the \$100 million in 20 years' time with 5 per cent probability. Holding out for a handout can pay off handsomely.

⁶ 'Smallest' in this context refers to the smallest maximum ship size that the port can accommodate.

⁷ The size of ship that can visit any part of the Port of Melbourne will ultimately be constrained by the Port Phillip Heads. Current physical limits and technologies may allow ships up to 14 000 to pass through the Heads (AECOM 2017, p. 72; Infrastructure Victoria 2017, p. 51).

bigger container ships than can visit the Port of Melbourne. Another previous Port of Brisbane CEO indicated that plans to increase draught limits ‘would wait until Victoria commits to extra depth, as there would be little demand for this draught in Brisbane until shipowners could service the entire route with larger vessels’ (Drewry Maritime Advisors 2017, p. 34).

In contrast, the Port of Melbourne operator’s investment decisions do not need to factor in or anticipate other port operators’ investments in port capacity to accommodate larger ships. This may have negative impacts nationally because:

... in addition to Victoria enjoying the cost savings from larger vessel sizes, both Sydney and Brisbane would gain the cost savings offered by larger vessels currently not yet available because of the Melbourne limits. If the Business Case were to be considered on a national basis, the benefits of lifting Melbourne’s constraints would be multiplied by a factor of over two. (Drewry Maritime Advisors 2017, p. 43)

This implies that the Port of Melbourne — acting alone — may make suboptimal investments in capacity to accommodate bigger ships. A common response to this sort of problem is to call on the national government to ‘internalise’ the benefits of removing capacity constraints at the limiting port. Indeed, expanding east coast deep water container port capacity to accommodate larger ships is on Infrastructure Australia’s priority list (Infrastructure Australia 2022). (The priority list is intended to identify ‘nationally significant’ projects that are candidates for taxpayer funding.)

However, the Port of Melbourne constraint does not create a need for the Australian Government to fund port expansions to accommodate bigger ships, for two reasons.

First, the operator of the Port of Melbourne already plans to expand to accommodate bigger ships, both through its Webb Dock East Berth 4 & 5 Extension⁸ and the development of a new Webb Dock terminal to handle ships up to 14 000 TEU. The need for both projects is contested (DP World, sub. 48, pp. 93–96), and allegations were made to the Essential Services Commission (ESC 2021b). However, the ESC found that the future projects are required (2021a, p. 95). More broadly, when considering the port’s cases for future capital expenditure, the ESC has stated that Port of Melbourne ‘needs a more robust approach [to capital forecasting, planning and management] in the future’ (2021a, p. v).⁹

The Commission considers that the Port of Melbourne lease and regulatory environment create a risk that the port operator will over-invest in port capacity (chapter 5) but is not in a position to evaluate whether the Port of Melbourne’s plans to increase port capacity are optimal from a national perspective. Whatever the case, it is clear that the Port of Melbourne constraint will be relaxed voluntarily by the port operator.

Second, even if there were convincing evidence that the Port of Melbourne’s investments to accommodate larger ships are inadequate, taking into consideration the potential benefits accruing to users of other ports, this would at most justify a role for government in corralling the port operators to jointly fund investments at the Port of Melbourne. But even this seems unnecessary. If other port operators are convinced that the Port of Melbourne is under-investing in port capacity to accommodate larger ships, there appear to be relatively low barriers to them privately coordinating and jointly funding additional investment at the Port of Melbourne.

⁸ The Webb Dock East Berth 4 & 5 Extension will not increase the maximum size of vessel that can be accommodated but will allow more large vessels to be berthed simultaneously.

⁹ The ESC received legal advice that the Webb Dock East Berth 4 & 5 Extension was not a relevant matter for the purposes of the recently concluded inquiry into the Port of Melbourne’s compliance with the pricing order (ESC 2021a, p. 14 of Appendix 9). That is, the ESC did not evaluate whether the port operator’s forecasting, planning and management in relation to the project demonstrated prudence and efficiency.

It is unclear if private coordination between ports would be considered cartel conduct

Coordination among port operators to invest in port capacity would potentially require Australian Competition and Consumer Commission (ACCC) authorisation as a form of cartel conduct, but even this is not obvious. Authorisation is required when the relevant parties to the agreement are competitors. However, as noted in chapter 5, the major container ports in Australia operate in separate and geographically distinct markets for container services. Thus, it could be argued, that agreements between the ports relating to investment are not agreements between competitors and cannot be cartel conduct or otherwise lessen competition.

If jointly funding investment at the Port of Melbourne was deemed to either be an agreement among competitors or have the potential to lessen competition, the ACCC would make its decision based on whether the likely public benefit outweighs the likely public detriment of the conduct. This would need to consider, among other matters, how the conduct would negatively impact competition and the possible cost savings achieved through the use of bigger ships.



Draft finding 7.1

Port expansions to accommodate bigger container ships do not need taxpayer funding

Australian container port operators and other parts of the maritime logistics system continue to prepare for bigger ships as needed and there is no need for government intervention to fund or otherwise coordinate investment or encourage the use of bigger ships.

7.2 Road and rail connections to ports

Moving containers to and from ports is the second biggest cost in the maritime logistics system, after blue water charges (DP World, sub. 49, p. 75). This means that the efficiency of road and rail connections to ports is an important part of the overall efficiency of the system. In line with the enquiry's terms of reference, this section reviews rail access Australia's container ports.

Road transport has a range of advantages compared with rail when it comes to moving Australia's containerised maritime freight. However, moving freight on road adds to congestion and has other impacts on the community. This has contributed to calls over many years for greater use of rail, and to port operator and government plans to invest in dedicated rail infrastructure and intermodal terminals.

Rail moves only a small share of Australia's containerised maritime freight

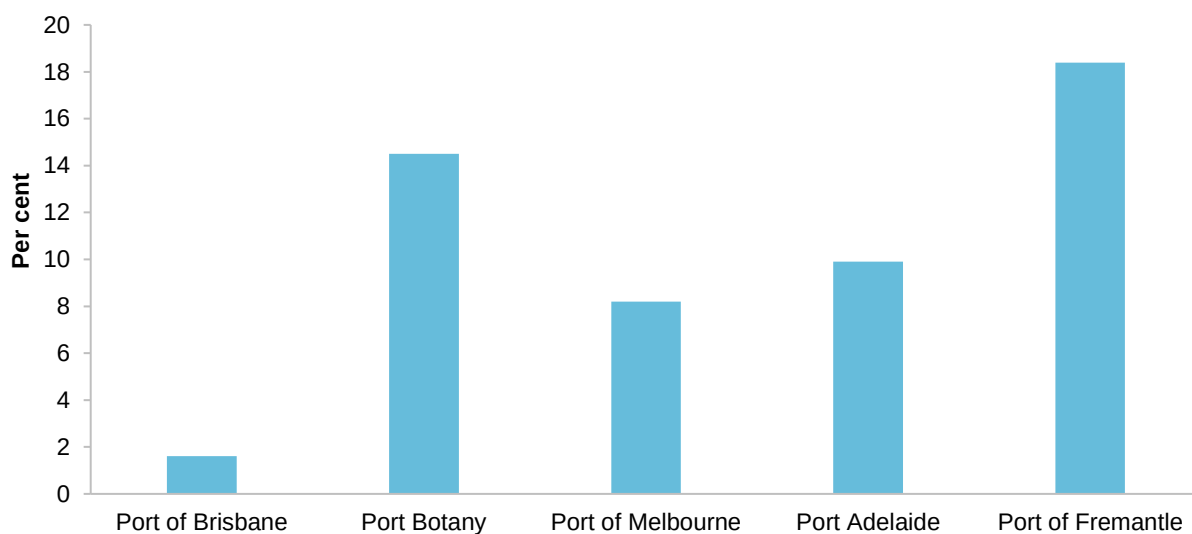
There is wide variation in rail's mode share at each of Australia's five biggest container ports (figure 7.4). The largest share of containers is moved by rail at the Port of Fremantle, at 18.4 per cent. The larger ports are slightly lower, with 14.5 per cent and 8.2 per cent of containers moved by train in Port Botany and the Port of Melbourne. The lowest share is moved at Port of Brisbane, with just 1.6 per cent of containers moved on rail.

Rail's low mode share at major container ports is not mysterious

Characteristics of the freight task mean there are compelling reasons for road transport's high mode share. That said, the changes that would increase rail's mode share are well known.

- For rail transport to be cost competitive, services need to run at a high frequency or cover large distances: rail journeys to and from Australia's capital city ports are typically short and compete for slots with passenger services on shared infrastructure.
- These factors have held back the use of rail for decades, while the productivity of road freight has increased over time. This increased productivity, in conjunction with the flexibility of trucks, remains a key driver of increased rates of road use when moving containers between ports, ECPs and final cargo destinations.
- Rail can compete more effectively if intermodal terminals and dedicated freight lines are used, allowing many of the difficulties related to frequency and utilisation to be overcome.

Figure 7.4 – Rail mode share varies markedly between Australia's main container ports
Share of TEU throughput moved by rail^a



a. Mode share estimates made by respective port authorities or State government have been used here, rather than BITRE Waterline or any other source of data. Consultation with BITRE found that:

Waterline rail activity data is supplied by port operators, except in the case of Port Botany, where data is supplied by the container terminal operators. Truck activity data reported in Waterline consists only of containers booked in standard VBS/TAS slots; bulk runs are excluded. In particular, export of empty containers is typically performed as a bulk run, and is thus excluded from this dataset. Finally, containers handled for transshipment are also included in the wharfedata. As a result, BITRE do not calculate a rail mode share.' (BITRE, pers comm, 17 June 2022).

b. Most recent available estimates have been used. The Port of Brisbane estimate is from 2021, the Port Botany estimate from 2021, Port of Melbourne estimate from 2019, Port Adelaide from 2021 and Port of Fremantle from 2021.

Sources: Flinders Port Holdings, sub. 55, p. 14; Fremantle Ports (2021, p. 4); NSW Government, sub. 58, p. 9; Port of Brisbane, sub. 6, p. 6; Port of Melbourne et al. (2021, p. 103).

Sharing railway lines with passenger services can substantially increase risk for freight operators

The majority of capital city ports in Australia are located within metropolitan areas and freight services compete with passenger services for access to rail corridors. On these shared rail lines, passenger services get priority and in many cases are run frequently (ALC 2017, pp. 76–78; TfNSW 2018b, p. 34). Freight trains need to pass through multiple parts of rail networks and have a scheduled time or slot for each in order to fit between existing passenger services. While finding slots for freight trains to operate is usually possible, risk is substantially increased due to the need to stick to these slots. If running off schedule, a delay will likely result in a freight train missing multiple windows in other parts of the network, causing delays to blow out further (NSW Auditor-General 2021, pp. 9, 30) as they may have to wait for multiple passenger services to

pass before being able to proceed. This can result in late fees for delivery or return of containers, missed slots for future services, potential stock loss for agricultural goods and longer-term issues around business reputation and customer retention. This is especially important when considering the large volumes moved by train, meaning that the risk is much less diversified than when compared with a large number of trucks.

These passenger prioritisation issues are common around the world. One such example is western Europe, which despite numerous rail lines still shares many connections with passenger services (McKinsey 2022, p. 10). As a result, freight rail transport faces similar challenges worldwide. Ports in Europe that have managed high mode shares in comparison with Australia — such as the Port of Hamburg with over 50 per cent rail mode share (Container News 2022b, p. 2) — have done so due to connections to freight networks which are used to transport containers inland over very long distances (Hamburg Port Authority 2012, p. 12).

Rail is less attractive for freight that only needs to travel short distances

Rail becomes more costly when moving freight over shorter distances (Deloitte Access Economics 2017b, p. 16). Trains are cheaper than road transport on a per tonne kilometre basis due to greater fuel efficiency and lower labour costs but combining rail and road (which is in most cases necessary to get goods to their final destination) entails additional container lifts. Longer trips therefore generate greater savings per kilometre travelled as loading costs are increasingly offset.

This is an issue when moving containers off Australian ports because many of them need to be delivered to metropolitan areas near ports, making rail less viable. In Melbourne, over 90 per cent of full import containers are delivered within metropolitan Melbourne (Port of Melbourne, GHD, and Victorian Department of Transport 2021, p. 7), while 80 per cent of containers arriving at Port Botany travel no further than 40 kilometres from the port gate (KPMG 2019, p. 7).

The productivity of road transport has increased

Increased truck productivity has allowed for improved efficiency within the container supply chain (Fremantle Ports 2014, p. 5). This increase in productivity has been driven by the use of bigger trucks and expanded access for those bigger trucks (including B-doubles and other 'high productivity vehicles'). BITRE (2011, p. 5) estimated that total domestic road freight in 2007 would have required twice as many trucks if productivity growth over the preceding 40 years had not occurred. Of this growth, articulated trucks contributed over 90 per cent.

Articulated trucks make up a small share of all trucks in Australia but they are highly productive and move the majority of Australia's freight task. In 2016, National Transport Commission estimated that just 3 per cent of the national truck fleet were articulated but these trucks moved 79 per cent of the national freight task (NTC 2016b, p. 28). While capacity can vary within classes, in 2021 the Port of Melbourne estimated that B-Doubles visiting the port on average carried 2.9 TEUs, Super B-Doubles carried an average of 3.2 TEUs and A-Doubles carried an average of 4.1 TEUs (Port of Melbourne, GHD, and Victorian Department of Transport 2021, p. 11).

Future growth in road freight productivity is likely to be driven by new technology that increases fuel efficiency and self-driving trucks, rather than increases in truck size. Some transport operators are pushing for increased road access for high productivity heavy vehicles (National Road Transport Association, sub. 8, p. 3). However, operators are increasingly hitting regulatory and infrastructure carrying capacity limits related to truck size (Infrastructure Australia 2019a, p. 345).

Intermodal terminals can make rail more cost effective and competitive

Investment in intermodal terminals has the potential to increase the share of freight moved by rail in and out of ports. Intermodal terminals are designed to allow frequent freight rail services to transport containers to hinterland locations, from which point containers or cargo can then be distributed by trucks. This is particularly useful for ports located in areas that have constraints on road access or suffer from high levels of road congestion. Road congestion reduces truck and driver productivity and can help short-haul rail become cost competitive (BITRE 2016, p. 180). The Moorebank Intermodal Rail terminal built to service Port Botany is the most notable example in Australia. The terminal allows for containerised freight to be moved closer to the demographic and geographic centre of Sydney (Deloitte 2017, p. 5). From this point, containers can be unpacked and dispersed further, mostly by road or possibly on other rail services. As is the case at Moorebank, the efficiency of intermodal terminals is increased when transport operators co-locate their own distribution facilities nearby, centralising freight activity at that location and reducing unnecessary trips (BITRE 2016, pp. 40–41).

While it is generally true that longer trains travelling longer routes are more cost effective, shorter trains and shorter routes can become viable if services are run frequently enough (Zgonc, Tekavčič and Jakšič 2019, p. 16). Intermodal facilities, if located on dedicated freight lines, have the potential to increase train frequency. This is due to the greater demand for containers to be moved to this one central location, given that there is a greater efficiency and ease of access for truck operators. Increasing frequency also helps offset fixed costs such as infrastructure charges — one of the largest costs faced by rail operators — and thereby increasing rail's competitiveness (BITRE 2016, p. 93).

An intermodal facility has the potential to increase train utilisation, which can increase the cost competitiveness of rail relative to road (DIRDC 2018c, p. 18). A train that delivers containers to a location but returns empty reflects a 50 per cent level of utilisation. The increase in utilisation is possible because the terminal can act as a return destination for empty containers, which train services can then carry to port on return journeys.

Despite the potential positives, intermodal terminals still face common difficulties. Many intermodal terminals are located within or at the end of passenger rail corridors, resulting in constrained access. These access constraints are likely to grow in the future as passenger and service numbers increase, further increasing competition to use rail infrastructure (Port of Melbourne 2020b, p. 14). Use of dedicated freight lines is the clearest way around these challenges, and any plans for future intermodal projects with access to dedicated freight lines involved should be assessed more favourably.

People advocate for greater rail use for a range of reasons

Industry and government stakeholders have frequently called for greater use of rail in the maritime logistics system (PBPL 2019, p. 66; Port of Melbourne 2020, p. 6; BCA, sub. 56, pp. 4–5; NSW Government, sub. 58, p. 9). Governments have often set, and not met, higher mode share targets for rail. In the case of Sydney, mode share targets have been stated and have remained unmet for decades (Department of Main Roads, NSW 1982, p. 9; Mandis Roberts 2003, p. 62; Port of Melbourne 2006, p. 87).

Australia's freight task is forecast to grow substantially in the coming decades and this has the potential to strain existing transport infrastructure (NSW Ports 2015, p. 37; Port of Melbourne 2020a, pp. 23–24). If road freight continues as the predominant method of moving maritime freight, existing freight corridors are expected to experience increased road congestion. This growth in road congestion has the potential to greatly decrease logistics chain efficiency and has been used by Port Authorities in Sydney and Melbourne in particular to justify calls for substantial increases in the share of freight moved by rail.

Moving freight by rail rather than road can also have other external benefits for the wider community, at a local, national and international level (Chi, Frost and Ellis 2017, p. 3). Key among these are environmental benefits, both in terms of lower air particulate matter pollution and greenhouse gas emissions. Heavy vehicles travelling by road are relatively less efficient than trains given the smaller volumes of cargo carried resulting in greater fuel consumption per TEU of freight moved. Other factors that drive greater fuel efficiency per container moved on rail rather than road include reduced wind resistance and rail alignments generally being flatter than roads (BITRE 2016, p. 86). As an example, the Australian Rail Association in conjunction with Deloitte Access Economics estimated that rail freight produces 16 times less carbon pollution per tonne kilometre when compared with road freight (ARA 2020, p. 4).

Another benefit is that rail is associated with fewer accidents than road transport. Accident costs for road transport have been estimated to be 20 times higher for road than rail for every tonne kilometre of freight moved. Indeed, in 2020 it was estimated that each container moved between Melbourne and Sydney by rail rather than road saves \$109 in avoided crash costs (ARA 2020, p. 52)

Most port development plans include mode share targets

The four largest container ports around Australia have targets for increased rail mode shares within their port development plans. Plans to achieve greater rail mode share incorporate substantial investment in dedicated freight lines and intermodal terminals (PBPL 2019, pp. 70–71; Port of Melbourne 2020b, p. 22; TfNSW 2018b, p. 4). Examples of targets and investment in rail are examined below.

Port of Brisbane

The Port of Brisbane's rail mode share has declined over time and is significantly lower than Australia's other main container ports. In the late 2000s, rail's mode share was over 10 per cent but was less than 2 per cent in 2020 (Deloitte Access Economics 2017, p. 4; Port of Brisbane, sub. 6, p. 6). This decline has occurred despite a section of freight-dedicated rail — the Fisherman Islands railway line — linking into the port. At the end of the dedicated freight line, trains leaving the port must enter and pass through the passenger corridor. Within that corridor, prioritisation of passenger services has resulted in reduced flexibility, customer confidence for rail freight (Deloitte Access Economics 2017a, p. 65) and reduced asset utilisation freight (Deloitte Access Economics 2017a, p. 20).

The historical relocation of the port from Brisbane central business district to the mouth of the river allows for easy access to the South East Queensland motorway network through the dedicated Port of Brisbane Motorway (PBPL 2019, pp. 66–67). As a result, this infrastructure along with passenger service conflict has allowed road transport to dominate container transport throughout South East Queensland.

The Port of Brisbane's 2018 to 2048 master plan states that the current mode share will not be sustainable in the longer term as demand on the road network increases (PBPL 2019, p. 66). The introduction of the Inland Rail project, which will provide a new dedicated link from the metropolitan fringe of Brisbane to Victoria, is expected to significantly change freight rail use patterns in Queensland and New South Wales (CSIRO 2022, pp. 80–81). Given the high levels of use expected for Inland Rail, new connections to the port would allow for greater linkage to nearby agricultural regions in Queensland and northern New South Wales (PBPL 2019, pp. 70–71).

Options for a dedicated link between the major Inland Rail link along eastern Australia and the Port of Brisbane are being considered. One option is to build a rail link between Acacia Ridge through to the Port of Brisbane (Deloitte Access Economics 2017a, p. 2). Within the project proposal, it is forecast that without the dedicated freight link, the rail mode share out of the port will fall to 1 per cent by 2035. If the link is built, a series of scenarios see the share increasing to between 12 to 30 per cent by 2035 (Deloitte Access Economics 2017a, p. 59).

Port Botany

Previous NSW Government policy set in 2006 included a 40 per cent target for freight at Port Botany moved by rail by 2010-11 (PC 2006, p. 338; QR National 2007, p. 3). Similar targets were set prior to 2006, pointing to a long history concerns from the NSW Government about road congestion around the port (Department of Main Roads, NSW 1982, p. 9). Despite these targets, the rail mode share has fallen substantially over the past two decades, with an estimated mode share of 25 per cent in 2003 (Mandis Roberts 2003, p. 62) that has fallen to around 14 per cent at present (NSW Government, sub. 58, p. 9).

The port's relatively high rail mode share is due to stretches of dedicated freight rail, and most importantly, the geographic location of the port. This dedicated freight rail connects Port Botany to intermodal facilities at Cooks River, Enfield and Chullora (NSW Ports 2005, pp. 2–3) and continues through to the Macarthur region via the Southern Sydney Freight Line (Federal Infrastructure and Transport Minister 2013, p. 1).

Given that Sydney stretches west and population density is higher in the eastern suburbs, a build up of traffic travelling east is a significant issue that reduces the efficiency of road freight out of the port. Restrictions on heavy vehicle use on Botany Road and Bunnerong Road mean that there are only two main access routes for heavy vehicles accessing Port Botany, the first being through Foreshore Road and General Holmes Drive, and the second being through a combination of Beauchamp Road, Denison Street and Wentworth Avenue. The port operator has argued that both routes need to continue to be available for heavy vehicle users (NSW Ports 2019a, p. 37).

NSW Ports have continued to target a higher rail mode share. NSW Ports development plan for Port Botany outlines a goal of transporting 3 million TEU per year, or 40 per cent of forecast freight volumes, by rail by 2045 (NSW Ports 2019a, p. 15). Investment in terminal infrastructure has been underway to achieve this, including \$120 million over four years starting from 2019 to double rail capacity to 1.5 million TEU (NSW Ports 2019a, p. 40). This investment by the port is being made in conjunction with investment from Patrick, and the resulting on-dock infrastructure is anticipated to reduce train turnaround times (NSW Ports 2019b). These efficiencies will be likely to make rail more cost effective at the port. An even more substantial investment is being made in the Moorebank Intermodal Rail Terminal, which is expected to increase the use of rail by providing a facility to enable the movement of a large number of containers west from Port Botany (Deloitte 2017, p. 5). From here, they would be dispersed across Sydney to reach their final destinations. Duplications and upgrades to parts of the freight line servicing Moorebank and the port are also underway (Infrastructure Australia 2019b, p. 1), again with the expectation that this would further reduce the costs of using rail.

Port of Melbourne

The share of freight being moved by rail in Melbourne has been trending down over the past decade (Port of Melbourne, GHD, and Victorian Department of Transport 2021, p. 103). A big contributor to this is the port's location in the centre of Melbourne. As a result, freight services out of the port must pass through the busiest parts of the city's passenger rail network (Port of Melbourne 2020b, p. 12), within which there are limited slots for freight trains to pass through.

A Mode Shift Incentive Scheme currently operates at the port, with \$3.6 million in subsidies paid by the Victorian Government in 2021-22 to four freight operators for containers moved by rail (Department of Transport 2021a, p. 1). This is expected to shift 42 500 containers from road to rail transportation out of the port, equivalent to around 1 per cent of the Port of Melbourne's containerised freight task (BITRE 2021c, p. 14). The Scheme was first introduced in 2008-09 and has been reviewed over time, with incentive payments updated according to demand and targets chosen by the Victorian Government (Department of Treasury and Finance 2008, pp. 322, 326; Parliament of Victoria 2019, p. 2). Since the Scheme the program's inception, incentive payments and rail's mode share have both declined.

The 2006 port development plan released by the Port of Melbourne Corporation stated a policy objective of moving 30 per cent of containers to and from Port of Melbourne by rail by 2010 and beyond (Port of Melbourne 2006, p. 82). However, since the first year of BITRE's *Waterline* data series (1994), no more than 15 per cent of the port's TEU throughput has been moved by rail (BITRE 2021c, pp. 12–15).

In order to increase rail usage around the port, investment is being made into Melbourne's Port Rail Shuttle Network (Port of Melbourne 2020b, p. 13). The network aims to provide regular freight services (scheduled between passenger services) from the port to intermodal facilities at the eastern, northern and western outer metropolitan fringes. The shuttle network is planned to move 30 per cent of the Port of Melbourne's containers by 2050 (Department of Transport 2021b). Within this plan are \$125 million in improvements to on-dock rail, which is needed to break trains into smaller lengths in the Dynon precinct prior to entering the port (Department of Transport 2021b, p. 2). Other aspects of this wider plan include a \$3.1 billion commitment from the Australian Government for the Melbourne Intermodal Terminal package. This package facilitates the construction of new terminals to be built at Truganina and Beveridge along with other rail works which will facilitate easier freight flow (Prime Minister 2022).

Expanding the existing Webb Dock in two stages is a key feature of the port's strategy to add capacity to meet future import and export demand (Port of Melbourne 2020a, pp. 53, 57). Webb Dock currently has no rail link but the Port of Melbourne has commenced planning for the development of an unused rail corridor between Webb Dock and Bolte Bridge, and the construction of a rail bridge to the west of Bolte Bridge (Port of Melbourne 2020a, p. 61). Securing approval for a rail bridge that constrains use of the Yarra River could be challenging. But Webb Dock is forecast to handle an increasing share of trade through the Port of Melbourne, so increasing rail mode share without the bridge could also be a challenge.

Port Adelaide

All cargo moved by rail at Port Adelaide is export freight, with all imports moved by road (Flinders Port Holdings, sub. 55, p. 14). Urban encroachment stresses are smaller than in other capital cities given the geographic location of the port toward the mouth of the Port Adelaide River, with large amounts of industrial land surrounding the port. This means that both road and rail access are relatively unimpeded, with clear approaches to motorways and train lines that bypass the central business district and the most densely populated metropolitan areas. Furthermore, throughput levels — with regard to imported containers in particular — are substantially lower than the other four ports, further reducing congestion issues (BITRE 2021c, pp. 12–17).

Ease of access for road transport is a key reason why a higher rail mode share is not seen at the port. High productivity vehicles are used comparatively more frequently at Port Adelaide compared with other ports around Australia. In 2021, 59 per cent of terminal volume was carried by high productivity vehicles (Flinders Port Holdings, sub. 55, p. 8). Over the past five years, the South Australian Road network has been opened up to allow greater high productivity vehicle access (Primary Producers SA 2018, p. 6), and the subsequent high levels of uptake have been major contributors to the lack of growth in rail mode share out of the port (Flinders Port Holdings, sub. 55, p. 9).

Port of Fremantle

The Port of Fremantle has the highest rail mode share of any of the five largest container ports in Australia, with an average of 18.4 per cent across the 2020-21 financial year. Regular services run to the port every day, both to move import and export cargo and containers. Over the past ten years, volumes of freight moved by rail have nearly doubled (Fremantle Ports 2021, p. 42). A contributor to the relatively high use of rail in Fremantle has been the Fremantle Container Rail Subsidy program, introduced in 2006-07. Under this program, full

containers receive a subsidy per TEU moved by rail (Department of Transport 2018, p. 2). The Western Australian Department of Transport undertakes a quarterly audit of containers and subsidies paid, while over the longer term KPIs around mode share are set and monitored to examine the effectiveness of the Scheme. In 2017, the subsidy was increased from \$30 to \$50 per TEU (Minister for Transport, Planning and Ports 2017).

Planning is underway for container terminal operations to migrate to Kwinana, to the south of the current location. This new location would be further from current metropolitan areas, easing some of the congestion issues caused by urban encroachment in Fremantle (Westport Taskforce 2020, p. 5). A key objective of this planning is improve road and rail transport corridors to ensure a continuing high rail mode share (Westport Taskforce 2020, p. 138).

Road transport could become even more cost effective in the future

Both road and rail transport are likely to experience pressure and difficulties due to metropolitan population growth and congestion in the future. For road transport, this relates to increased road congestion as the freight task continues to grow and the possibility for increasing restrictions such as curfews and restricted access to some road routes. For rail transport, difficulties in accessing and passing through shared rail networks are likely to increase as greater numbers of passengers use those networks, and greater numbers of services are required to move those passengers.

Both rail and road freight services face curfews in certain locations. Given increasing urban encroachment on both ports and freight networks, there is the possibility that curfews will increasingly impinge on the ability for freight to be delivered. However during the initial COVID lockdown period, curfews around trucks carrying essential goods were lifted to deal with logistics chain disruptions (NHVR 2020, p. 1). In many cases, these curfew exemptions have been extended. The Australian Logistics Council (sub. 57, p. 8) have stated that surveying commissioned by them found that only 6 per cent of respondents were aware of the changes to curfews during the pandemic. While further evidence of community reaction to curfew removal is relatively limited at present, ongoing removals or reductions to truck curfews would have the effect of further improving road transport's ability to competes with rail.

Technological development in trucking also has the ability to further improve the productivity and cost effectiveness of heavy vehicles and reduce their environmental impacts. Improvements in automation and self-driving technology could reduce labour and maintenance costs and likely result in fewer accidents (Infrastructure Australia 2019a, p. 347). Greater development and use of electric or hydrogen fuel cell technology in heavy vehicles has the potential to greatly reduce pollution, emissions and noise pollution generated by road transport (Infrastructure Australia 2019a, p. 344).

Rail infrastructure is extremely costly and typically requires significant government expenditure. In most of the development plans released by port authorities, government investment in dedicated freight rail lines is required for ports to meet mode share targets. Ultimately, potential plans need to be assessed with thorough business case analysis. Accurately accounting for the wider external costs and benefits of developing new rail infrastructure is important when deciding if investment is worthwhile.

**Draft finding 7.2****Most container ports are planning substantial investments in rail infrastructure**

Container port operators in Brisbane, Sydney, Melbourne and Fremantle plan to increase the share of freight travelling to and from those ports by rail over the coming decades. Any further government investment in rail to service container ports needs to be accompanied by a clear cost–benefit analysis, including analysis of the relevant externalities and including alternative scenarios for the development of truck technology, over the full economic life of the project.

7.3 Empty container imbalance and storage

Australia imports more containerised goods than we export, and we import and export different types of goods. This creates an imbalance — exacerbated by the surge in demand for imported goods during the COVID-19 pandemic — and means that we export a large number of empty containers. Before they can be exported, empty containers need to be stored somewhere. This part of the maritime logistics system usually does not attract much attention, but the empty container supply chain and empty container parks (ECPs) in particular have been under considerable pressure over the past three years.

The empty container supply chain

Containers are not single use items; after they are shipped to Australia they have to make their way back out of the country (figure 7.5). A number of steps can be involved in this process (box 7.2).

Empty containers are Australia's single biggest containerised export and they need to be stored before being shipped

The profile of Australia's imports and exports means that empty container storage plays a more prominent role in our maritime logistics system than in other countries. At Australia's four largest container ports — the Port of Melbourne, Port Botany, the Port of Brisbane and the Port of Fremantle — the volume of imported full containers outweighs the volume of exported full containers (BITRE 2021c, pp. 12–15).

In 2020, over 47 per cent of the containers exported from Australia were empty, a small increase from 45 per cent exported in 2019 (table 7.1). This share was much higher in Sydney, with over 64 per cent of containers being exported empty in 2020, increasing from 61 percent in 2019 (BITRE 2021c, pp. 13, 15). This large number of empty containers means that storage facilities are important in enabling returns and distribution throughout the wider freight system. In Sydney and Melbourne, it is estimated that together ECPs can store roughly 155 000 TEUs (L.E.K. Consulting Australia Pty Ltd 2021, p. 23; NineSquared 2021, p. 47), equivalent to just under 3 per cent of combined container movement through the two ports.

Box 7.2 – Containers can reach customers and return to the port in different ways

Transport companies move containers in a variety of ways. These are usually agreed to between transport operators and shipping companies and cargo owners. The most common steps in the process are as follows.

- Full imported containers can be taken from port to either a transport operator's depot or warehouse or directly to the cargo owner's premises.
- Once a container is at the transport operator's depot or a warehouse, it is often stored overnight before being taken to the end customer, with this process referred to as staging. In an empty container supply chain review completed in 2021, NineSquared estimated that most containers (around 70–80 per cent), are 'staged' in this way (NineSquared 2021, p. 15).
- Once they have been emptied, containers need to be 'dehired' — that is, returned to the shipping line that owns/leases them. Provided this occurs within a specific period, usually 7 – 10 days after being available for pick up from the wharf (NineSquared and Neil Matthews Consulting 2020, p. 26; AI Group, sub. 60, p. 5), no charges are levied. If this 'free time' is exceeded detention fees accrue on a daily basis.
- Empty containers are mostly dehired through delivery to an empty container park specified by the relevant shipping line (NineSquared and Neil Matthews Consulting 2020, pp. 12, 25).
- In Melbourne, for example, NineSquared estimated that around three quarters of empty containers are returned to shipping terminals via an ECP (NineSquared 2021, p. 15).
- The alternative is for the empty containers to be delivered directly to the shipping terminal for export as an empty or to an exporter for refilling.
- At the five largest container ports, just over 280 000 TEUs (20-foot equivalent units) of empty containers were imported in 2020 and given that roughly 2.1 million TEUs of full containers were exported, this suggests that around 1.8 million TEUs were refilled by exporters in 2020. Conversely, 1.9 million TEUs worth of empty containers were exported in the same year (BITRE 2021, pp. 12–15).
- Given 4.1 million containers were imported in 2020, just over 7 per cent of all containers imported were empty (BITRE 2021, pp. 12–15).
- Once at an ECP, containers sit until they are transported via a stack run (trucks carrying multiple empty containers) to the port container terminal.

Table 7.1 – Just over half of the containers exported from Melbourne and Sydney in 2020 were empty

Container movement (TEUs, 2020)	Melbourne	Sydney	Total
Full import ('000)	1 397	1 277	2 674
Empty import ('000)	133	8	141
Full export ('000)	900	440	1 340
Empty export ('000)	570	797	1 367
Total TEUs exchange	2 999	2 523	5 522

Source: (BITRE 2021c, p. 15).

In addition to differing by volume, Australia's imports and exports differ by type. This imbalance compounds congestion issues further, as the redistribution effort requires a greater number of containers to be stored before they are allocated.

- The majority of Australia's imports are manufactured consumer goods. These goods are typically of relatively low density and are mostly shipped in 40-foot containers, which have increasingly become the container of choice for shipping lines. Over the last decade, 40 foot containers have gone from being less than 50 to over 60 per cent of the container throughput at Australia's main container ports (BITRE 2021, Time Series tables)
- Conversely, the majority of exports are either agricultural products or raw materials. These tend to be much heavier and need to be shipped in 20-foot containers because two 20-foot containers have a higher weight limit than a 40-foot container — due to both structural reasons and crane lift limits.

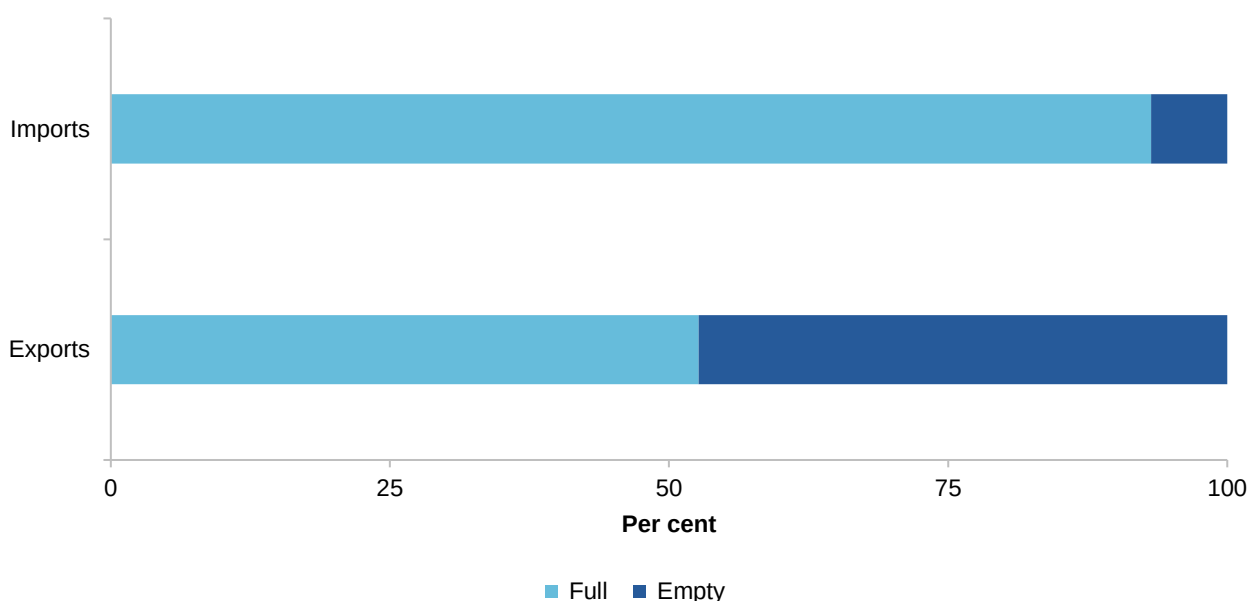
Australia's imports are increasingly being transported here in 40-foot containers (chapter 2), and a small number of inquiry participants have noted that accessing 20-foot containers (GrainGrowers, sub. 22, p. 3) and specialised containers for export has become more difficult and has limited trade in some instances (Australian Meat Industry Council, sub. 41, p. 7). This difficulty varies from port to port based on the profile of their import and export trade.

The falling share of 20-foot containers does not appear to be a widespread issue; moreover, it is not an issue that requires government intervention. Any government intervention to increase the availability or reduce the price of 20-foot containers for export would amount to a subsidy to the relevant exporting businesses. There are no clear nonmarket benefits that would justify such a subsidy.

If the availability of 20-foot containers is a challenge for exporters, it is open to them to find ways to source them. These could include, for example, acquiring their own containers (rather than relying on shipping company container pools), or the development of alternative packing and loading technology that to cap loose cargos inside 40-foot containers.

Figure 7.5 – Australia exports a lot of empty containers

Share of TEUs imported full or empty at Australia's top 5 container ports, 2020



Source: BITRE (2021c).

A greater amount of empty container storage in Melbourne and Sydney is needed when compared with other ports around Australia. This is due to large volumes of import containers passing through these ports, which exceed demand for exports to a greater degree than elsewhere. In 2021, it was estimated that total empty

storage capacity in Sydney was around 55 000 TEUs, with an additional 5000 to 10 000 TEUs stored in the yards of transport operators (L.E.K. Consulting Australia Pty Ltd 2021, p. 23). Total ECP capacity in Melbourne is estimated to be much greater, about 97 000 TEUs (NineSquared 2021, pp. 47, 48).

The ownership and location of ECPs varies between Melbourne and Sydney. In Sydney – as with the other container terminals around Australia — the majority of ECP storage is at the port. In contrast, ECP storage in Melbourne is dispersed throughout nearby suburbs, with some limited storage at the port itself. Some shipping lines either own or have exclusive arrangements with ECPs in Melbourne (NineSquared 2021, p. 29), which is not the case in Sydney. In Melbourne, Maersk/Hamburg-Sud have an exclusive arrangement with the Westlink Container Park, while CMA CGM ANL, MSC (through logistics arm MEDLOG) and COSCO (through Oceania Container Services) own and operate ECPs, and often have a preference that their empty containers are returned to their own ECPs (NineSquared 2021, p. 12). Shipping line ownership of ECPs is not yet widespread in Australia, but these cases and MSC's move (through subsidiary MEDLOG) to open an ECP at the Port of Brisbane (Container News 2022a) reflect the ability of shipping lines to integrate within the maritime logistics chain through ECP ownership.

Empty container storage capacity in Melbourne and Sydney has historically been sufficient to manage the peaks and troughs in container movement. In early 2020, consultation for a review of Victoria's empty container supply chain found that stakeholders 'did not observe the need for additional ECP capacity to cater for fluctuations in demand' (NineSquared 2021, p. 27). In New South Wales, a recent review found that '[h]istorically, the latent capacity of 30-35% has provided sufficient operating and peaking capacity to absorb variances in import and export demand', but a lack of investment since 2015 has meant that by the peak periods around 2018, Sydney had insufficient storage capacity for empty containers (NineSquared and Neil Matthews Consulting 2020, p. 38).

Pressures associated with the COVID-19 pandemic pushed empty container storage facilities to their limits

The empty container supply chain was pushed to its limits during late 2020 and early 2021. The COVID-19 pandemic led to significant congestion in the maritime logistics system. As consumption patterns and demand shifted from services to manufactured goods, the volume of containerised imports both into Australia and globally increased substantially (chapter 1). As Ports Australia (sub. 45, p. 2) note: '[f]reight congestion existed prior to the pandemic, however this issue has been significantly exacerbated during COVID-19 due to increased global demand for shipping, port closures from outbreaks, and more local port matters such as industrial relations disruptions'.

As the pandemic continued, congestion flowed through to the empty container logistics chain. An increase in import volumes resulted in an increase in the number of empty containers accumulating in Australia (NineSquared 2021, p. 25). At the same time, increasing demand for port berths and increasingly tight timeframes, meant more and more ships were leaving Australia before they could be loaded with empty containers, leading to an even greater excess of empty containers (ACCC 2021, p. 13; Shipping Australia, sub. 11, p. 59). Normally, these excess empty containers might be collected by 'sweeper' vessels but the reduced availability of ships and berth slots made operation of sweeper services more difficult, and consequently few were chartered (Whelan 2021, p. 1). Given these factors, the numbers of empty containers stored at ECPs surged, with many parks in Sydney and Melbourne coming close to or hitting full capacity.

Container storage congestion increased the difficulty of accepting and returning containers

Inquiry participants highlighted the negative and cascading effects of full ECPs (Freight and Trade Alliance, sub. 31, p. 8; International Forwarders and Customs Brokers Association of Australia, sub. 34, p. 8). Several key issues were raised that directly impacted transport operators.

As congestion at ECPs rose, getting containers into the ECP facilities on time became increasingly difficult. In their submission to this inquiry, the Container Transport Alliance Australia (sub. 50, p. 11) commented:

During Peak Season in late 2020, and again in 2021, numerous examples can be provided where transport operators (on behalf of their importer / forwarder clients) have been unable to secure empty container return timeslots at nominated return facilities within a reasonable period before container detention fees are incurred.

In some cases, detention fees were charged when containers were unable to be returned because ECPs were full, or when containers had to be redirected to facilities other than the one originally nominated (NineSquared 2021, p. 29; Freight and Trade Alliance, sub. 31, p. 18; Container Transport Alliance Australia, sub. 50, p. 8). Detention fees are fees charged by shipping lines for the late return of containers to the specified port terminal or container park. The International Forwarders and Customs Brokers Association of Australia (IFCBAA) stated that 'exposed instances of shipping lines intransigence to extending container detention free periods, when containers cannot be accepted by an ECP due to capacity constraints' (sub. 34, p. 11). In response, they stated 'IFCBAA refutes any shipping line that seeks to take advantage of a crisis situation not of the importer/exporter/agent's making and are forced to pay additional fees and charges, such as port congestion surcharges, container detention, container holding costs and redirections'.

The Container Transport Alliance Australia (CTAA) also expressed similar concerns. They stated that:

[a] major and growing concern of Australian importers, freight forwarders and their transport providers is the imposition of container detention fees by shipping lines despite there being no physical opportunity to de-hire (return) an empty container in the timeframe imposed ...

During Peak Season in late 2020, and again in 2021, numerous examples can be provided where transport operators (on behalf of their importer / forwarder clients) have been unable to secure empty container return timeslots at nominated return facilities within a reasonable period before container detention fees are incurred (sub. 50, p. 11).

Congestion and related redirections made it difficult for the planning of transport operations, such as ensuring that trucks and drivers were available in the required timeframe and even having to store containers at their own premises. The Freight and Trade Alliance (FTA) and Australian Peak Shippers Association (APSA) in their joint submission to the inquiry noted that '[t]he congestion at empty container parks forced transport operators to store containers at their own premises and complete multiple lifts to access containers within stacks with no recompense from foreign owned shipping lines (sub. 31, p. 18). Given that transport operators typically bear the costs of redirection when ECPs are congested or full, the FTA and APSA noted 'Again, without any level of compensation provided by shipping lines, the issue reached a crisis point where Australian transport operators applied an industrywide broad surcharge to recover costs of related inefficiencies (futile truck trips, more truck kms travelled, extra handling costs, etc.)' (sub. 31, p. 18).

Commenting on these issues, Shipping Australia (sub. 11, p. 62) noted that:

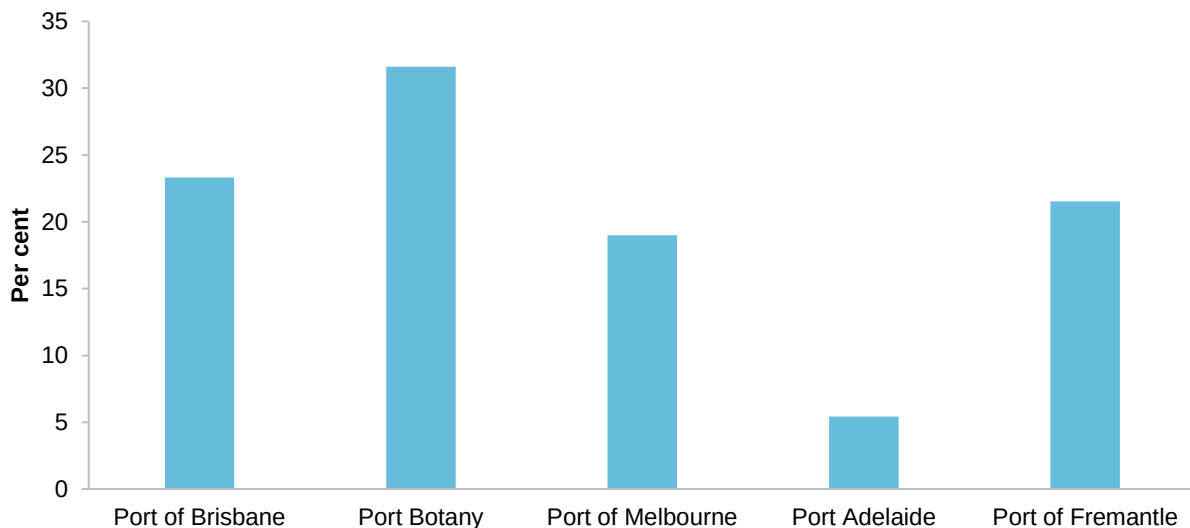
Container free time can be an issue in helping an empty box backlog to form. Ocean shipping containers normally (but not always) belong to ocean shipping companies. Shipping lines grant

shippers and consignees a certain amount of free time (time without charge) to take possession of the shipping containers for the purpose of unloading. Free time helps to reduce the incentive to return of [sic] empty boxes and can contribute to a build-up of empty container volumes in Australia.

Measures have been taken at Port Botany to ease ECP congestion

Port Botany exports more empty containers than any other Australian port (figure 7.6). Sydney also has less total empty container storage capacity compared with Melbourne. As a result, greater pressure has been placed on the empty container logistics chain in Sydney when compared with other cities in Australia. Congestion in Sydney's ECPs was particularly pronounced and led to the establishment of the Empty Container Working Group (ECWG) in July 2020, operating with oversight from Transport for NSW, to help industry coordinate voluntary solutions to ECP issues.

Figure 7.6 – Empty containers are a large share of throughput at Port Botany
Number of empty TEUs exported as a share of total TEU throughput, 2020



Source: (BITRE 2021c).

A key initiative developed by the ECWG and implemented by the NSW Government was an easing on restrictions of storage heights for ECPs. In selected parks, operators have had height limits increased to allow for stacking up to seven containers high, with previous limits often set at 4 to 6 containers (FTA 2021). This was part of changes enacted in the State Environmental Planning Policy (Three Ports) Further Amendment (Shipping Containers) 2021, whereby planning regulations stipulate maximum allowable heights due to both safety risks and amenity concerns. This measure was estimated to have added an additional 3000 containers worth of storage, adding up to 10 per cent¹⁰ to previous capacity (NineSquared and Neil Matthews Consulting 2020, p. 39).

The Empty Container Incentive Scheme, introduced by Ports NSW in July 2021, was another policy introduced to tackle the empty container build up. The scheme aims to encourage shipping lines to more closely balance the share of import and export containers on each ship calling at Port Botany. This has been implemented through increases and decreases in wharfage rates applied per TEU of exports (table 7.2).

¹⁰ Estimates of total ECP capacity range around 60 000 TEUs. Given that empty import containers tend to be 40 ft (or two TEUs), this would suggest that capacity was increased by up to 6000 TEUs.

Under the scheme, wharfage charges are higher if shipping lines have lower load/discharge ratios (or L/D ratios — the total number of TEUs loaded divided by the number of TEUs unloaded). Shipping lines receive a rebate on their wharfage charges if their L/D ratios are higher than set thresholds. For example, in July 2021, a L/D of between 0.98 and 0.989 would receive the standard wharfage charge without any additional incentive or fee.

Table 7.2 – Wharfage rates incorporate a rebate or penalty depending on the L/D target^a

Load / Discharge Ratio Range	Change to \$17.38 base rate	\$/TEU (ex GST) applicable
0 - 0.899	100%	\$34.76
0.90 - 0.949	50%	\$26.07
0.95 - 0.979	25%	\$21.73
0.98 - 0.989	0%	\$17.38
0.99 - 0.999	-20%	\$13.90
1.0 +	-40%	\$10.43

a. Rates as at 1 July 2021. The charges are reviewed and change based on movement in the L/D ratio over time.

Source: (NSW Ports 2021b, p. 2).

While the scheme appears to have moved average L/D ratios closer toward a balance (NSW Ports 2022, p. 2.), there is the potential it could cause adverse effects over the longer term. Shipping Australia (sub. 11, p. 64) outlined a potentially significant issue: containers come in a variety of different types, and once some types of containers are empty they should not be returned to port. This has the potential of placing some freight customers at an inherent disadvantage with no real congestion reducing benefit. For example, Shipping Australia (sub. 11, p. 64) observed that '[s]ome shipping lines carry large volumes of one-way full export containers, and tank-tainers, and these may be shipper owned containers'. This concern could stretch wider, as the lack of distinction between empty container types within the incentive structure could create difficulties for those who wish to access containers beyond the standard 40-foot containers many imports arrive in. In a rush to improve L/D ratios, there exists the potential for relatively scarce food grade 20 foot containers to be exported without any goods in them. As of yet, there has not been widespread evidence of any of these issues impacting the wider supply chain, but the scheme does have the potential to cause unintended consequences.

NSW Ports should consider the longer-term intentions of the scheme. It is expected that decreased congestion and improved berth availability would naturally result in improved L/D ratios as pandemic induced pressures subside. Whether more ships are able to achieve a relatively balanced L/D ratio of 1 remains to be seen, but in this scenario the incentive scheme may result in limited changes to wharfage charges for many ships.

Increased ship and berth availability in the future should ease congestion

While the pandemic has resulted in significant pressure on ECPs and the transport operators that interact with them, some of the factors that have created this situation will likely recede in time. Most importantly, some of the main pressures on berth access are likely to lift as disruptions ease, making loading empty containers onto regular services and chartering sweeper vessel services both more feasible. Reduced traffic and greater availability of ships has already meant that sweeper vessels were able to be scheduled in 2021 (NSW Ports 2021a). Shipping Australia (sub. 11, p. 64) have noted '[i]n the short term, the problem of empty

containers largely goes away. In 2020 and in part of 2021, there was a severe empty container management problem, but it later dissipated’.

However, pressure in ECPs continues, and detention fees continue to be charged in instances where empty containers can not be returned. As discussed in chapter 6, the Commission is concerned about these fees. Detention fees exist to incentivise the timely return of empty containers but charging fees in circumstances when containers can not be returned because container parks are full does not fulfil this purpose. The Commission considers that shipping contracts should not be exempt from the unfair terms provisions in Australian Consumer Law and is seeking feedback on related issues that could arise in relation to international treaty arrangements.

7.4 Planning and coordination

Urban encroachment and the availability of industrial land

Urban encroachment is front of mind for a number of inquiry participants

The impact of urban encroachment on ports and port related industrial land is a concern for a number of inquiry participants.¹¹ As a result, and in line with the inquiry’s terms of reference, this section reviews the impacts of urban encroachment on ports and connections with ports. Stakeholder concern usually takes one of two forms. First, that the system’s efficiency will be hampered by regulatory constraints on the availability of port or industrial land or how that land can be used. Second, that the efficiency of transport networks will be degraded by congestion associated with residential development or regulatory constraints on truck access. These concerns can be motivated either by increases in industrial activity or residential development, or through changes in community preferences (for example, if residents come to expect a higher level of amenity).

Inquiry participants’ concerns about the impact of urban encroachment are not without historical foundation. In Sydney, urban encroachment contributed to the shift of the maritime logistics system away from Sydney Harbour. In 1974, when the Maritime Services Board called for applications for terminal operators to locate at Port Botany, ANL took up the opportunity, partly motivated by ‘progressively more vocal and well-organised resident opposition to the environmental and safety problems being created by the invasion of residential areas by increasing numbers of container-carrying trucks moving to and from’ its Sydney Harbour terminals (BTE 1985, p. 5). Sydney Harbour was home to commercial port operations for decades after Port Botany became operational in 1980, but by 2002, ‘general and container stevedoring at White Bay [in Sydney Harbour] had become a marginal activity in all respects’ due to several factors, including ‘the large increase in residential encroachment adjacent to the site’ (P&O Ports 2004, pp. 2–3). The terminal operator stated that:

The proximity of this greater number of residents has meant that our operations within the terminal have had to be modified at substantial financial and operational cost due to constant and ever increasing complaints from residents. External transport services supporting the terminal have been similarly affected. For instance, residents’ complaints regarding noise were a significant contributing factor in the decision to suspend overnight rail operations despite this being the optimum time to access the metropolitan rail system. (P&O Ports 2004, p. 3)

¹¹ Examples of concerns are raised in the following submissions to this enquiry: BCA, sub. 56, p. 4; NSW Government, sub. 58, p. 16; Ports Australia, sub. 45, p. 9; Port of Melbourne, sub. 65, p. 9; Road Freight NSW and Australian Trucking Association, sub. 52, p. 3; VFF, sub. 32, pp. 6-7

With the exception of the Port of Brisbane, urban encroachment is a pressing or looming concern at all of Australia's main container ports (DIRDC 2018a, p. 38).

- Having been relocated away from the city 40 years ago, the Port of Brisbane is not likely to face any limits on its operations due to urban encroachment in the foreseeable future. Brisbane's first container terminal was built in 1969 near the suburb of Hamilton, which now has among the highest median residential property prices in Brisbane (Lutton 2021). Five years later, in 1974, the *Port of Brisbane Strategic Plan* identified Fisherman Island at the mouth of the Brisbane River as the site for a new container port, and the container terminal at the new port was opened in 1980 (Dean and Gregory 2020, pp. 30–32). The Fisherman Island location 'provides the port with the strategic advantage of separating and buffering [Brisbane Core Port Land] from residential and other urban land uses' (PBPL 2019, p. 11).
- Urban encroachment appears to be of greatest concern at Port Botany. The Greater Sydney Commission is reviewing the industrial lands policy under the Greater Sydney Regional Plan and stakeholder engagement for the review revealed 'concern about the ongoing erosion of industrial land and its impacts on port, freight and logistics operations' (Cred Consulting 2021, p. 36). One of the port operator's five objectives in its 30 year master plan is to '[p]rotect the ports and intermodal terminals from urban encroachment' (2015, p. 30).
- The Port of Melbourne is concerned that '[c]hanging social and environmental expectations of neighbouring communities [have] the potential to affect port operations and future development plans' (Port of Melbourne Operations Pty Ltd, sub. 65, p. 9). The port operator and other stakeholders (for example VFF, sub. 32, p. 6) have specific concerns about the potential impacts of the Fishermans Bend project, notwithstanding strategies to protect port activities outlined in the *Fishermans Bend Framework* (DELWP 2018, p. 47).
- Urban encroachment is not yet a pressing issue at Port Adelaide, but the port operator and other stakeholders have concerns given the history of urban encroachment in the eastern states, particularly New South Wales. Flinders Port Holdings (sub. 55, p. 14) submitted that their most serious concerns come from road re-routings associated with the nearby Osborn Naval Shipbuilding Precinct, causing traffic delays of up to 30 minutes. The Port Adelaide masterplan recognises that 'various competitive encroachments [in the vicinity of the Adelaide Inner Harbour] are likely to result in increased demand for the land for non-port related uses out to 2070' (FPH 2022, p. 44), contributing to the port operator prioritising development of the Outer Harbor to accommodate future freight demand.
- The resumption of port land for tourism purposes and road extensions at the Port of Fremantle have fuelled concerns about urban encroachment. There have also been moves to build a movie studio on land currently used to store imported vehicles (CEVA Logistics, sub. 10, pp. 17–20). Urban encroachment is a factor in plans to build a new port in Perth (Westport Taskforce 2020, p. 15).

Urban encroachment is not an issue that is unique to the maritime logistics sector (box 7.3).

The availability of industrial land around Port Botany has been raised by a number of study participants

Lack of industrial land close to ports has been identified as a problem by some inquiry participants because of the potential impact on freight and logistics costs if businesses choose to locate further afield (NSW Ports, sub. 66, p. 16; Road Freight NSW and the Australian Trucking Association, sub. 52, p. 5). Cargo destined for facilities further from ports will cover longer distances and businesses in these locations face greater transport costs. These costs create a greater willingness to pay for land near ports. This was noted by the BCA (sub. 56, p. 4), who have suggested that 'there is typically a price premium on industrial land adjacent to ports' relative to industrial land in other locations'.

Box 7.3 – Urban encroachment is an issue for the agriculture sector too

The Commission has previously observed that ‘While agricultural land use can affect the amenity of nearby residential areas, urban encroachment can also negatively impact farm businesses’ (2016b, p. 91). The same point holds with respect to the port and industrial land used in the maritime logistics system.

A number of the *Regulation of Agriculture* inquiry participants expressed support for ‘right to farm’ laws, which have been applied in the form of nuisance shield laws in Australia. These laws shield farmers from nuisance complaints relating to the continuance of their existing activities. The Commission recommended against the use of nuisance shield laws because they function ‘to preclude a legal remedy, rather than address the source of the conflict’ (PC 2016b, p. 95).

The Commission identified a range of planning tools that could be used to address the source of land use conflict affecting the agriculture sector, including:

- the development of clearly defined, forward looking land use plans that are tailored to different regions, which may help to manage rural fragmentation, avoid land use conflicts and mitigate the need for regulation (Griffith 2015; QFF 2015b)
- programs to educate prospective purchasers of rural living allotments about the realities of farming practices so as to avoid nuisance complaints at a later date (PIRSA 2013)
- buffers between different land uses, in the form of separation distances or physical barriers (PC 2016b, p. 96).

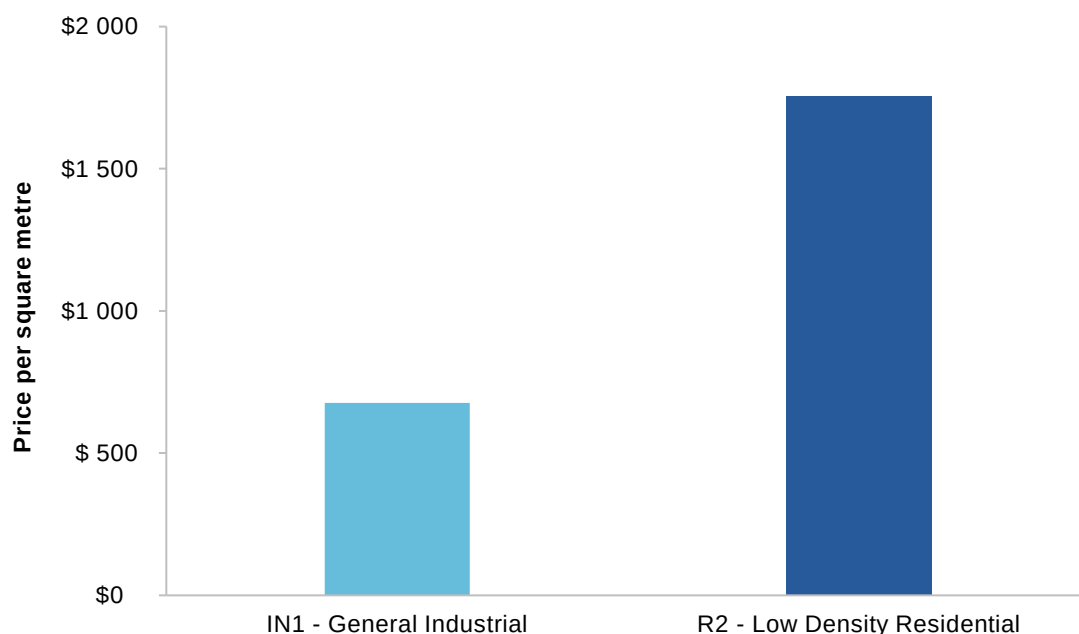
The same sort of tools are relevant to the land use issues arising in the maritime logistics system.

In the suburbs around Port Botany — Mascot, Botany, Wolli Creek and Alexandria — the share of land zoned for residential rather than industrial use has expanded. A study by L.E.K Consulting in 2021 found that across almost 2100 hectares of land around Mascot and Botany, the share of residential land had increased from around 22 per cent to 35 per cent over the last 50 years (L.E.K. Consulting Australia Pty Ltd 2021, p. 13). NSW Ports submitted that industrial ‘and urban services lands’ account for 8 per cent of land across Greater Sydney and only 4 per cent of land in eastern Sydney (sub. 66, p. 16). The NSW Government (sub. 58, p. 16) commented that ‘there is a lack of well-located and sufficient industrial land in Sydney which creates a number of challenges, including availability, cost and location’.

This growth in the share of land being zoned for residential use reflects the higher relative value of residential land use. In the case of land around Port Botany, an industrially zoned block used to service the port was valued at \$676 per square metre in 2021, while a neighbouring residentially zoned block was valued at \$1756 (figure 7.7). The stark differences in land values between similarly located but differently zoned properties suggest that the lower-valued land is not being used in a way that maximises community wellbeing. In this case, the difference in land values near Port Botany suggests that some land currently used to service the port could be better used for housing, even low-density housing.

Figure 7.7 – Land values do not indicate that industrial land is especially scarce around Port Botany, but that residential land is

Unimproved value of industrial land servicing Port Botany and neighbouring residential land, 2021^a



a. The figures are for specific properties in the Bayside local government area (which includes Port Botany).

Source: NSW Valuer General (2022).

Not everyone interprets these differences in land values in the same way. Road Freight NSW and the Australian Trucking Association (sub. 52, p. 3) cite work by SGS Economics & Planning which argues against land transitioning to its highest and best use (Gill, Hendrick and Orris 2021). They argue that letting land values guide the use of land to its highest best use 'fails to capture the full value that industrial and urban service businesses contribute to the economy' at least in part because 'it assumes that the concept of economic value is based exclusively on land value' (Gill, Hendrick and Orris 2021). However, the argument that land should be used in its highest and best use assumes that land values are based on economic value, being the costs and benefits accruing to users of that land.

A more convincing reason not to rely on differences in land values — for similarly located but differently zoned land — as a signal that land use is not maximising community wellbeing is the existence of nonmarket benefits. As inquiry participants have pointed out, moving freight activities further away from ports can increase road use, adding to congestion costs and vehicle emissions (NSW Ports, sub. 66, p. 16; Road Freight NSW and the Australian Trucking Association, sub. 52, p. 5).

The planning system has to balance multiple objectives

The planning system has to manage tensions between competing land uses while facilitating the allocation of land to its highest value use, once non-market costs and benefits are accounted for.

A number of inquiry participants have proposed measures to deal with urban encroachment and the availability of industrial land that privilege the maritime logistics system. The Port of Melbourne (sub. 65, p. 12) suggested that encroachment issues be addressed by ensuring 'that the onus or burden of compliance should rest solely with the agent of change'. To protect ports and related businesses from

encroachment from other uses, the ALC (sub. 57, p. 7) called for the creation of a distinct planning category for 'freight and logistics lands'. Similarly, the *National Urban Freight Planning Principles* recommend actions that would '[d]esignate and zone land to allow for the expansion of existing freight operations around ports ... to provide greater capacity for the future' (DITRDC 2021c, p. 16).

These proposals would help ensure the continued operation of the maritime logistics system but in doing so would erect new barriers to land moving to its highest valued use over time, risking leaving the community worse off. Improvements to the zoning system and the use of buffers are an alternative way of addressing inquiry participants' concerns.

The availability of land for different uses was discussed in the context of flexibility of land use in the Commission's 2021 *Plan to identify planning and zoning reforms*. The Commission supported the use of fewer land use zones that would each have broadly stated allowable uses (PC 2021a, p. 11). A system like this can create concerns about conflicts between different land users, but these may be overstated. The Commission's case study on changes to Victoria's commercial zoning arrangements found that:

... the merging of the previous five business zones into two standardised commercial zones in 2013 ... increased the availability of suitable sites and reduced set-up costs for small-scale supermarkets and large format retailers. ... The significant negative impacts predicted to result from the reforms do not appear to have come about. (2020c, p. 13)

Similarly, the New South Wales Productivity Commission (2021, p. 297) have argued that:

Rationalising the standard business and industrial zones and broadening permissible uses within each zone will better accommodate the changing needs of businesses and households. Reform need not erode barriers between incompatible commercial and industrial activities.

Overall, stakeholders supported greater flexibility in employment zones. Many agreed existing business and industrial zones could be consolidated where the range of permissible uses were similar, provided genuinely incompatible land uses were separated or their impacts mitigated.

Buffers are an important tool for mitigating the impact of genuinely incompatible uses. These can be obstructions (such as walls or vegetation) or different types of lower impact land use to limit exposure to these impacts. In particular, the New South Wales Productivity Commission highlights that industrial land around logistics hubs like Port Botany can 'act as a buffer against land uses likely to conflict with heavy industrial and waterfront activities, especially residential' (2021, p. 303). Buffers can be applied to freight corridors as well as port sites (Infrastructure Australia 2017, p. 30).

Most ports have varying types of buffers in place, including industrially zoned land adjacent to the port as a buffer between the port and residential users. This is the case at the Port of Melbourne (Port of Melbourne 2020a, p. 43) and Port Botany (L.E.K. Consulting Australia Pty Ltd 2021, p. 13). At the Port of Melbourne, retaining buffers forms part of the port's long term development strategy.

PoM will continue to invest in and advocate for strong buffers as the Port is expecting to stay in its current location for 50 years. Strong buffers are required to reduce land use conflicts and provide planning certainty to both the Port and our neighbours. PoM has invested in improving the buffers on Port land which includes landscaped areas, public open space, cycling trails and shared user paths. (Port of Melbourne 2020a, p. 43)

Industrial land reduces the noise and visual impact that ports have on residents living nearby, given that ports operate 24 hours a day, 365 days a year. However, at times industrial land itself needs a buffer from nearby residential land due to noise impacts. Different industrial zones allow different industrial activities based on the profile of their impacts, such as noise, odour and light. Examples of existing higher impact

industrial land uses within Fishermans Bend include cement depots and plasterboard manufacturing (DELWP 2016, p. 8). As a result, within the Wirraway district — located at the edge of the Fishermans Bend precinct and neighbouring residential areas — land use has been restricted to allow only smaller industrial facilities and warehouses and commercial uses such as retail and offices to provide a buffer between some industrial zones and residential areas (DELWP 2016, p. 28).



Draft finding 7.3

Planning systems should allocate land around ports to highest value uses

Urban encroachment is an issue at all of Australia's major container ports except Brisbane. Industrial land around some ports is gradually being redeveloped for higher value commercial and residential uses and this can create conflict with some port users. Planning decisions should support the use of land in its highest value.

Coordination between governments and long-term planning

By 2050 the containerised freight task is forecast to more than triple at the Port of Brisbane, increase by just under three times at the Port of Melbourne and increase by two and a half times at Port Botany (KPMG 2019, p. 5; Port of Melbourne Operations Pty Ltd 2020, p. 23; Port of Brisbane, sub. 6, p. 4). Accommodating that expected growth will be impossible, or at least difficult and more costly, if governments do not engage in long-term planning. As owners and operators of infrastructure, and as regulators of where, when and how businesses operate, governments, at every level, wield enormous influence over the long-term growth and efficiency of the maritime logistics system.

Coordination between different levels of government is essential for an efficient maritime logistics system

Ports, and the maritime logistics systems they are part of, are often spread across multiple local government areas with their own distinctive planning controls and decision makers and are also subject to state government planning controls and decision making. And while ports plan and invest in infrastructure to move goods between ports and the landside logistics system, they do not control what happens beyond the port gate. Beyond the port gate, governments have primary responsibility for planning and investing in infrastructure. The dispersed but integrated nature of the maritime logistics system means that changes in one part of the system can have reverberations throughout the system.

Governments can work with or against one another in this environment so '[t]he success of freight systems in Australia depend largely on cooperation between all levels of government for implementation' (Port of Melbourne, sub. 65, p. 11). Governments can also work with or against the businesses operating in the maritime logistics system. The Port of Brisbane has \$500 million of investment planned for the five years from 2019-20 and a master plan that looks three decades into the future (PBPL 2019, 2022). But the port operator's infrastructure investments 'will be of limited value if the port's future capacity is under-utilised because of Government's inability or unwillingness to provide adequate road and rail infrastructure beyond the immediate environs of the port. ie; beyond the port gate' (Port of Brisbane, sub. 6, p. 4).

State governments play a leading role in the planning and regulation that affects the maritime logistics system. Around Australia, state governments design planning schemes, and local governments' role is to implement those schemes (Parliament of Victoria 2013, pp. 71–74; PC 2021a, p. 6). These planning schemes outline the different types of land use controls, such as zones or buffers, which can be used by local government.

As a result, ‘planning and goal alignment [between] State and Local Government is critical for long term productive service levels in and around port precincts’ (Flinders Port Holdings Group, sub. 55, p. 11). This alignment does not always occur. It is possible that local governments, when making decisions in their and their constituents’ interest, do things that are not in the interests of the wider community.

There are some measures in place to ensure an alignment between higher-level objectives and local governments. In New South Wales, for example, local governments prepare Development Control Plans to address specific technical requirements of developments. Those Plans must, in theory, be consistent with their Local Environment Plans and Local Strategic Planning Statements, both of which must be endorsed by the state government, and those documents may not be endorsed if they are inconsistent with Regional Plans and District Plans (figure 7.8). These arrangements aim to align state and local planning but local planning instruments can still deviate from state planning instruments and the New South Wales Productivity Commission and Property Council of Australia have highlighted some concerns with implementation (NSWPC 2020; PCA 2019 cited in PC, 2021, p. 9). In Victoria, the Port of Melbourne advocates for stronger State Government control over planning (sub. 65, p. 9).

The Commission has previously found that ‘[a]lthough most states have introduced or announced measures to align local and state planning ... there may be room for further improvements’, and ‘there often appears to be few consequences for Local Governments that do not ultimately seek to implement State-level policies’ (2021a, p. 8). The Commission (2021a, p. 9) suggested that:

... States could examine mechanisms — including penalties or rewards — to provide stronger incentives for local governments to adequately reflect state development objectives, such as those in housing supply policies, in local plans.

There are long-term plans for port infrastructure in each state and little evidence to suggest these plans are inadequate

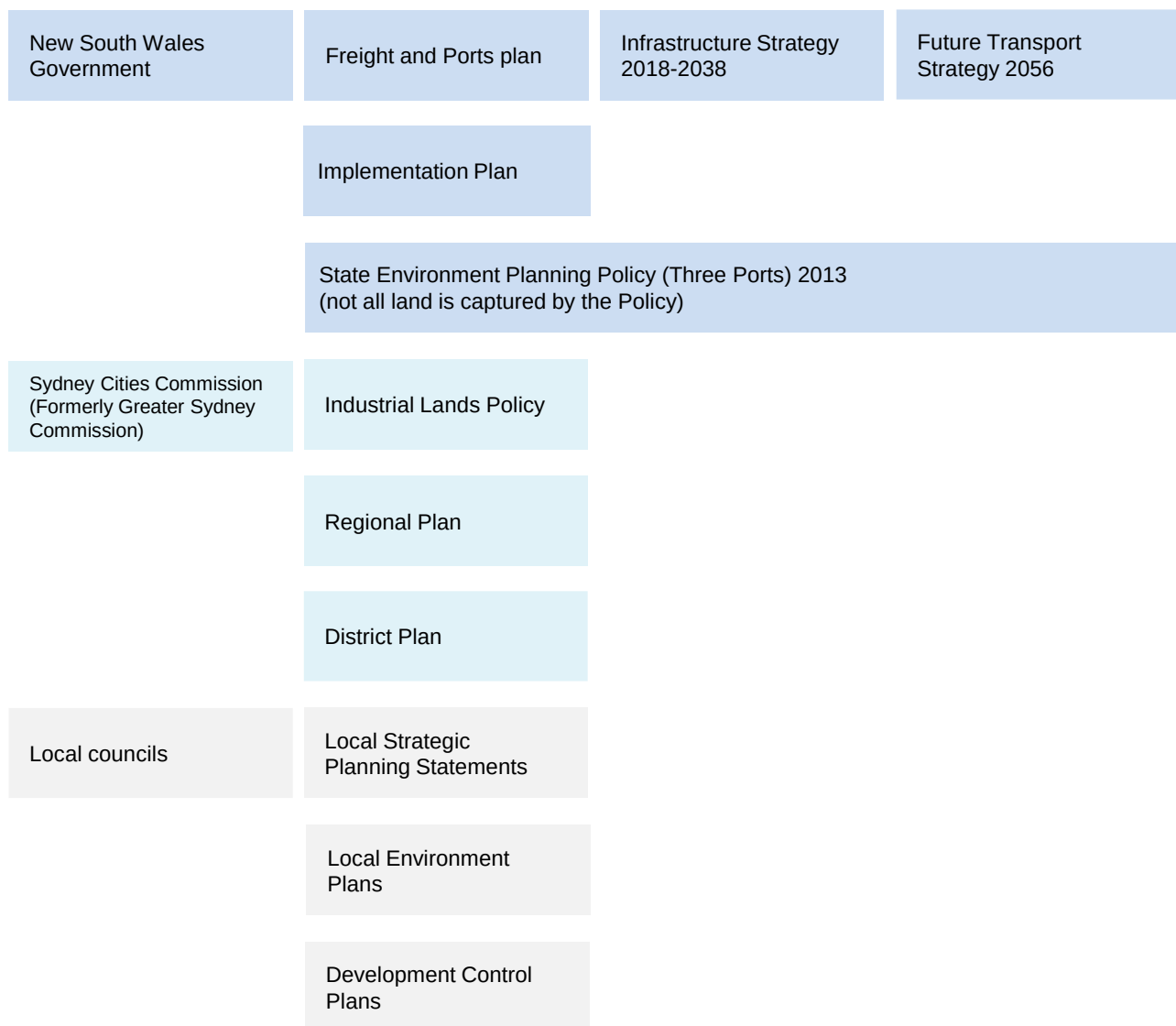
Given their overarching control of the planning system, state governments individually release long-term strategic plans to ensure that significant infrastructure projects are prioritised ahead of time. These planning decisions need to be considered over long time frames given the complexity of landside access infrastructure at ports. For example, it may be necessary to preserve freight corridors decades in advance, and economic and environmental assessments of different project options should be completed before investment decisions can be made.

Some long-term strategic plans relevant to ports focus on infrastructure or freight broadly, and outline investment and planning needs — such as restrictions on certain types of land use in areas near potential projects — across the state. Following on from the recommendations in these infrastructure, freight or transport plans, in depth reports and reviews can also then be released around specific projects related to ports. In these types of plans, different project options and supporting road and rail corridors that meet earlier recommendations can be examined and decided upon before final business and investment cases are prepared. Examples include different options for new rail or road links, or the development of completely new port facilities and precincts. Recent port-related plans released by state governments include:

- Queensland: *Draft State Infrastructure Strategy* (TMR 2021, p. 47) and *Queensland Freight Strategy Action Plan 2020–2022* (TMR 2020, p. 19)
- NSW: *NSW Freight and Ports Plan 2018–2023* (TfNSW 2018b, pp. 54–55)
- Victoria: *Victorian Freight Plan: Delivering the Goods* (DEDJTR 2018, pp. 30–31, 38–39, 42–43, 46–48), *Infrastructure Victoria Second Container Port Advice* (Infrastructure Victoria 2017, pp. 67–180), *Navigating our Port Futures: The Victorian Commercial Ports Strategy* (Department of Transport 2022a)

- South Australia: *The Integrated Transport and Land Use Plan* (DIT 2013, pp. 103–104), *The 30-Year Plan for Greater Adelaide 2017 Update* (Department of Planning, Transport and Infrastructure 2017, p. 78), *20-Year State Infrastructure Strategy* (Infrastructure South Australia 2020, p. 138).
- Western Australia: *State Infrastructure Strategy: Draft for public comment* (Infrastructure Western Australia 2021, pp. 196–197), and the Westport Taskforce Stage 1 and Stage 2 reports.

Figure 7.8 – Planning instruments and strategies shaping the Port Botany maritime logistics system



Sources: (INSW 2018; TfNSW 2018a, 2018b).

Plans and strategies are only as good as their implementation, but the Commission is not aware that this is a problem for Australia's major container ports. Victoria and Western Australia are the jurisdictions where port planning and development is most active in Australia.

Plans for a new port in Victoria are progressing but are still at an early stage

In 2016, the Special Minister of State asked Infrastructure Victoria to independently review and recommend how to best meet future maritime freight demand (Infrastructure Victoria 2017, p. 4). Economic analysis found that expanding the current Port of Melbourne precinct was the lowest cost option to provide additional

capacity up to 8 million TEU per year (Infrastructure Victoria 2017, p. 97). This is a substantial increase on current maximum capacity, which was estimated by Infrastructure Victoria at around 5 million (Infrastructure Victoria 2017, p. 78).

Infrastructure Victoria forecast that total Victorian container demand could reach 8 million TEU per year by 2055, at which point a second container port would be needed (2017, p. 99). Infrastructure Victoria has argued that the development of a second container port at Bay West operating alongside the Port of Melbourne would be the most cost effective way to accommodate growth beyond 2055 (Infrastructure Victoria 2017, p. 100).

It was estimated that developing the new port would require 15 years of planning, approvals and construction, so these processes should begin around 2040 (Infrastructure Victoria 2017, p. 172). However, land use and zoning changes to support the development of Bay West should be made 'as soon as possible' (Infrastructure Victoria 2017, p. 172). This involves both state and local government, and the City of Greater Geelong and Wyndham City Council's draft *Avalon Corridor Strategy* notes that implementing 'necessary planning zone and overlay controls to protect long term development opportunities associated with Bay West' is an immediate priority (City of Greater Geelong and Wyndham City Council 2021, p. 60).

Allowing 15 years for planning, assessment, approval and construction of a second container port in Melbourne may be overly optimistic. The development of Port Botany effectively started in 1961 when the Maritime Services Board took jurisdiction of the site, and the first container terminal became operational in 1980, nearly 20 years later (Robinson, Milloy and Casling 1985, p. 310). The 'long, tedious and complicated' development of Port Botany is partly attributable to 'public concern and political action and reaction in a period of heightened social awareness of environmental issues' (BTE 1985, p. 1). None of these factors have become less important over the last half century. Regardless, Infrastructure Victoria's advice to use and expand the Port of Melbourne while developing a second container port to account for future growth provide a basis for long-term planning by the Victorian Government.

Western Australia is more advanced with their plans for a new port

Western Australia's long-held plans for a new port are now being implemented. Port capacity at the existing Port of Fremantle has expanded over time to accommodate growth in freight volumes but it is now facing challenges common in other capital city ports. The port is located at the mouth of the Swan River, and the area surrounding the port has seen substantial residential development. The ensuing congestion on the port's road and rail links as well as concern from nearby residents regarding more emissions, noise and vibration created by port and port related operations have meant that further development at the port is very difficult and costly (Westport Taskforce 2020, pp. 38, 72).

In 2017, the Western Australian Government came to power with a commitment to developing a port in the Outer Harbour at Kwinana (Westport Taskforce 2018, p. 1) and recently allocated \$97 million to finalise the port's detailed design with a view to it being operational by 2032 (Government of Western Australia 2020). The City of Kwinana have committed to working closely with state government to deliver the port (City of Kwinana 2020).

Before 2017, various Western Australian Governments had spent decades considering how to accommodate future growth in trade. It has been anticipated that future growth would be accommodated in the Outer Harbour since the 1950s (Westport Taskforce 2020, p. 44) and Kwinana had been identified as a preferred location as early as 2004 (Western Australian Planning Commission 2004, p. 2). In 2015, Regional Development Australia — which brings together different levels of government around the country — had argued that a new port was a top infrastructure priority (Regional Development Australia 2015, p. 24) but further extending the life of the Port of Fremantle through the Perth Freight Link Project was the (outgoing) State Government's preferred option as late as 2017.

The process undertaken in Western Australia is similar to that taking place in Victoria but the timeline to port development is much shorter in Western Australia. The Western Australian Planning Commission (WAPC) has already implemented a Planning Control Area to reserve the road pathway to the port (Westport Taskforce 2022). Implementing the state's key planning strategies, guided by the State Planning Strategy 2050 (Government of Western Australia 2021), is a key responsibility of the WAPC.



Draft finding 7.4

Long term planning appears to be adequate

All state governments have freight and transport strategies that include consideration of future port infrastructure needs. Compelling evidence has not been presented that more plans are required or that existing plans will not be implemented.

8. Workforce arrangements: background and framework

Key points

- ✱ **Workplace arrangements between employees and their employer are critical to the operation of a business and can be fundamental to employees' livelihoods and wellbeing.**
 - Labour is not just an ordinary input to economic production. There are ethical and community norms about the way a country treats its employees.
 - For the most part, workplace arrangements are formally negotiated through, or the boundaries are set by, the workplace relations system.
 - In Australia, this system is a complex array of laws, regulations and institutions, with the *Fair Work Act 2009* (Cth) and the institutions that administer it at the centre.
- ✱ **The workplace relations system confers power to employees to act collectively and take protected industrial action to redress the likely outcome of employers holding greater bargaining power in the absence of regulation.**
- ✱ **Container terminals have a strong workplace culture and new entrants to the industry (employees and employers) are more likely to adapt to existing norms than disrupt the culture.**
- ✱ **High rates of unionisation and high barriers to entry for container terminal operations combined with the regulatory framework means that the balance of power in workplace negotiations favours employees and their representatives.**
- ✱ **Workplace relations affects productivity through the terms under which people are employed and the process by which those terms are agreed.**
 - There is substantial evidence of the effects of workplace relations on productivity. However, it is not the sole driver of changes in productivity, meaning it is difficult to demonstrate any link using only quantitative methods.
- ✱ **The Commission has given weight to the interests of *all* Australians in assessing potential reforms to workplace relations arrangements in Australia's ports, including consumers, the unemployed and employees and employers that are directly and indirectly affected.**

Workplace arrangements between employees and their employer are a critical aspect of the operation of a business and are fundamental to employees' livelihoods and wellbeing.

For the most part, these arrangements are formally negotiated through, or the boundaries are set by, the workplace relations system. In Australia, this system is a complex array of laws, regulations and institutions, with the *Fair Work Act 2009* (Cth) (FW Act) and the institutions that administer it at the centre.

The terms of reference for this inquiry ask the Commission to examine workforce issues, including industrial relations, labour supply and skills, in Australia's maritime logistics system. This chapter and the following one focus on workplace arrangements in Australia's ports. That is, they consider arrangements covering activities on port waters and within port gates. The focus aligns with the issues raised by inquiry participants — the bulk of the evidence put to the inquiry focused on the workplace relations of container terminal operators and, to a lesser extent, towage services.

These chapters do not examine workplace arrangements beyond the port gate — for example, in road, rail or warehousing. These sectors, while part of the maritime logistics system, are also part of the broader logistics system. Nor does the chapter examine workplace arrangements in international shipping, which are outside the control of the Australian government. Consideration of workplace arrangements outside ports would require a much broader scope of inquiry. (Arrangements for coastal shipping are, however, mentioned in chapter 12.)

The parts of the FW Act most relevant to this inquiry are those that provide the framework for the negotiation and content of enterprise agreements, including the use of industrial action. This is because the vast majority of employees in container terminals and towage services are employed under enterprise agreements (MUA, sub. 59, pp. 93–94; Svitzer, sub. 5, p. 7).¹ For example, Victoria International Container Terminal (VICT) (sub. 7, p. 5) employs 181 people in operations and engineering through their enterprise agreement as well as 49 'white collar' staff. Other parts of the FW Act, like the minimum wage and the national employment standards, while important to the workplace relations system as a whole, are not directly relevant to this inquiry. For that reason, these features of the system are not discussed.

The Commission has been asked to examine workplace relations as it operates in one industry, not the operation of the workplace relations system as a whole. Therefore, where the issues and evidence relate very specifically to the operation of workplace relations in the ports, the Commission has made industry-specific draft recommendations. Work beyond this inquiry would be required to determine whether there is a case for wider application of those recommendations. However, in some instances, where the evidence in this inquiry aligns with previous work by the Commission — principally the Commission's inquiry into the workplace relations framework — the Commission has made draft recommendations with system-wide application to improve workplace relations in Australia.

This chapter begins with a snapshot of Australia's port workforce (section 8.1), then describes the relevant parts of Australia's system of workplace relations (section 8.2). Section 8.3 sets out the structures that confer bargaining power to employees or employers. Section 8.4 discusses the link between workplace relations and productivity. Finally, section 8.5 describes how the Commission has given weight to the interests of *all* Australians in assessing whether changes are needed to the operations of workplace relations in Australian ports.

Chapter 9 examines the operation and impacts of workplace relations in the ports and makes draft recommendations designed to promote productivity and reduce harm to third parties. Labour supply and skills are addressed in chapter 10.

The Commission is interested in understanding whether there are other areas where workplace arrangements should be examined.

¹ There are exceptions to the widespread use of enterprise agreements, but these are rare. For example, some towage operators are moving away from enterprise agreements and now contract labour through cooperative arrangements or partnerships. For example, Rivotow operate 17 tugs at Port Hedland for BHP under a partnership model (Rivotow nd, nd).



Information request 8.1

In addition to container ports and towage services, are there other sectors in Australian ports where workplace relations issues affect the efficiency or productivity of operations? For example, bulk ports, empty container park operations or pilot services.

8.1 A snapshot of the ports workforce

Publicly available data on the ports workforce is limited because it is such a small and highly disaggregated sector. The Commission has drawn on a variety of ABS data sources and information from industry participants in developing a profile of the workforce. However, there remain significant data gaps, particularly for industry-wide measures of labour productivity (discussed further in chapter 3 and section 8.4).

On average, the number of people working in Australian ports has held steady at about 17 000 for the past two decades (figure 8.1).² However, there has been substantial fluctuation around this figure, perhaps in part due to seasonal fluctuations in the use of casual labour in bulk agricultural ports.

The workforce includes people responsible for the operation of ports, pilot services, towage operations, mooring ships, and loading and unloading ships. This equates to just 0.1 per cent of Australia's working population. By way of comparison, about 200 000 people are employed moving freight by road and about 6000 people work moving freight by rail (ABS 2022d).

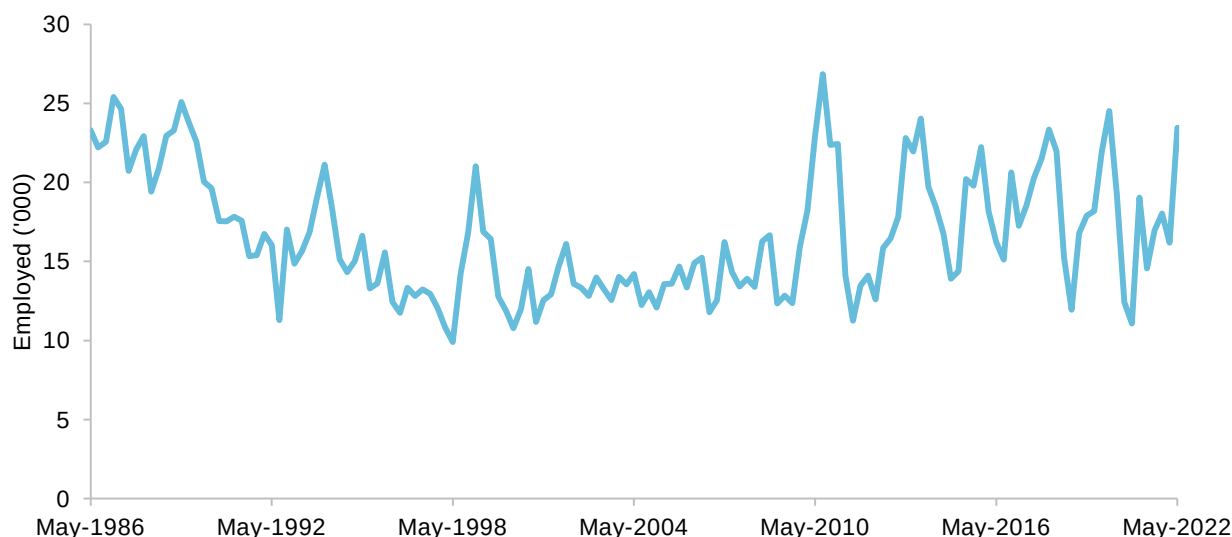
Port workers are most likely to work on the quayside (about 75 per cent of the workforce), with the remainder working on the marineside.³ About 60 per cent of the workforce are employed at the large capital city ports, which have large international container terminals. The remainder work at regional ports, which predominantly handle exports of bulk grains and minerals (ABS 2018a, 2018b, 2018c).

² This average estimate over 20 years of 17 000 people differs from the 'point in time' estimate of 14 000 employees used in chapter 10. A point in time estimate is needed in chapter 10 because the population census is the only ABS data which provides the granularity to examine the number of employees by skill levels in Australian ports.

³ The area of a port that is in the harbour, as distinct from the part of a port that is on the land (quayside) and the ocean beyond a harbour (blue-water).

Figure 8.1 – Despite large fluctuations, employment in ports has held relatively steady for over 20 years^a

People employed in water transport support services, 1986–2022



a. Water transport support services includes stevedoring, container terminal operations, bulk loader operations, mooring services, pilots, towage services, lighterage services, ship registration and salvage services. Note it includes people working in water passenger terminal operations. It does not include water freight transport.

Source: ABS (*Labour Force, Australia, Detailed, May 2022*, Cat. no. 6291.0.55.001).

8.2 An overview of Australia's workplace relations system

Labour has distinctive characteristics (box 8.1), and these have shaped Australia's workplace relations system over a long history of regulating labour arrangements.

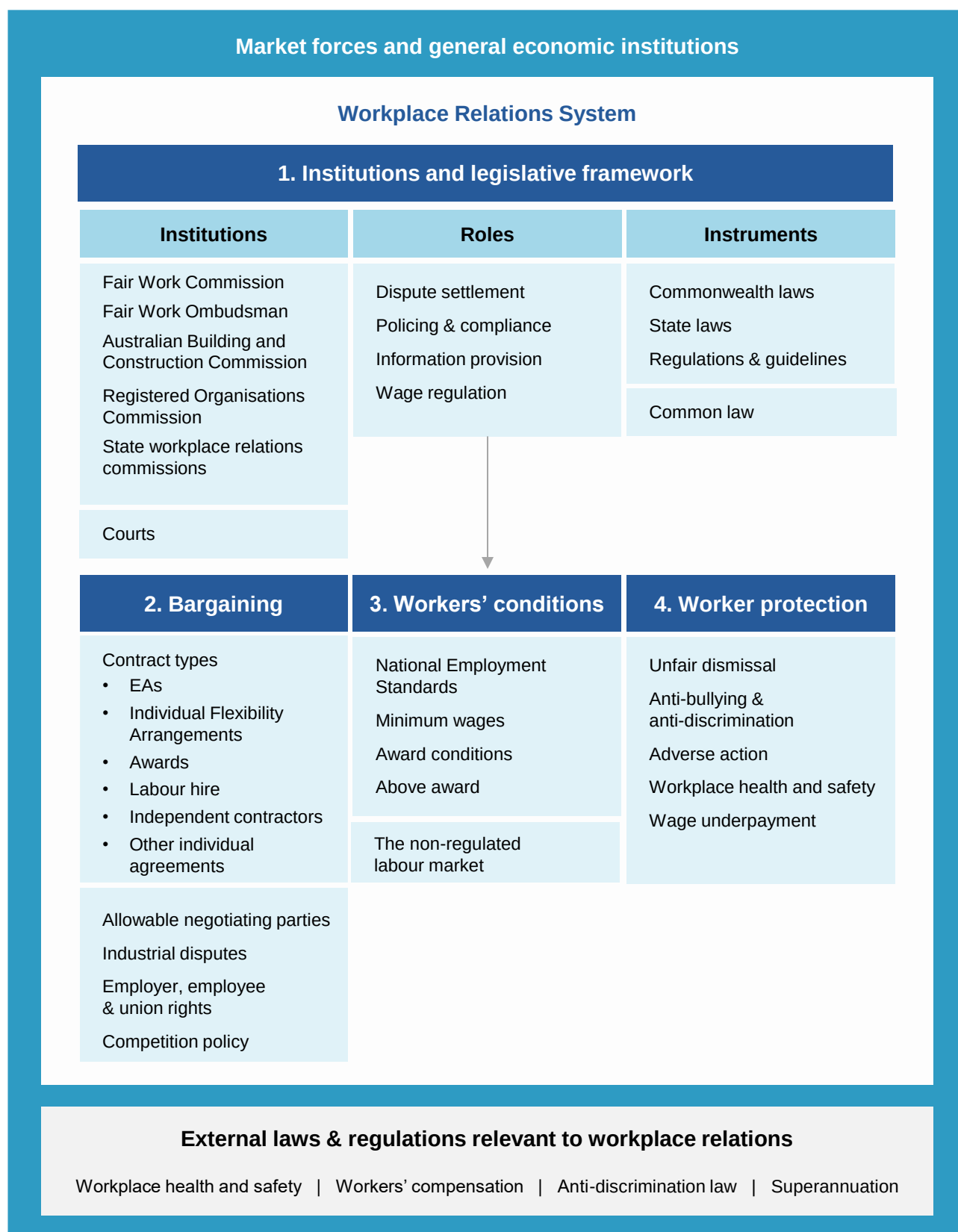
The complex array of laws, regulations and institutions that make up the system is depicted in figure 8.2.

Box 8.1 – Enduring features of labour markets

A workplace relations framework must recognise two enduring features of labour markets.

- Labour is not just an ordinary input. There are ethical and community norms about the way a country treats its employees.
- Without regulation and an ability to act collectively, many employees are likely to have much less bargaining power than employers, with adverse outcomes for their wages and conditions.

Source: PC (2015, p. 2).

Figure 8.2 – The main elements of the workplace relations system

Along with market forces, accepted practices, cultural norms and the common law, the workplace relations system shapes people's behaviour, the nature of their workplaces and their working lives. For example, market forces, accepted practices and cultural norms come together with workplace relations regulation to determine relative bargaining power between employees and employers in an industry (section 8.3). Cultural norms are particularly relevant in the ports where a history of industrial conflict and an adversarial workplace culture (discussed below and in chapter 9), have an important influence on contemporary workplace relations.

Whether the system is productivity enhancing or diminishing is determined by the overall structure and direction of the system as well as how employees and employers operate within it. Therefore, before examining the 'real world' operation of the system in the ports in sections 8.3, 8.4 and chapter 9, it is important to understand the system's building blocks and objectives. This section overviews the key laws, institutions and practices that comprise Australia's workplace relations system. It focuses on those parts of the system that are relevant to Australia's ports and comments on how they apply in the ports sector.

Workplace relations laws

The FW Act is at the centre of the legislative framework for the workplace relations system in Australia. Its objective is to provide 'a balanced framework for cooperative and productive workplace relations that promotes national economic prosperity and social inclusion for all Australians' (s. 3).

While the FW Act is the primary workplace relations law in Australia, other laws also regulate workplaces in important respects including competition laws and workplace health and safety (WHS) laws.

Workplace relations policy and competition policy have both complementary and competing objectives that must be balanced. As a consequence, the FW Act and the *Competition and Consumer Act 2010* (Cth) overlap and interact to some extent. Workplace relations policy is fundamentally concerned with the distribution of profits between employers and employees. It explicitly allows what would be seen as anti-competitive behaviour (for example, collective bargaining), if viewed through a competition lens. In contrast, competition policy is primarily concerned with protecting and promoting effective competition between market participants. It is mostly ambivalent about the distributional impact of competition between businesses.

The workplace relations system is largely exempted from Australian competition law under s. 51(2)(a) of the Competition and Consumer Act, which excludes matters relating to the negotiation and determination of terms and conditions of employment from the restrictive trade practices provisions of the Act. However, some provisions still apply, including in relation to: secondary boycotts (s. 45D, s. 45DA and s. 45DB); resale price maintenance (s. 48); and anti-competitive contracts or understandings in the supply or purchase of goods and services, including in employment arrangements (s. 45E and s. 45EA) (chapter 9).

Workplace health and safety laws are an important aspect of workplace regulation. In ports, different regulators are responsible for quayside and marineside operations. Regulation and enforcement of quayside WHS occur primarily through national, state and territory workplace health and safety regulators, though WHS laws are substantially harmonised. On the marineside, WHS is a more complicated picture, with both Australian and international regulation applicable in different contexts and the Australian Maritime Safety Authority playing an important role (chapter 2). The Australian Maritime Safety Authority is the national safety regulator for domestic commercial vessels and is central to the discharge of Australia's safety obligations under international maritime conventions, including inspection of international vessels in Australian ports.

WHS and workplace relations laws operate in separate spheres, however they can overlap. FW Act provisions in relation to right of entry, anti-bullying and anti-sexual harassment all have a WHS dimension. Safety requirements can also shape enterprise agreement content and can influence when and how industrial action is taken, its impact and the operation of mechanisms to suspend or terminate that action.

Workplace relations institutions

The Australian Government has created four specialist bodies that collectively deal with disputes, provide information, approve enterprise agreements, investigate and enforce compliance with the law and adjudicate on some key matters of workplace relations law.

- The **Fair Work Commission** is the national workplace relations tribunal and was established under s. 575 of the FW Act. Its functions include setting minimum wages, resolving claims about unfair dismissal and adverse action, approving enterprise agreements, dealing with matters about bargaining and industrial action, and issuing orders to stop prohibited conduct such as bullying or sexual harassment. The Fair Work Commission can deal with disputes through conciliation, mediation and (where permitted under the FW Act) arbitration.
- The **Fair Work Ombudsman** is responsible for providing education and advice, promoting compliance, and enforcement of workplace rights and obligations under the FW Act. The Ombudsman was established under s. 681 of the FW Act.
- The **Australian Building and Construction Commission (ABCC)** was established under s. 29 of the *Building and Construction Industry (Improving Productivity) Act 2016* (Cth). The ABCC is responsible for education and advice, compliance and enforcement in the building and construction industry. It also enforces the *Code for the Tendering and Performance of Building Work 2016* which places additional requirements on building industry participants involved in building work funded by the Australian Government.
- The **Registered Organisations Commission** regulates registered organisations (unions and employer associations).

The Government has committed to abolishing the ABCC and the Registered Organisations Commission (ALP nd; Burke 2022).

In March 2022, the ABCC commenced court action against the Construction Forestry Maritime Mining and Energy Union (CFMMEU) alleging the conduct of its officials at a picket line at the Port of Fremantle breached the FW Act (ABCC 2022). The ABCC is yet to release official material outlining its jurisdiction on this matter, but the Maritime Union of Australia (MUA) has strongly stated its view that 'the ABCC has no place on the waterfront' (MUA National Secretary in Bennett 2022).

These workplace relations institutions are supported by the judicial system, which enforces civil penalty provisions and, through its judicial review and appeal functions, influences the common law interpretation of the FW Act. The Federal Circuit Court and Family Court, Fair Work Division of the Federal Court and the High Court are the principal parts of the judicial system that deal with workplace relations matters.

8.3 Bargaining power in labour markets

In practice, the laws and institutions that govern the workplace relations system impact actual workplace arrangements in two ways. First, they set bounds on workplace arrangements that are legal, such as minimum standards for workplace conditions. Second, they impact outcomes in negotiations over wages and conditions of employment because they shape the bargaining power of both employees and employers.

At their core, workplace arrangements are driven by the relative bargaining power of employers and employees and how it is exercised. The bargaining power of a party depends on their capacity to hold out during, or to withdraw from, negotiations. And the party with the greatest bargaining power will have more influence over wages and conditions.

Factors that influence bargaining power include:

- the presence or absence of alternative employers or employees

- the ability for a party to make credible threats to inflict costs on the other party with little cost to themselves
- legal and other limitations — for example, workplace culture or community norms — on industrial activity and outcomes
- uncertainty about the actions the other party will take.

There is a widespread view that in the absence of regulation, bargaining power in labour markets often will be skewed in favour of employers (PC 2015, pp. 1137–1138). This could lead to outcomes that are neither efficient nor equitable, with low wages and poor working conditions.

Commentators argue that one of the goals of workplace relations policy is to reduce the bargaining power of employers relative to employees compared to the situation that is likely to occur in the absence of regulation (McCallum, Moore and Edwards 2012, p. 59; PC 2015, pp. 1148–1149; Stewart et al. 2015, p. 2). This is done through regulation that allows employees to act collectively through unions, engage in collective bargaining and take protected industrial action. Governments also set minimum standards in labour markets through regulating floors for wages and conditions.

However, bargaining power is not always skewed in favour of employers. For example, employees may develop firm-specific or sector-specific skills that make them hard to replace, strengthening their hand in bargaining. Or occupational licensing (usually backed by statute or regulation) may limit an employer's ability to hire alternative workers, shifting bargaining power towards employees who can then gain better terms and conditions (Harper et al. 2015, pp. 140–143). Industry characteristics may also give an organised workforce leverage in negotiations, for example, if any disruption or slow down to the production process has large and on-going costs to the employer.

If bargaining power is skewed excessively towards employees then this can also be a cause for concern for policy makers. For example, unions predominantly represent their members, not other potential employees or the community more broadly. By achieving substantial wage rises for their members, a union may cause employers to reduce their demand for labour (for example, by using machines instead), removing job opportunities for other workers. It may also mean that goods and services are not produced as efficiently as they might be, with a cost to community wellbeing.

In other words, a situation whereby employee bargaining power outweighs that of employers may also adversely affect efficiency and equity. For example, the Commission (2014a, p. 548) has previously found that:

The costs of disputes and excessive bargaining power [of the union] ripples throughout the various tiers of the construction industry (and associated suppliers) and ultimately results in higher contract prices and resource wastage. Higher prices must be borne by taxpayers or infrastructure users.

It is not a simple task for a government to balance regulation so that neither employers nor employees hold excessive bargaining power. This task is made more difficult by the variety of power relationships between employees and employers across the economy. A national workplace relations system may work well in aggregate and poorly in industries that have substantially different characteristics to the rest of the economy.

Moreover, while a workplace relations systems might strive to 'create the right regulatory balance between protecting workers' wages, conditions and safety on the one hand, and on the other, an employer's ability to make decisions about the way they manage their businesses and employment conditions' (PC 2017c, p. 84), there will be many views on what the 'right balance' looks like. Workplace relations systems are not static and are influenced by political processes. This in turn affects where this balance lies.

Bargaining power in the labour market for Australia's ports

Container terminal operations are one labour market where the bargaining power of employees (primarily represented by the MUA (box 8.2)) and employers differs substantially from the rest of the economy.

There is no single reason for this. Instead, multiple and, at times, contradictory forces play a role in determining relative bargaining power, in part, because the container terminals operate in a system of vertically separated markets (chapter 4).

Four main factors influence the relative power balance of employees and employers in enterprise bargaining.

First, on the landside, exporters and importers have very little choice about using a container terminal to move their containerised cargo internationally and can face costs if cargos are delayed. For example, some cargos risk spoiling if they sit too long on the docks. Disruptions in ports during protected industrial action, therefore, can add to pressure from cargo owners via shipping lines for operators to conclude negotiations.

Second, on the marineside, there is fierce competition between container terminal operators for business from shipping lines, with very few barriers preventing shipping lines changing which container terminal operator they use (chapter 6). This means that container terminal operators face high costs of industrial action — primarily the potential loss of business from shipping lines to other container terminals. The very competitive relationship between container terminal operators provides a strong short-term incentive to make concessions to end an industrial dispute. While acceding to employees' demands may have substantial long-term costs for an operator, management has to weigh up these short- and long-term costs.

Third, cultural norms, that perpetuate historical workplace arrangements in container terminals, and which reflect power sitting with workers are strong. Many aspects of current workplace arrangements have a long history extending back to before containerisation in the 1960s. The industry also has a long history of industrial action being used as a tactic in workplace negotiations (box 8.3 and chapter 9).

New entrants to the industry (employers and employees) appear to be more likely to adapt to existing norms than disrupt the culture. Given the barriers to entry, new container terminal operations are rare in Australia (although ownership changes of existing terminals occur). The number of container terminal operators in Australia's three largest container ports only expanded from two to three in the last decade (chapter 2). These new operators — Hutchison (pers. comm., 8 July 2022) and VICT (sub. 7, p. 5) — have both reported pressure to default to historical workplace arrangements that they did not consider suitable for their operations.

Box 8.2 – Union representation in Australia's ports

The Maritime Union of Australia (a division of the CFMMEU) and the Australian Maritime Officers Union (AMOU) represent workers on the marine and shoreside of the port and also represent employees in container terminals. The third union involved in the ports — the Australian Institute of Marine and Power Engineers — only represents workers on the marineside (AMOU, pers. comm., 20 June 2022). Chapter 2 presents some additional information about the respective roles and representation of each union.

Container terminal workers are highly unionised. For example, DP World (sub. 49, p. 60) estimated that 95 per cent of its Australian workforce is unionised. Within this, operational employees including lashers, straddle and crane drivers are represented by the MUA (grades 1 to 6 in the Stevedoring Industry Award 2020). Workers in supervisory positions (which are less numerous), for example, shift coordinators (grade 7 in the award), are represented by the AMOU (sub. 18, p. 1).

The high levels of unionisation in container terminal operations have a profound effect on the operation of workplace relations, and on the wages and conditions of workers. Union coverage of about 95 per cent creates a strong collective voice, particularly given one union represents most employees at all competing container terminals. This level of coverage has not changed for many decades, which is in stark contrast with most of the economy where union coverage has been declining for decades. The level of unionisation at all Australian ports (including bulk ports and people involved in moving containers not employed by container terminal operators) was about 40 per cent in 2020⁴ and only 13 per cent in the economy more broadly (ABS 2021a).

Finally, employees face only a handful of possible employers if they want to work in container terminals. This would normally indicate a potentially monopsonistic labour market (where there is one or very few employers and many potential employees). For example, terminal operators have stated that they have no problems in recruiting workers:

[Flinders Port Holdings'] recent experience indicates that accessing the employment market for entry level stevedores has not been problematic. ... This is entirely due to the extremely favourable labour rates and working hours enjoyed by stevedores. (Flinders, sub. 55, p. 12)

Box 8.3 – Troubled waters: 1998 waterfront dispute

The current workplace arrangements, disputations and culture in container terminal operations reflect, in part, the long history of employee and employer relations on the waterfront. The prolonged dispute between Patrick Stevedores (as they were then known) and the MUA in 1998 was a major and highly charged dispute in Australian ports.

In January 1998, Patrick locked out its stevedoring employees at Webb Dock in the Port of Melbourne. The dispute escalated with industrial action by both employees and Patrick beyond its Melbourne operations. It culminated in a move by Patrick in April that year to terminate the employment of approximately 1400 stevedores (Bennett 1998; O'Neill 1998a, pp. 8–9, 1998b, p. 6).

The next day, the Australian government announced a reform package with seven objectives:

- ending over-manning and restrictive work practices
- higher productivity (the goal: a five port average net crane rate of 25 container movements per hour)
- greater reliability through less industrial action and elimination of outdated work practices
- improved safety performance
- lower costs across the waterfront logistics chain
- more effective use of technology
- improved training (PC 2003, p. 9; Reith 1998, p. 2724).

The dispute was heavily litigated on a number of fronts, with a High Court decision in May 1998 opening the way for a settlement to be reached. The settlement included an agreement to retain 645 employees at Patrick, payment of wages and entitlements, and changes to a range of work practices (O'Neill 1998b).

The Commission (2003, p. 7) has previously found that 'the subsequent workplace reform package that emerged from this dispute produced higher container handling rates and an improvement in the efficiency of Australia's ports'.

⁴ This data has a high standard error.

The first three factors indicate that bargaining power tends to sit with employees; the fourth that some bargaining power rests with employers. On balance, employees hold greater bargaining power over the workplace arrangements in container terminals. How this power manifests in relation to the content of enterprise agreements, the conduct of bargaining and industrial disputation is discussed in detail in chapter 9.

The Commission's concern is with behaviour that has a detrimental impact on the broader community, not whether bargaining power should, as a matter of course, sit with one party or another. At least some of the costs of the inefficiencies that are created are passed through to importers and exporters and flow on to the rest of the economy in the form of higher prices for imported goods and higher costs of exporting — reducing community wellbeing overall.



Draft finding 8.1 Unions hold substantial bargaining power

Conditions in container terminal operations, together with the workplace relations framework, confer significant — and unbalanced — bargaining power on unions.

8.4 Effect of workplace relations on productivity and efficiency

Workplace relations affects productivity through two main mechanisms:

- the terms under which people are employed (for example, the content of enterprise agreements)
- the process by which those terms are agreed (for example, enterprise bargaining).

As discussed in chapter 3, productivity is a measure of the rate at which goods and services are produced from inputs (such as labour, machinery and raw materials). More specifically, productivity increases when growth in the volume of output is greater than the growth of the volume of inputs. Many factors can affect productivity growth including workforce skills, capital accumulation, management practices, business innovation, competitive pressure and a more efficient allocation of resources across the economy.

Productivity improvement has been a central tenet of Australian workplace relations regulation since the introduction of enterprise agreements in the early 1990s (Keating 1993). The foundation of the enterprise bargaining system is that employers and employees (for the most part) have an incentive to agree to terms which lift productivity and therefore wages. The promotion of productivity features prominently in the FW Act's objectives (ss. 3, 3(a) and 3(f)). However, it is not a requirement that parties explicitly consider effects on productivity as part of enterprise agreements.

The effect of terms of employment on productivity

The outcome of negotiations over wages and other conditions of employment between employees and employers has an ongoing impact on productivity — both for the entity employing the workers and the broader economy.

An economically efficient labour market will involve wages and other conditions that are set at a level where the benefit to the employer from hiring one more worker (called the marginal revenue product of labour) equals the opportunity cost to that extra worker (such as the wage the worker could earn in an alternative

job). If the wage for some group of workers is set either above or below this efficient level, then the mix of inputs used in production will be distorted.

If wages are above the efficient level for some workers, employers will find the cost of those workers too high. They will reduce the number of those workers employed and rely on other groups of workers or more capital to produce goods and services. If wages are below the efficient level for some workers, then those workers will seek alternative opportunities and employers will face a shortage of those workers. Employers will have to rely on other groups of workers or more capital to overcome this shortage and produce goods and services.

Both situations distort the mix of labour and other inputs that employers choose and reduce productivity. Formally, there is a loss of technical efficiency (labour and capital are not being used in a way that maximises output), allocative efficiency (the mix of goods and services produced is not as valuable to consumers as it could be) and dynamic efficiency (businesses inefficiently invest in capital to overcome the distortion to wages).⁵

Other inefficient terms and conditions of employment can have similar effects. For example, unwarranted restrictions on who can work in certain jobs (for example, based on qualifications or work history), can harm both workers and employers. A worker may not be able to obtain the job they want and that best meets their skills, despite an employer's preference to hire them. The restriction stops both the employer and the worker from getting to their preferred outcome, reducing productivity for the worker and the business.

The effect of bargaining on productivity

Any bargaining over workplace conditions will have a level of cost through the diversion of resources from other productive activities during negotiations. Essentially these are transaction or information costs. In many instances, these costs have little material effect. However, they can become substantial if bargaining is heavily disputed and protracted because the production of goods or services can be prevented or can occur inefficiently (for example, due to protected industrial action). Any resources wasted through this process diminish productivity and can harm the parties involved. That said, the point of a dispute is to inflict economic harm on the party who is 'resisting' a particular outcome and provide an incentive to reach an agreement.

The likelihood of bargaining becoming disputed or protracted depends, in part, on the attitudes and behaviours of management and employees. One thing workplace relations regulation cannot guarantee is harmonious relationships between employers and employees. Every workplace will have accepted and evolving norms about how people should interact and negotiate with each other. These norms can have a sizeable effect and can work to either facilitate or undermine the intent of the workplace relations system.

The parties who are bargaining over workplace arrangements may not consider third parties who might be harmed by the conduct or outcomes of negotiations (for example, industrial action). Both organised labour and businesses will tend to prioritise the interests of their members or owners, respectively, over those of the broader community — the so-called 'insiders–outsiders' problem. This means that even if the participants to bargaining are willing to bear the costs of disputatious or protracted bargaining, there may be other economy-wide costs that government should take into account. An effective workplace relations system will aim to reach fair, economically efficient outcomes without protracted disputes that harm third parties.

⁵ These three terms are discussed in more detail in chapter 1.

Quantifying the effect of workplace relations on productivity is difficult

Isolating the empirical contribution of workplace relations or enterprise bargaining to productivity, particularly at the aggregate level, is difficult. The effect of the workplace relations system on productivity is not easily separated from the other factors that can influence productivity (Daley, McGannon and Ginnivan 2012, pp. 22–25; PC 2015, pp. 994–995).

The Commission's inquiry into public infrastructure included a detailed review of studies and empirical evidence of the relationship between workplace arrangements and aggregate productivity in the construction industry and found that:

... it is hard to isolate numerically the effects of workplace arrangements, including industrial relations, from all the other factors shaping workplace productivity, especially given small and inadequate datasets and statistical noise. (PC 2014a, p. 543)

This does not mean that workplace relations have no effect on productivity. Changes to the workplace relations system can enable productivity improvements, but they are also only one of many factors that affect productivity.

Workplace arrangements and labour productivity in Australia's major container ports

Overall productivity at Australia's container terminal operations has lifted over the past three decades (figure 3.10). One related indicator is that the level of employment remained relatively steady between 2000 and 2020, while the volume of freight moving through Australian container terminals increased by 180 per cent (ABS 2022d; BITRE, various). This is indicative of the shift towards more capital-intensive operations over time, a trend that started with containerisation in the 1960s (BTE 1986, p. 186; Sheridan 1994, pp. 277, 280). However, there are no aggregate data available on labour productivity at Australian ports (chapter 3). This means that it is not possible to clearly identify the factors that have driven better overall productivity, nor what might have prevented productivity growth from being stronger.

As discussed above, this is not evidence that workplace arrangements do not affect productivity in Australian ports, simply that showing that link through data is not straight forward. Many inquiry participants have discussed the link, particularly the impact of industrial action on port productivity and the constraints to efficient use of labour in enterprise agreements (summarised in box 8.4 and discussed further in chapter 9).

Box 8.4 – Participants' views about the effects of workplace relations on port productivity

A number of inquiry participants submitted that workplace relations was a significant driver of poor productivity outcomes in Australia's ports.

For example, DP World (sub. 49, p. 51) 'considers that flaws in DP World's industrial framework impose the most urgent and significant drag on competition and productivity within Australian ports'.

Qube (sub. 64, p. 7) stated that:

... because of the significant pressure able to be applied by unions, restrictive practices are contained in most enterprise agreements applying in the industry. The main industry union, the CFMMEU, has a constant agenda of seeking common industry terms and conditions in

Box 8.4 – Participants' views about the effects of workplace relations on port productivity

enterprise agreements. The strong bargaining position of the union and its ability to cause significant damage to customers in particular makes the achievement of improved productivity and efficiency extremely difficult.

VICT (sub. 7, p. 6) submitted that 'addressing the productivity and efficiency of the maritime logistics supply chain will require a reconsideration of the operation of the Fair Work Act in relation to the maritime logistics industry'. And Ai Group (sub. 60, p. 12) stated that:

The industrial relations practices in the maritime and ports sector are hampering productivity and increasing costs for both operators and users of ports and shipping. There is a clear case for further Government intervention.

Svitzer (sub. 5, p. 6) stated it is facing workplace arrangements that include 'legacy industry terms which are designed to reduce flexibility, productivity and utilisation and which impose unsustainable costs on business which are passed on to end customers'.

Several submissions (Ai Group, sub. 60, pp. 12–13, 21–24; HIA, sub. 40, pp. 3–4; IFCBAA, sub. 34, p. 9; MCA, sub. 25, p. 7; NatRoad, sub. 8, pp. 8–9) agreed with the ACCC's (2021a) recent findings about the negative impact of workplace relations on productivity in the container ports sector. Reflecting these findings, the ACCC (sub. 26, p. 2) in its submission to this inquiry stated:

... systemic industrial relations issues across the entire container freight supply chain have played a pivotal role in inhibiting productivity and efficiency gains at Australian ports. While this has been a challenging area for some time, restrictive work practices and industrial actions have escalated in recent years.

Employee representatives argued that workplace relations at container terminal operators are not driving poor productivity on the ports.

The MUA (sub. 59, pp. 6, 30, 40–43) argued strongly that container terminal workers and the enterprise agreements under which they are employed are not responsible for supply chain issues or poor productivity of container terminal operations. They expressed strong disagreement with the conclusions made by the ACCC in their most recent *Container stevedoring monitoring report: 2020-21*. The MUA stated that 'the significant improvement in labour productivity has been the main contributor to overall container terminal productivity improvement over the last 22 years. In fact, the overall improvement in container terminal productivity appears to be almost entirely due to the increase in labour productivity'.

The MUA also pointed out that workers in terminal operations have no role in many of the tasks which drive some measures of performance like berth hours. These are driven by other workers in the port including pilots, mooring line workers, towage workers and regulators like harbourmasters.

Enterprise agreements place ongoing limits on the efficient allocation of labour and capital in container terminals. Terms in enterprise agreements which limit merit-based hiring, promotion and training clearly constrain productivity (chapter 9.1). Enterprise agreements also contain many terms which of themselves may have a very marginal impact on productivity. However, their cumulative effect is likely to limit the efficient operation of each container terminal and the operation of container ports as a whole. For example, VICT (supplementary sub. 78, p. 1) discussed how 'restrictive labour practices' affect its productivity,

resulting in its 'cranes becoming idle for a period rather than being fully utilised for the shift with an overall lower productivity for that particular shift'.

One of the other ways in which workplace relations affects the productivity of container terminals is through disruptions. As noted above, industrial action is designed to inflict costs on the other bargaining party during negotiations over enterprise agreements. So, it is not surprising that industrial action is reported to cause slower crane moves or working hours to be lost (box 8.5). The primary issues are the scale and frequency of industrial action in container terminals, which have a cumulative impact on the overall productivity of container ports, and downstream effects on importers, exporters and ultimately consumers (chapter 9).

Box 8.5 – Effect of industrial action on productivity

Container terminal operators have provided an indication of the effect industrial action has on productivity.

DP World (sub. 49, p. 52) submitted that industrial disputation in the most recent round of enterprise bargaining had a 'direct and severe impact' on crane utilisation.

Labour being unavailable to work has a clear impact on the ability of a terminal to operate. For example:

- '[c]ollectively, DP World estimate over 60,000 individual working hours was lost to protected and unprotected industrial action during the last DP World bargaining round' (DP World, pers. comm., 27 May 2022)
- Patrick Terminals (Patrick) (pers. comm., 9 June 2022) commented that 'close to 35,000 productive hours were lost since commencement of bargaining in September 2020 and November 2021, causing significant business interruption across the supply chain. Patrick concluded negotiations in March 2022'. The disruption at Patrick was concentrated at the Melbourne and Fremantle terminals, and in the second half of 2021.

Productive hours lost in the last bargaining round at Patrick^a

Productive hours lost to protected industrial action		Productive hours lost to unprotected industrial action	
Sep-20	2 551	Port Botany	7 772
Oct-20	4 225	Fisherman Islands	3 396
Nov-20	0	Fremantle	12 139
Dec-20	0	East Swanson Dock	11 366
Jan-21	0	Total	34 673
Feb-21	0		
Mar-21	0		
Apr-21	0		
May-21	102		
Jun-21	1 218		
Jul-21	6 503		
Aug-21	3 861		
Sep-21	2 322		
Oct-21	8 566		
Nov-21	5 326		
Total	34 673		

a. Productive hours are hours that would otherwise have been worked.

Source: Patrick, pers. comm., 23 June 2022.

Box 8.5 – Effect of industrial action on productivity

In these examples, the length of bargaining is likely also playing a role in the scale of hours lost to industrial action. The last round of bargaining at DP World and Patrick both ran to almost two years (chapter 9.2).

Losing working hours flows through to the productivity of the terminal. For example, DP World measured the impact of industrial action in its terminals on the overall productivity of its operations and found that:

[i]n late 2020, during the most recent round of enterprise bargaining, a detailed assessment undertaken by DP World showed that productivity was being impacted between 22–34% in any given 24-hour period and that DP World lost between 16 hours and 50 hours of productive work each day. (DP World, pers. comm., 18 July 2022)

All terminals experienced substantial productivity losses over 2020, with DP World's Melbourne terminal the most disrupted.

Productivity lost to industrial action at DP World over 2020

	Average productivity loss (%)	Average number of productive hours lost in each 24 hour period
Brisbane	22	16
Sydney	30	30
Melbourne	34	50
Freemantle	30	18

Source: DP World, pers. comm., 18 July 2022.

8.5 The Commission's approach to assessing potential reforms

Legislated workplace rights and responsibilities can have ramifications for prices, productivity and employment, along with the wellbeing of people and entities far beyond those that are directly affected. Stronger workplace protections for some employees/employers can, in some circumstances, come at the cost of higher prices for consumers and other businesses, or less employment for other employees or would-be employees.

The Commission's view is that any changes to the operation of workplace relations in the ports should maximise the wellbeing of the community as a whole, not the interests of any one group of stakeholders. In the course of this inquiry, the Commission has given weight to the interests of *all* Australians, including consumers and the unemployed, and the employees and employers that would be directly and indirectly affected by particular workplace relations changes (box 8.6).

The Commission's approach to assessing potential reforms to the application of Australia's workplace relations system to the ports takes into account that:

- any content in enterprise agreements must be agreed to by employees and employers
- the workplace relations system is designed to allow industrial parties to exert economic pressure as part of the bargaining process.

However, because the content of agreements and industrial action can come at a cost not just to the employees and employers who are directly affected, but also the broader Australian community, it is important to consider whether the regulatory settings as they manifest in Australia's ports are fit for purpose.

Box 8.6 – The Commission's approach to assessing changes to workplace relations

Improvements in community wellbeing through changes to workplace relations regulations can be achieved in a number of ways including by:

- improving the overall use and allocation of resources in workplaces (encompassing managerial as well as employee efficiency)
- enhancing employment opportunities, matching of people to jobs and informed employment choices
- accommodating differences in the needs and circumstances of people and businesses
- promoting efficient pricing and efficient investment in innovation, skill and capital
- promoting institutions that are efficient and effective
- curtailing the abuse of power that could add significantly to social and economic costs
- achieving outcomes that are consistent with community norms, for example in relation to equitable outcomes and ethical behaviour
- consistency with complementary regulations and policies.

Source: PC (2015, pp. 88–89).

9. Workforce arrangements: issues

Key points

- ✱ **Enterprise agreements in container terminals contain content that leads to inflexible and prescriptive work arrangements. These arrangements limit the efficient allocation of labour and capital and constrain productivity, imposing costs on all users of the ports and their customers.**
 - Enterprise agreement content that excessively constrains productivity should be prohibited.
- ✱ **Negotiations to reach the current container terminal enterprise agreements were protracted and bargaining periods overlapped at multiple operators. Longer negotiations create more opportunities for parties to use protected industrial action to influence the content of enterprise agreements.**
 - Mechanisms in the *Fair Work Act 2009* (Cth) (FW Act) to resolve protracted bargaining have not been sufficient. Solutions lie in providing more points of intervention at an earlier point in time for the Fair Work Commission to resolve lengthy or intractable negotiations.
- ✱ **Limited employer responses to industrial action by employees can mean that costs of industrial action are more likely to fall on employers and contributes to unbalanced bargaining power in the ports.**
 - The FW Act should be amended to provide employers with more graduated response options.
 - Where employees withdraw notice of industrial action and an employer has designed a contingency plan, the employer should be able to stand down relevant employees, without pay, while plan is in force.
- ✱ **Protected industrial action causes outsized harm to third parties in the supply chain. FW Act mechanisms for suspension and termination of protected industrial action need strengthening.**
 - When determining whether to suspend or terminate industrial action on the grounds of significant harm, the Fair Work Commission should interpret the word 'significant' as 'important or of consequence'.
 - The range of third parties who can make applications to suspend or terminate protected industrial action in the ports should be widened to include entities with an interest but who may find it difficult to show they are directly affected, such as employer and employee associations or third parties like importers/exporters.
- ✱ **The Fair Work Commission should establish a fast-track process for dealing with applications involving port employers and employees and their representatives, and ensure members with requisite skills, experience and standing are available to deal with these cases.**
- ✱ **The Commission has recommended incremental reform with the aim of putting in place more graduated mechanisms to resolve disputes and place some limits on the content of enterprise agreements.**

As noted in chapter 8, the terms of reference for this inquiry ask the Commission to examine workforce issues, including industrial relations, labour supply and skills, in Australia's maritime logistics system. That chapter sets out the scope of inquiry (workplace arrangements covering activities on port waters and within port gates), and the framework the Commission has used to examine workplace relations issues in the ports.

This chapter analyses how productivity in Australian ports is affected by the content of enterprise agreements (section 9.1), time spent bargaining (section 9.2) and protected industrial action (section 9.3).

The *Fair Work Act 2009* (Cth) (FW Act) provides for three forms of enterprise agreement: single enterprise, multi-employer enterprise and greenfield. Different rules around bargaining, industrial action and approval apply to each. The overwhelming majority of enterprise agreements, including in the ports, are single enterprise agreements (Attorney-General's Department 2022) and these, therefore, are the focus of this chapter.

Most of the draft recommendations made in this chapter repeat recommendations made by the Commission in its 2015 inquiry into workplace relations. The Commission's view remains that these should be applied across the economy, as was recommended in 2015. Draft recommendations which have been made for the first time in this inquiry are based only on evidence from the ports. The Commission, therefore, is not in a position to recommend economy wide changes for those draft recommendations — it will be for future work to evaluate whether or not those recommendations should be applied more broadly.

9.1 The content of enterprise agreements unduly restricts the allocation of labour and capital in container terminals

Workplace relations play a significant role in the day-to-day operations of the ports through the content of enterprise agreements. Agreements in container terminals cover many aspects of operations including recruitment, promotion and training, rostering, who is chosen to work a shift (order of pick), out-sourcing and automation. While the conditions and wages set out in agreements are often well above what is set out in the modern award, the *Stevedoring Industry Award 2020* (Stevedoring Award) is still a factor in shaping workplace arrangements.

Agreement content has been characterised as restrictive or inflexible in submissions by terminal operators and employer groups. There is also a view that it has become more limiting over time through a process of 'ratchet bargaining', with restrictive content secured in one agreement used as the starting point for negotiations elsewhere.

The Maritime Union of Australia (MUA) (sub. 59, pp. 97–98) holds a very different view. It has submitted that recent enterprise agreements have sought to provide:

... stability and permanency for workers to meet life and family commitments in the midst of uncertain shipping schedules, and compensate workers for working significant numbers of nights and weekends. The amount of work in each port also varies over the year. For example, there are typically more imports of consumer goods to container terminals in the lead up to Christmas. Exports of fresh foods will also vary seasonally. Cargo volumes fluctuate significantly with economic activity. ... Clauses have been agreed to across the industry that allow for such peaks and troughs to ensure labour profile and flexibility adapts to the workload and level of predictability of vessel arrivals and contracted hours.

This section focuses on workplace arrangements and enterprise agreements in container terminals and how they affect productivity. Some observations are also made about the towage sector.¹

The section examines the role and content of awards and why what is deemed a 'permitted matter' is so contentious. It then looks at content in enterprise agreements as it relates to:

- recruitment, promotion and training
- rostering
- 'order of pick' and backfilling positions
- subcontracting
- automation.

This analysis makes clear that content in some agreements: places significant restrictions on merit-based recruitment and promotion; impedes the efficient allocation of labour; and fetters operators in making key business decisions such as the introduction of automation. Taken together, the relevant clauses create agreements which are unduly restrictive, particularly given the adversarial workplace relations environment in which they are applied. The section concludes with the Commission's draft recommendations to address these issues.

Role and content of awards

Awards have been part of the workplace relations framework in Australia for more than 100 years and are unique to Australia. A number remain relevant in the ports. As noted above, the Stevedoring Award underpins enterprise agreements in container terminal operations (as well as bulk stevedoring). Others include the:

- *Marine Towage Award 2020*
- *Ports, Harbours and Enclosed Water Vessels Award 2020*
- *Port Authorities Award 2020*
- *Coal Export Terminals Award 2020*
- *Seagoing Industry Award 2020*
- *Dredging Industry Award 2020.*

Where employees' wages and conditions are set by an enterprise agreement, an award will have an indirect influence by providing a baseline that the agreement must exceed in order to pass the better off overall test and be approved by the Fair Work Commission (FWC).

Even in industries where terms and conditions in agreements are well above the underlying award, it is common for parallels (or similar content) to persist for historical and cultural reasons.

This is largely the case in ports, where enterprise agreements have significant coverage. The Stevedoring Award (and its antecedents) sets a foundation for, and in many instances is incorporated into, container terminal enterprise agreements. Types of employment, job classifications, allowances, loadings and (to a lesser extent) minimum shift lengths are some of the items where award entitlements are echoed in agreement content.

¹ The Commission has not undertaken a detailed analysis of enterprise agreements and other work arrangements in the towage sector. The Commission recognises that towage operators and employees will have sector-specific issues which may or may not overlap with the experiences in container terminals and would welcome more information from participants about the extent to which work arrangements in the towage sector enable or inhibit productivity improvements (information request 8.1).

However, DP World (sub. 49, p. 9) noted that there is a 'substantial and growing' gap between its enterprise agreements and the Stevedoring Award on pay, with hourly base rates in its EAs between 36 per cent and 59 per cent above award.

The extent to which the Stevedoring Award creates precedents for restrictive and inflexible terms in enterprise agreements in container terminals is difficult to assess because employers and employees have the capacity to negotiate conditions in EAs that fit their circumstances (with the proviso that those conditions have to be approved by the FWC).

The Australian Industry Group (Ai Group) (sub. 60, pp. 33–35) was critical of 'antiquated' provisions in the award, which it argued were overly restrictive and failed to provide employers with the flexibility required to meet the needs of port users. These included:

- full-time ordinary hours falling between 7:00 am and 5:00 pm, Monday to Friday for an average 35 hours per week (cl. 13.1 and 13.2)
- minimum seven-hour shift lengths (unless agreed otherwise), with casuals entitled to a 7-hour payment even if required to work a shorter period (cl. 11.1, cl. 13.3(d))
- employees moving from shift work to day work entitled to retain beneficial terms and conditions associated with shift work (cl. 14.2).

However, the Commission notes that provisions in awards can be varied, on application, under s. 157 of the FW Act, which permits the FWC to make a variation where necessary to achieve the modern awards objective. The modern awards objective includes criteria relevant to the issues raised by Ai Group, including 'the need to promote flexible modern work practices and the efficient and productive performance of work' (s. 134(1)(d)).

Ensuring that awards used in the ports provide a relevant and sufficiently flexible safety net is important. Moreover, the importance of awards in the ports could increase if applications to terminate enterprise agreements after nominal expiry — which, if granted, result in the employer and employees reverting to the award — continue to be a feature of enterprise bargaining in the ports.

The Commission is interested in understanding whether the Stevedoring Award is contributing to terms in enterprise agreements which limit workplace relations or productivity. And if so, how this is occurring.



Information request 9.1

What role are modern awards playing in the ports? Given the prevalence of enterprise agreements in the sector, could changes to modern awards contribute to improved workplace relations or productivity? If so, in what way, and would there be benefit in the Fair Work Commission undertaking a review of the Stevedoring Award?

Permitted matters in enterprise agreements

While enterprise bargaining is generally predicated on parties having the flexibility to negotiate and mutually agree upon terms in an agreement for their own benefit, there is nonetheless a public interest in the negotiation and operation of enterprise agreements. The parties negotiating EAs are afforded unique rights, such as collective bargaining and protected industrial action, which would generally be considered contrary to public policy principles regarding competition (chapter 8).

Ever since the introduction of enterprise bargaining, there has been debate over the content of agreements. Generally, employers have supported a narrower approach, arguing content should be confined to the relationship between employers and employees and not encroach on what they regard as management or operational decision making (PC 2015, pp. 678–679; Ai Group, sub. 60, pp. 24–25; CCIWA, sub. 43, p. 3; MCA, sub. 25, pp. 7–8; MIAL sub. 26, p. 14). Conversely, unions have generally advocated that EAs should be able to cover a broad range of issues affecting employees' working lives, including job security, and social and economic matters that affect workers generally; and they have opposed any reduction in the scope of content permitted under the FW Act (PC 2015, pp. 677–678; MUA, sub. 59, pp. 106–107).

Limits on the terms and conditions that can be contained, or enforced, within an agreement are included in the FW Act. The Act sets out:

- 'permitted matters', which are legally enforceable and can be the subject of protected industrial action during bargaining, subject to meeting other legislative requirements (s. 172)
- 'unlawful terms', which explicitly cannot be included in agreements (ss. 194–195A)
- 'mandatory terms', which must be included (ss. 202–205).

Permitted matters include matters pertaining to the relationship between the employer and employees, matters pertaining to the relationship between the employer and employee organisations, deductions from wages for any purpose authorised by an employee, and how the agreement will operate. This is an expansion of permitted matters compared with the previous *Workplace Relations Act 1996* (Cth) which limited agreements to matters pertaining to the relationship between an employer and employees.

For the past 30 years, workplace relations legislation has been largely silent on what matters might be considered part of the employee–employer or, under the FW Act, the union–employer relationship, leaving the detail to case law. The exception occurred during WorkChoices, when a list of prohibited content (since repealed) was added to the workplace relations regulations (*Workplace Relations Act 1996* (Cth), s. 356; *Workplace Relations Regulations 2006* (Cth), ss. 2.8.4–2.8.7).

The FW Act allows the inclusion of 'non-permitted' matters in enterprise agreements approved by the FWC, though they have no legal effect (s. 253). Allowing non-permitted matters may make the EA approval process smoother. However, it brings uncertainty about the status of the clauses and the potential for litigation if there is a dispute about a clause (PC 2015, p. 681).

In contrast, unlawful terms may not be included in enterprise agreements (s. 186). Unlawful terms relate to issues such as discrimination, the ability to 'opt out' of an agreement, requirements to pay bargaining service fees, terms that breach the FW Act's general protections provisions, attempts to modify rights to unfair dismissal protection or protected industrial action and terms that provide an entitlement to right of entry that are inconsistent with the FW Act's right of entry provisions.

Effects of enterprise agreement content in container ports

Agreement content is, by design, agreed to by employers and employees, as the MUA highlights (box 9.1). However, this is an industry where an imbalance in bargaining power that favours employees (chapter 8) is likely contributing to agreements being accepted by employers despite adverse implications for performance. As discussed in chapter 8, some of the costs of these arrangements fall on third parties and ultimately consumers who are not party to these agreements.

Whether the content of enterprise agreements affects productivity and efficiency in Australia's container ports is contested (box 9.1). In general, employers are more likely to emphasise the constraints imposed by EAs and unions are more likely to represent all EA content as fundamental worker entitlements.

Quantifying the effects of enterprise agreements on workplace performance is challenging. The absence of detailed data on hours worked and labour productivity, as noted in chapters 3 and 8, limits the type of analysis that is possible. However, this inquiry has assessed, where possible, whether agreement content is likely to hinder productivity or efficiency.

The Commission has closely examined the enterprise agreements in place in container terminals.² Additional detail on the agreements considered and the Commission's analysis is provided in appendix B.

While individual clauses may have significantly different effects on port performance, most clauses that the Commission examined are working in the same direction — to restrict the allocation of labour and capital in container terminals. This is likely to have an overall effect that is mutually reinforcing.

That said, while terms in agreements can have a similar flavour, there are notable differences in the content of EAs across container terminal operators. This points to potential differences in the circumstances surrounding negotiations as well as the expertise and performance of managers negotiating these agreements. Newer operators come without some of the history of the more established operators, though submissions indicated that there can be significant pressure to import arrangements in place elsewhere in the industry. On the other hand, Melbourne's Victoria International Container Terminal (VICT) is an example of a newer operator that has an agreement that looks quite different to other operators', at least in part a consequence of it having implemented significantly greater automation.

Box 9.1 – The effect of EA content on port productivity is disputed

Employers submitted that enterprise agreement content creates an inflexible operating environment. A number of submissions also commented that unions often adopt a 'ratchet' approach to bargaining, with no flexibility to depart from historically agreed content and a focus on seeking common terms across employers with little regard for differing operational requirements. DP World (sub. 49, p. 9) has stated that:

... outdated conditions are entrenched as the baseline for each new round of negotiations and unions are incentivised to engage in a crude war of attrition. The regime has entrenched a range of industry conditions that limit or constrain productivity improvement ... There is very limited scope for genuine negotiated outcomes that permits modernisation of these kinds of employment terms.

Similarly, Svitzer (sub. 5, p. 7) observed that:

By general industry standards these agreements tend to be prescriptive and restrict the efficient deployment of labour. The content of the agreements is the result of historical disputes and practices which are increasingly inapplicable to current operator needs. However, modifying historical inefficiencies is practically very difficult, if not impossible. Indeed union claims are commonly directed to further restrict change.

² Of the three container terminal operators with more than one container terminal, Patrick and Hutchison have national EAs, with sections for terminal-specific variations (for example, of rosters). DP World has a separate EA for each of their four terminals.

Box 9.1 – The effect of EA content on port productivity is disputed

VICT (sub. 7, p. 5) stated that:

Despite being quite a different operator to other stevedoring operators, VICT faced claims for enterprise agreement terms reflecting historical arrangements applying to other operators, many of which are restrictive work practices that VICT considers to be unreasonable and unsustainable.

Claims such as these are contested by the MUA. Responding to claims about restrictive workplace practices in the ACCC's *Container Monitoring Report 2020-21* (2021a), the MUA (sub. 59, p. 106) stated that:

It must be noted that Enterprise Agreements are agreements reached between employers and workers, represented by their union. Any provision in the agreement has also been signed off by the employer. Each Agreement is unique, and customised to the particular situation at a particular company.

Reflecting differences between agreements, the Commission has endeavoured to understand content in the context of the workplace to which it applies. In some instances, parties have explained that terms which appear unduly restrictive have a more neutral effect in practice.

Some participants to this inquiry have expressed that parties should be required to explicitly consider effects on productivity as part of enterprise agreements (DP World, sub. 49, p. 57). Under the FW Act (and previous workplace relations regulation), there is nothing which prevents this type of clause, but nor are they mandatory. The Commission (2015, pp. 691–694) has previously considered proposals to mandate these types of explicit links to productivity in enterprise agreements and concluded the case for this was not strong. What is highly desirable is that parties voluntarily negotiate mutually beneficial changes in work practices that lift productivity.

Few participants in this inquiry raised concerns about negotiations around wage increases in container terminal enterprise agreements, with a heavy focus instead on operational terms and conditions. This focus may shift as changes to the broader economic environment put a greater focus on cost of living and inflation expectations adjust.

Recruitment, promotion and training are based on tenure, not merit

As a general proposition, modern Australian workplaces are founded on merit-based recruitment, promotion and training. However, there are substantial limits to these outcomes within container terminal enterprise agreements. Enterprise agreements create a strong hierarchy of jobs based primarily on time served. The effect of this is to reduce the flexibility of workplace arrangements, with length of tenure prioritised over merit or business requirements in training and promotion decisions.

This section sets out how clauses in EAs which limit recruitment, promotion and training decisions combine to constrain productivity. The clauses make it less likely that each job in a container terminal is filled by the most appropriate person, meaning labour is likely to be allocated inefficiently.

Outcomes are also poorer for individual container terminal workers — both existing and potential. Existing workers may not be in roles most suited to their skill sets or preferences and potential workers may struggle to get a job commensurate with their skills and experience.

That said, existing workers have a strong incentive to limit or prevent competition from the wider labour market. The degree of bargaining power held by container terminal employees has resulted in enterprise agreement content that limits competition to each container terminal workforce from competent outsiders.

Recruitment clauses limit new employees to start in lower-level roles

Recruitment in container terminals is restricted primarily through limiting new recruits to entry or lower-level positions. The Commission understands that it is common industry practice for new employees to start as lashers (one of the most junior roles in the terminal), which at face value seems to apply irrespective of their skills and experience. For example, the EA for Hutchison's operations in Sydney and Brisbane states that '[e]mployees starting employment after the commencement of this Agreement will be appointed to Level 1A following on from the Induction period' (cl. 16.13). Level 1A are people working at the most junior roles in the terminal, including lashing, spotting³ and basic clerical tasks (cl. 16.12).

One potential effect of this is that a crane driver with suitable qualifications, experience or aptitude would find it difficult to move 'at-level' from one container terminal operator to another. At a new firm with similar EA restrictions they would be hired as a lower-level employee and, at face value, be utilised and be promoted in the same way as any other new employee with no prior industry experience. Overall, this reduces the efficiency of operations across container terminals.

Another issue is that entry level positions at container terminal operations involve lashing — physical, often unpleasant, work to secure containers on to the ship. The skill sets needed for lashing are not obvious prerequisites for other roles in the operation of the terminal like driving cranes and straddles. As Patrick Terminals (Patrick) (pers. comm., 23 June 2022) has stated, '[s]ome entry roles are highly physical which can act as a barrier to entry and progression to more technical roles'.

Container terminal operators have commented on how enterprise agreements adversely limit the composition of their workforce. For example, Patrick (pers. comm., 23 June 2022) commented that '[t]he terms of EAs across the stevedoring industry, including Patrick Terminals, mean that there are limitations on workforce size, composition and merit-based progression'.

Agreements also create a hierarchy of employment types, with new hires engaged as casuals before progressing to permanent guaranteed wage employment and then permanent full-time employment.⁴ In some instances, EAs prescribe minimum service periods before workers can move from one employment type to another. These clauses likely deter mobility between terminals and possibly also deter potential new hires from applying for work in container terminals.⁵

One clause that has attracted attention recently is Hutchison's 'family and friends' approach (box 9.2), but this does not appear to be out of step with practices often found in workplaces across the economy.

³ Lashing is securing or releasing containers on a ship. Spotting is visually monitoring the movement of containers. For example, when a quay crane moves a container from a ship to the shore or to assist the crane operator to place the container if their view is obstructed.

⁴ Guaranteed wage employee positions are mostly called permanent guaranteed employees or variable salary employees in EAs. Casual employees are called supplementary employees in the ports (Stevedoring Award, s. 8–10; MUA, sub. 59, pp. 98–99).

⁵ Container terminal operators have reported that there are no difficulties in finding people willing to take on entry level roles. However, these types of clauses could change the skill mix in the pool of applicants.

Box 9.2 – Hutchison’s family and friends clause mirrors practice elsewhere

A ‘family and friends’ recruitment clause in the 2021 Hutchison enterprise agreement (cl. 10.4) sets out that 40 per cent of appointments will come family and friends of employees, 30 per cent from the MUA and 30 per cent from Hutchison.

This clause has attracted public commentary, with some expressing concerns that it will set a new minimum expectation for container terminal enterprise agreements (see, for example, ACCC 2021a, p. xvi; Marin-Guzman 2021b; Marin-Guzman and Mitchell 2021; Patrick Terminals 2021; ACCI, sub. 73, p. 15; DP World, sub. 49, p. 59)

Hutchison (pers. comm., 8 July 2022) has stated that:

The recruitment clause in its EA meets the needs of the current business. While it does receive referrals from family and friends, these candidates must go through the operator’s rigorous five stage selection process. Hutchison’s recruiting process works extremely well as we get to choose who we want from referrals across a wide number of sources including family and friends, candidates with experience as well as people with absolutely no experience in stevedoring. Furthermore, we are only seeking a relatively small number of new employees over the life of the EA. As an example of our last intake, there were 140 candidates for only 30 jobs.

Generally, it is not unusual in a workplace for managers to seek out recommendations from staff for potential recruits.

The MUA’s (sub. 59, p. 109) view is the clause was offered by Hutchison as part of finalising negotiations and industrial action was not used to pursue the claim.

Agreements contain very prescriptive criteria for receipt of training and promotion

Enterprise agreements use points systems to prescribe criteria for access to training (which itself is often a pre-condition to promotion) and internal promotions. While these systems vary across agreements, all tend to reward tenure and penalise some or all of disciplinary action, absenteeism and past skill acquisition. For example, Hutchison’s criteria for training award one point for each month of service (for permanent employees) and deduct points for various reasons including a formal warning (12 points), absence (six points beyond 13 uncertified days) and skills held (for example, three for quay crane skills) (cl. 10.9).

DP World (sub. 49, p. 54) commented on how the points system for promotion affects its operations:

There is limited scope to create a true merit-based system for promotion within the Enterprise Agreement terms. The criteria in the Enterprise Agreements set out a weighting heavily in favour of length of service factors, effectively creating a system where the longer serving (and thus usually older) employees, rather than the best performers or those that DP World considers have best potential for long-term careers in the industry or at higher levels, are first in line for more lucrative skills opportunities.

Examination of different EAs indicates that tenure will be the deciding factor on who receives training and promotion in most systems. In some EAs employment type also affects promotion decisions, with permanent full-time employees given preference over permanent guaranteed wage employees who, in turn, are given preference over casuals. This is not necessarily an unusual arrangement, but it does add to the number of limitations on promotion decisions.

The preclusion of merit-based promotion and training in these systems will likely become more of an issue as workplaces incorporate more technology into production processes. As Patrick (pers. comm., 23 June 2022) stated, '[a]s the nature of roles within the stevedoring industry become more technical, merit-based progression becomes more important'.



Information request 9.2

Is tenure the deciding factor on who receives training in container terminals because so much training happens within the workplace? That is, it makes sense to train someone who has the required points for promotion because they are better placed to use that training.

While the Commission has noted that clauses limit the role of merit in promotion, that is not to deny the link between skill and experience. As the MUA (sub. 59, p. 110) articulated, '[i]t is the union's position that experienced workers should be considered for promotion from within the workforce first, indeed, given the lack of external skills training this has been an essential part of skills development on the waterfront'.

The Commission's point is that there are many other criteria which may make someone more or less suitable for a particular role, in addition to experience. Not allowing employers and workers to take account of these criteria when seeking promotion harms the relevant workers and lowers the efficiency of terminal operations.

Training in the maritime industry is discussed further in chapter 10. Appendix B contains further detail on barriers to merit-based recruitment, promotion and training in container terminal EAs.



Draft finding 9.1

Restrictions on merit-based hiring and promotion harm workers and productivity

There are substantial restrictions on merit-based hiring, promotion and training within container terminal operations. These restrict fair and reasonable access for workers who are qualified, but not currently employed by the specific container terminal operator. They also harm existing terminal workers by precluding them from jobs that best fit their skills and preferences, and create undue hurdles for potential container terminal workers. Overall, the clauses act to constrain productivity.

Container terminal rosters are very complex, raising questions about how well they accommodate flexibility for employers and certainty for employees

Container terminal operations face considerable pressure to service vessels quickly and to have the capital and labour needed to provide that service available on demand. To meet demand, they operate 24 hours a day, seven days a week with three eight hour shifts — day, evening and night. As the MUA (sub. 59, p. 97) observed:

Stevedoring is a 24-hour industry scheduled around the arrival and departure times of multi-million-dollar cargo ships. There is a great deal of pressure to load and discharge these ships as quickly as possible in order to maintain their efficiency and utilization. Of critical importance in the stevedoring industry is to have the right number of workers, with the right skills

available precisely when a ship arriving from a lengthy voyage is ready to be loaded or discharged, and for the length of time necessary to load or discharge the ship.

There is also a degree of uncertainty in demand for container stevedoring. For example, ships can run late in arriving at their berthing windows or miss a window altogether, and the number of containers on a ship can differ from what was expected. And, as the MUA (sub. 59, p. 97) noted:

Receival and delivery work also must be carefully organised in relation to ship schedules, loading and unloading. The precision that employers seek in this regard is further complicated by the fact that unexpected and last-minute delays are common.

While variability in demand to service vessels occurred even before the level of stress on international shipping exerted by the COVID-19 pandemic, the last two years have brought a level of uncertainty around shipping schedules rarely seen in the industry. Increases in demand and global disruptions to shipping meant the proportion of vessels arriving outside their scheduled window rose considerably (DP World, sub. 49, p. 33; FPH, sub. 55, p. 8; MUA, sub. 59, pp. 43, 116–117). As noted by the MUA, '[i]n January 2022, 86% of international container vessels were still arriving in Australian ports on average more than 7 days late' (MUA, supplementary sub. 72, p. 1).

The amount of notice that shipping lines provide to container terminal operators when arrangements like this change will largely determine how costly it is to accommodate them. The most costly situation is when labour that was scheduled to work sits idle and additional labour has to be rostered on for the new arrival time.⁶

The extent to which container terminal operators have flexibility to change the allocation of labour in response to variable demand to service vessels is contentious and complex to unravel. Even before the COVID-19 pandemic, variability meant an ongoing tension between container terminal operators and the MUA about the degree of flexibility in deployment of labour which should be acceptable within the industry and the wage rates and conditions which are sufficient to compensate for that flexibility (box 9.3).

Container terminal operators have called for increased flexibility to allocate workers based on the availability of work and argued that current levels of flexibility are already adequately compensated through wages. The MUA is strongly of the view that workers are already providing a very flexible source of labour and further flexibility is untenable.

Flexibility to deploy labour can mean a range of things including:

- having the number of people and skill sets required at a given location and time
- capacity to determine when people start work relative to the work available
- ability to determine shift length, and safe work and fatigue management practices.

On available evidence, the Commission is not in a position to assess whether the current arrangements appropriately balance flexibility for employers and certainty for employees. What is clear, however, is that these competing objectives have produced elaborate and complex rostering arrangements.

⁶ Chapter 6 discusses why container terminal operators do not charge shipping lines fees when they arrive outside their window.

Box 9.3 – Views differ on the extent to which rostering in container terminals is sufficiently flexible

Patrick (pers. comm., 4 July 2022) commented that ‘Patrick’s rosters still contain limitations which impact our ability to efficiently meet fluctuating trade demand’.

Hutchison (pers. comm., 8 July 2022) commented that:

Fixed rosters mean the workers under certain circumstances get paid even if they do not work such as cancellations after allocation cut off. If we manage to advise workers not to come in before the allocation cut off time, we can bank those hours. But shipping changes by the hour. We might allocate labour and then you find out the ship has hit bad weather. We would rather have a base salary, with flexibility to change shifts if ships are delayed or due to weather work cannot proceed without increasing costs.

The MUA submitted that ‘[w]hile ‘idle time’ was a feature of stevedoring work organisation before 1998, work has been significantly re-organised and intensified since that time, to the point that idle time has been eliminated’ (sub. 59, p. 107). Moreover:

The efforts by employers of finding ways to ensure that workers are available to be allocated when they want them to work, but to avoid paying them when the need for labour changes at the last minute has given rise to quite unusual and complex systems for allocating workers to shifts and calculating the payment of workers. This has been a significant focus of enterprise bargaining since it began. Unlike other industries, rosters are not calculated to ensure 24-hour operation (or some other period). Instead, work is organised so workers can be picked up to work at the time that employers want them to work. (sub. 59, p. 97)

Rostering lies at the heart of concerns about flexibility

The dispute between employers and employees over the flexibility of working arrangements primarily revolves around rostering and the extent to which employers should pay employees to work when there is no work to be done — so called ‘idle time’.

Different rostering arrangements and flexibility provisions apply for each of the three types of employment at container terminals (permanent full-time, permanent guaranteed wage and casual employees).

About 60 per cent of workers in container terminals are permanent full-time employees with fixed rosters (MUA sub. 59, p. 99). Flexibility is built into those rosters, albeit in a complex way using ‘irregular shifts’ (where the employee knows they will be working and is allocated the shift by a specified time on the day before) and mechanisms to cancel or extend shifts (discussed in more detail in appendix B).

The arrangements where notification occurs the afternoon before appear to provide a high degree of flexibility for shifts that are not pre-allocated by a roster. It is difficult to see how the notification of shift arrangements could be made substantially more flexible without employees essentially being on-call.

The remainder of the workforce are mostly permanent guaranteed wage employees. These employees have very flexible shift allocations and, depending on container terminal operator, may be entitled to a minimum or average number of weekly shifts, or an equivalent payment. Only a small number of casuals are employed in container terminals. And for some operators, EAs cap the number of permanent guaranteed wage and casual employees that they can include within their workforce.

Employees in container terminals are highly remunerated and to some extent this represents compensation for the operational flexibility needed in the industry (box 9.4). However, it is difficult to assess whether this represents reasonable compensation, because the bargaining power exercised by employees in this sector means that favourable wages and conditions may not solely be driven by rates of wage compensation for shift work seen in the rest of the economy.

Box 9.4 – People working in the ports are well remunerated but also face a sometimes difficult work environment

Because the container terminal industry is relatively small, there is no data collected in a standardised form that enables direct comparisons to other industries. The best available ABS data, covering all port workers, provides an indication of the differences between wages for port workers and workers in the rest of the economy.

About 39 per cent of employees in Australian ports earned \$2000 or more each week in 2016 compared to 13 per cent of construction workers and 14 per cent of the whole working population.

Due to rostering arrangements, many people working at container terminals do not necessarily work a 'standard' 37.5 hour week. Patrick (2021) stated that, using the terms of its 2016 EA, on average, a full-time employee at Port Botany earns about \$172 000 per year including bonuses and overtime for working on average 198 days per year. In comparison, a person working five days a week, who takes four weeks of annual leave will work 230 days⁷ in a year for their annual salary.

To some extent, higher wages compensate for the comparatively flexible work arrangements at container terminals. For example, Hutchison (pers. comm., 8 July 2022) commented that:

The high wages and generous benefits in the industry more than compensates for providing some of the flexibility required by the business. [Hutchison] has no difficulty in recruiting employees to work in the industry. Stevedoring jobs are highly prized because of the income levels and favourable working conditions.

This comment also indicates that the sector is not facing labour shortages (chapter 10).

Wages are also likely compensating for the 24/7 nature of the work and the unsociable hours which that entails. For example, the scheduling of global shipping means that ships from Singapore (a transshipment hub) often bunch on weekends in Port Botany.

Moreover, some workers — particularly those doing lashing — are exposed to unpleasant and potentially risky conditions. While some types of weather can shut container terminals, as long as safe working conditions are maintained, terminals do not stop operations because of rain, cold or darkness (Patrick EA 2022, cl. 12.22, Flinders Adelaide Container Terminal Stevedoring 2021–2025, cl. 17.14).

Further evidence is required for the Commission to assess the extent to which enterprise agreements currently afford or impede rostering flexibility in container terminal operations.

⁷ The number of public holidays differs between states and territories. This number is based on a simple assumption of 10 public holidays.



Information request 9.3

The Commission is interested in further evidence on how container terminal enterprise agreements enable or restrict the flexible allocation of labour. To what extent do existing arrangements provide sufficient flexibility to employers to manage the allocation of labour given variable peaks and troughs in demand?



Draft finding 9.2

Limits to the number of workers with flexible rosters is inefficient

Limits on the number of casual workers and other workers with flexible rosters (permanent guaranteed wage employees) who can be employed in container terminals create barriers to the efficient allocation of labour, which will flow through to the productivity of container terminals.

EAs contain strict rules about which employees can be picked for a shift

Enabling employers to pick the most appropriate person for a job is the norm in most workplaces and contributes to enterprise productivity. Yet there are many aspects of EAs in container terminal operations which seem to work against this.

Most container terminal operators face strict rules in their EA about which types of employees can be rostered on for a shift — this is known as the ‘order of pick’ (appendix B). Generally, it means employees are picked in the order of permanent full-time, permanent guaranteed wage and then casual (MUA, sub. 59, p. 107, Hutchison Ports Australia and MUA Enterprise Agreement 2021 (Hutchison EA), Part B, Sch. 6, cl. 9.1). Some operators have flexibility to deviate from the order of pick (Patrick Terminals Enterprise Agreement 2022 (Patrick EA), cl. 22.6; Victoria International Container Terminal Operations Agreement 2021 (VICT EA), cl. 32.6).

DP World (sub. 49, p. 55) characterised these arrangements as ‘need[ing] to follow a complex set of rules about which employees are to be offered work and when’. The MUA (sub. 59, pp. 107–108) characterised them as having ‘been developed over many decades to secure permanency of work in an environment where workers are otherwise required to be extremely flexible’. The MUA also stated that these arrangements mean that permanent employees meet their minimum annual hours and that employers retain supply of skilled labour.

Minimum staffing requirements together with the inflexibility faced by employers in allocating labour can mean that the absence of one worker has an outsized effect (box 9.5). For example, in Australia, three people are required to operate a tug (a master, an engineer and a deck hand) and container terminal operators generally use four to six person quay crane teams. The need to comply with ‘order of pick’ requirements, which tightly limit the pool of employees who can be called on to fill a vacancy, coupled with prescriptive rostering arrangements, can mean that the absence of one key team member can render a whole team idle if they cannot be replaced. This issue can be accentuated during enterprise bargaining periods when bans on employee upgrades — where someone works above their level of employment — can form part of industrial action and restrict the backfilling of roles.

Box 9.5 – Limits on backfilling roles has substantial flow on effects

Hutchison (pers. comm., 8 July 2022) commented on the effect that absent employees can have on crane teams:

The frequent occurrence by employees in key skills taking sick leave and being absent from the workplace impacts the productivity of the operations. This results in a serious reduction in the number of containers that are handled during a shift as a crane team is dissolved due to the loss of key skills. This in turn has a knock on effect to the supply chain. It appears to be a cultural legacy that a large amount of absenteeism occurs on almost every shift.

There is debate over whether these staffing requirements are necessary for operational or safety reasons. For example, Patrick (2021) stated that ‘while they are called ‘safe manning’ levels [they] are really just Union vetos on headcount’. The Commission’s view is that maintaining workplace health and safety is essential and that the relevant workplace safety authorities are best placed to decide safe level of staffing for tasks in Australia’s ports or as operational requirements change — for example, through automation. However, these institutions are not designed to arbitrate industrial disputes.



Draft finding 9.3

‘Order of pick’ rules limit backfilling and restrict productivity

Strict rules determining the ‘order of pick’ which specify which workers can be engaged first for a task are limiting terminal operators’ capacity to backfill positions. This impedes operators’ ability to allocate labour to its most productive use and can mean one absence has an outsized effect on the productivity of a terminal.

Subcontracting is limited in EAs to the extent allowable under the FW Act

Terms in enterprise agreements that aim to regulate the use of labour hire and contractors are contentious not just in the ports, but across the economy. This is because, on one hand, these terms limit the ability of businesses to manage and allocate resources. On the other, employee groups argue that using non-employee labour can undermine job security and the integrity of enterprise agreements.

A number of container terminal enterprise agreements contain restrictions or conditions on subcontracting or outsourcing, particularly in relation to maintenance functions (for example, Hutchison EA, part B: schedule 4). These clauses stop short of prohibiting subcontracting, which has the potential to be found to be non-permitted content (PC 2015, p. 816). Instead, container terminal EAs limit the functions that can be outsourced and require that outsourcing can only occur following consultation and compliance with prescribed processes.

Inquiry participants raised concerns about the limits to subcontracting of labour in EAs. DP World (sub. 49, p. 55) submitted that restrictions on how and when work can be outsourced have built up over time, while Ai Group (sub. 60, pp. 13–21) characterised content of this nature as anti-competitive and likely to reduce productivity.

The MUA (sub. 59, p. 110) put a different view, arguing that clauses dealing with outsourcing promoted workplace safety by prioritising the maintenance of container stevedoring equipment — which it described as a ‘critical safety issue’ — by container terminal employees who had the best knowledge of that equipment.

The question raised by these clauses is whether restrictions on subcontracting, by hindering the free supply or purchase of services, represent an unreasonable constraint on competition that should be prohibited under competition or workplace laws. These sorts of clauses have been more tightly regulated in the past. Under WorkChoices, restrictions on engaging independent contractors and labour hire were considered prohibited content (*Workplace Relations Act 1996* (Cth), s. 356; *Workplace Relations Regulations 2006* (Cth), reg. 2.8.5(1)(h) and (i)).

The Harper Review (2015, pp. 392–396) considered this issue and concluded that '[c]ollective bargaining should not intrude on the freedom of companies to acquire goods or services, including labour services, from other contractors, or their freedom to supply goods or services to others'. On that basis, it recommended amendments to the *Competition and Consumer Act 2010* (Cth) (CCA) to clarify its application to such arrangements.

The Commission supports competition in the supply or purchase of goods and services and has considered these issues previously (PC 2015, chap. 31). However, exclusive supply contracts are common in many business-to-business environments and generally are not anti-competitive unless the exclusive supplier has market power and there is a lack of due process to award the exclusive contract, underpinned, for example, by a threat to use the market power if exclusive supply is not granted. In other words, any regulatory restrictions of these type of clauses in enterprise agreements need to be underpinned by an analysis of whether the intent of the exclusivity clauses is anti-competitive. At present the Commission has not received sufficient information about these clauses to reach the conclusion that further regulation is required.



Information request 9.4

Do restrictions on subcontracting of labour in enterprise agreements in the ports limit competition in the labour market? And if so, what is the effect of this?

Decisions to automate processes are constrained by EAs

The introduction of automation in container terminals has long been a contested workplace relations issue. Terminal operators pursue automation because of perceived benefits for service consistency and reliability (chapter 11), while employees and their representatives are concerned about its impact on employment and job security.

The FW Act provides that an enterprise agreement must include a term requiring the employer to consult with their employees about major workplace changes. If no such term is included, the model consultation term (*Fair Work Regulations 2009*, sch. 2.3; see appendix B) is taken to be a term of the agreement (s. 205).

In the ports, however, enterprise agreement clauses require consultation on decisions to introduce automation that appear to go beyond the model consultation term or equivalent clauses usually found in other industries. While there is some variation between agreements, these clauses constrain automation and other technological change by:

- requiring lengthy or complex consultation processes
- requiring agreement by employees or determination by a third party (such as an independent panel or the FWC) before automation or other forms of workplace changes can occur, which limits the ability of the operator to implement automation once consultation has occurred.

DP World stated that these clauses require it to seek agreement with the MUA on roles, rosters and labour arrangements and requirements and are an impediment to automation.

While there is no blanket prohibition on automation, the process required makes any decision to introduce new technology slow, painstaking and difficult to achieve. Redundancy that occurs via this process is also subject to an additional severance package of 15 weeks' pay. (sub. 49, p. 55)

Hutchison also has a clause prohibiting redundancies of people who were employed when the current EA began due to automation or technological change (cl. 8.4), although it can reduce employees' hours (cl. 8.5). Hutchison does not see this clause as particularly constraining, primarily because their view is the business is in a growth phase and while automation might mean labour is deployed elsewhere in the business, an overall reduction of jobs is unlikely (pers. comm., 8 July 2022). There is a risk, of course, that if the business is not growing, this clause may restrict future decisions.

Examples of these clauses are provided in appendix B.

The combination of extended timeframes for consultation and uncertainty that changes will be able to go ahead at the end of that process adds risk and complexity to decisions about automation, which require significant capital investments. The adversarial workplace relations environment in the ports may also preclude effective consultation and mean that decision processes are caught up in broader industrial disputation.

Container terminal operators have a legitimate interest in pursuing technological improvements that they assess will improve efficiency, productivity or reliability, as do employees and their representatives in being consulted on changes that will have a significant impact on their working lives. However, consultation requirements should not act as a significant impediment to taking or giving effect to business decisions. The Commission considers this has occurred in container terminals.

There is merit in action to lower the barriers to automation in ports, particularly in the most extreme instances, while ensuring employees and their representatives continue to have a right to meaningful consultation before major change occurs. How this might be achieved is discussed below.



Draft finding 9.4

Container terminal enterprise agreements distort operators' ability to automate

Container terminal enterprise agreements contain terms which substantially restrict or disincentivise operators from introducing further automation. These clauses, reflected in mandated consultation lengths and, for some operators, the requirement for employee or third party (such as an independent panel or Fair Work Commission) consent, appear to go beyond equivalent clauses in other industries or the model consultation term in the *Fair Work Act 2009* (Cth).

In conclusion, the evidence points to adverse effects of EA content on container terminal operators' performance

Analysis of EAs in container terminals, combined with submissions from participants, makes it evident that some content in EAs has a negative impact on productivity. Some include arrangements that negatively affect current and potential container terminal workers. This includes limits to merit-based hiring, promotion and training; limits to the number of workers with flexible rosters; and 'order of pick' rules. This is not to say productivity is not growing in container terminals, only that it is growing slower than would otherwise occur without these restrictions. Patrick (pers. comm., 9 June 2022) commented that '[w]aterfront productivity

growth has generally slowed across the industry and productivity [was] impacted through a deterioration in overall terms of enterprise agreements’.

The costs of lower productivity in container ports due to workplace arrangements fall not only on container terminal operators, but also can be passed on to users of their services — exporters, importers and Australian consumers.

How much productivity is curtailed is hard to assess because it is difficult to make causal links between EA content and productivity. Further, as noted above, there are multiple other factors at play which influence the productivity of ports, including workplace culture, the competitive and regulatory environment, and shocks to world shipping and supply chains.

What can be done to address EA content which limits the efficiency of port operations?

Addressing unduly restrictive EA content through a list of unlawful terms

One way to address EAs that impede container terminal operator performance would be to place additional limits on the lawful content of agreements.

Several inquiry participants advocated for this approach for at least some EA content.⁸ In contrast, the MUA (sub. 59, p. 15) submitted that ‘the content[s] of Enterprise Agreements are already highly restricted by the Fair Work Act’ and raised concerns about further restrictions on content on the grounds that:

... a one-size fits all solution will impede the ability to make agreements suitable to the circumstances of each workplace and employer, and we believe this to be a smokescreen for further attacks on workers’ rights and conditions of employment. (sub. 59, p. 15)

The Commission (2015, pp. 678–679) has previously noted the challenges of using prescriptive white lists (lawful content) or black lists (unlawful content) to restrict the content of enterprise agreements. In particular, it is impossible in designing lists to envisage all possible clauses that may be relevant to a future employment relationship. There is also a trade-off between the certainty of legislative prescription and the flexibility of allowing precedent to build and develop through the common law.

The Commission continues to be of the view that, from an economy-wide perspective, the ability for employees and employers to decide arrangements which best suit their circumstances is desirable, and that long, prescriptive lists of lawful or unlawful content should be avoided.

However, the deleterious effects of agreement content on the productivity of container terminals and costs in the rest of the supply chain means that an exception to these general principles is justified. The content of enterprise agreements in container terminals is a sufficient handbrake on productivity that sector-specific regulation is warranted. Discussion now turns to potential ways of giving effect to this outcome.

The issue of industry-specific regulation

A variety of options for further regulation of the content of enterprise agreements in the ports have been raised by inquiry participants. The two most common are a ports code which would operate in a similar manner to the *Code for the Tendering and Performance of Building Work 2016* (Cth) (Building Code) and defining ports to be an ‘essential service’ under the FW Act. The Government has recently repealed large

⁸ ACCI, sub. 73, pp. 18–19, 21–22; Ai Group, sub. 60, pp. 3, 17–18, 20, 25; CCIWA, sub. 43, p. 3; HIA, sub. 40, pp. 4–5; MCA, sub. 25, pp. 4, 7–8; and NatRoad, sub. 8, pp. 9–10.

sections of the Building Code as part of its commitment to abolishing the Australian Building and Construction Commission and the Registered Organisations Commission (*Code for the Tendering and Performance of Building Work Amendment Instrument 2022*; ALP nd; Burke 2022).

Is there a case for a ports code?

The content of the previous Building Code, and inquiry participants' views, are described in box 9.6.

While the Building Code provides a precedent for industry-specific regulation, there are also clear downsides to this approach, primarily because it can result in bargaining parties in similar occupations being regulated differently — forklift operators working in the ports compared to those working in warehouses would be an example. It also adds complexity to workplace relations regulation and increases the regulatory burden for businesses, particularly where they operate across more than one industry. For these reasons, industry-specific regulation is rare in workplace relations and a high bar should remain for taking this approach.

Box 9.6 – A ports code?

A separate legislative instrument such as a code is one option to give effect to industry-specific workplace regulations in Australian ports.

The building industry provides a model for this approach. The Building Code, established under the *Building and Construction Industry (Improving Productivity) Act 2016*, mandated standards of conduct that building industry participants had to meet in order to be eligible to undertake building work funded by the Australian government. The Code covered:

- content of enterprise agreements
- obligation to report on actual or threatened industrial action and certain relation action
- security of payment
- standards of conduct on site
- freedom of association
- right of entry
- industrial action
- sham contracting
- compliance with laws
- unregistered written agreements and other agreements
- prohibited conduct
- collusive practices
- engagement of non-citizens and non-residents
- above entitlement payments
- dispute settlement
- fitness for work (alcohol or drugs). (ABCC nd)

The Ai Group (sub. 60, pp. 24–27) and National Road Transport Association (sub. 8, p. 9) submitted that such a code would provide an effective means of proscribing excessively restrictive content in enterprise agreements in the ports.

The [ports and shipping industry (PSI)] Code should include prohibitions on agreement provisions that impose inappropriate restrictions. The list of prohibited content contained in section 11 of the [Building Code] should act as an appropriate guide for the development of

Box 9.6 – A ports code?

prohibited content in the PSI Code. Prohibitions on agreement clauses which attempt to avoid the requirements of the PSI Code should also be included, similarly to section 11A of the Building Code. (Ai Group, sub. 60, p. 25)

Ai Group (sub. 60, pp. 25–27) proposed the ports code would be created via amendments to the FW Act and issued by the relevant minister, with supporting penalty and enforcement arrangements. An advantage of this approach, compared to legislation, is that it would provide a flexible and tailored approach more suited to industry-specific regulation. It would also enable regulation to keep pace with changes in industry practice and provide an effective tool for education and compliance.

Moreover, there are material differences between the building and construction industry and the ports. The Australian Government's role in funding and procurement of building work provided a key lever to compel compliance with the building and construction code. Being able to tender for government work (for employers) and to represent employees engaged on it (for unions) provided strong impetus for compliance with the Building Code, with failure to meet its requirements potentially resulting in exclusion from tendering for, or being awarded, building work funded by the Australian Government (PC 2014a, pp. 503–504; Building Code, cl. 18). The absence of this lever in the ports would mean a heavy onus on a regulator to achieve compliance.

A code would also bring an additional layer of regulation, with resourcing implications for employers, employees and their representatives, and government.

The Commission has not reached a final view on the desirability or otherwise of a ports code and is seeking further evidence for the final report.



Information request 9.5

What might be the benefits and drawbacks of introducing a ports code (modelled on the previous Building Code)? If there is a code who should be responsible for its enforcement?

Should the ports be defined as an 'essential service'?

Container Transport Alliance Australia (sub. 50, p. 14) and Qube (sub. 64, p. 6) advocated for ports to be defined as an 'essential service' under the FW Act, with additional controls on industrial action to apply on that basis. The FW Act does not currently include a definition of essential service and the most analogous provisions, dealing with emergency management (ss. 194, 195A) clearly refer to emergency situations, like firefighting, not work that is essential to the economy.

The Commission has proposed draft recommendations to reduce the harmful effects of industrial action and lengthy bargaining in sections 9.2 and 9.3. These have not been framed in terms of an essential services definition. The Commission invites feedback on this approach.



Information request 9.6

What would be the benefits and drawbacks of classifying the ports as an ‘essential service’ under the *Fair Work Act 2009* (Cth)? What rights and obligations should follow if the ports were classified in that way?

Side deals could be used to work around restrictions to EA content

Restrictions on agreement content have previously led to the proliferation of side agreements, for example, after the *Electrolux*⁹ decision and during WorkChoices (Stewart and Riley 2007, pp. 908–909, 911). This risk was also identified in port operations. DP World (sub. 49, p. 51) has submitted that:

... the scope of matters that can be the subject of enterprise agreements is poorly defined and has led to extensive, complex and time-consuming litigation. In many cases, unions then seek to circumvent any constraints through ‘side deals’ with stevedores to address issues that would otherwise not be permitted.

The Commission (2015, p. 683) has previously formed the view that ‘the possible emergence of side deals is not a sufficient reason to preclude changes to agreement content’, noting that if employers and employees are minded to sign a side deal, ‘there is little the regulatory structure can do to help prevent it’.



Information request 9.7

To what extent are side deals being used in the ports and how influential is their content? What would be the consequences if side deals were used more?

What is the Commission proposing?

The Commission is proposing to limit unduly restrictive content in the enterprise agreements in the ports through the mechanism of a short list of unlawful terms. The evidence presented to the Commission indicates that there is content in enterprise agreements in container terminals which directly restricts productivity and, when taken as a whole, these agreements are more likely to limit rather than enable productivity growth.

The terms in enterprise agreements that are of most concern to the Commission are ones which limit merit-based hiring, promotion and training; strict rules determining the ‘order of pick’; limits on the number of casual workers¹⁰ and other workers with flexible rosters; and restrictions on innovation and workplace change.

The Commission is seeking feedback on what content should be made unlawful in enterprise agreements in the ports and how this could be done.

⁹ *Electrolux Home Products Pty Ltd v Australian Workers’ Union* [2004] HCA 40 established a more stringent approach to the assessment of prohibited content in enterprise agreements.

¹⁰ The Commission recommended in 2015 that restrictions on engaging casual workers should be unlawful across the economy (recommendation 25.2). The Commission’s view remains that an economy-wide approach should apply for such terms.



Draft recommendation 9.1

Prohibit enterprise agreement content that imposes excessive constraints on productivity in the ports and costs on the supply chain

The Australian Government should amend the *Fair Work Act 2009* (Cth) to introduce a short list of unlawful terms in enterprise agreements in the ports. The list should aim to prohibit excessive constraints on:

- merit-based hiring, promotion and training
- the number of casual workers and other workers with flexible rosters
- strict rules determining the 'order of pick'
- innovation and workplace change.



Information request 9.8

What content should be made unlawful in enterprise agreements in the ports?

How could the most restrictive content in enterprise agreements be curtailed without limiting the rights of workers to be consulted on issues including major workplace change?

How might draft recommendation 9.1 be practically implemented? What are the technical or legal issues which should be addressed and how should they be addressed?

9.2 Improving bargaining practices in the ports

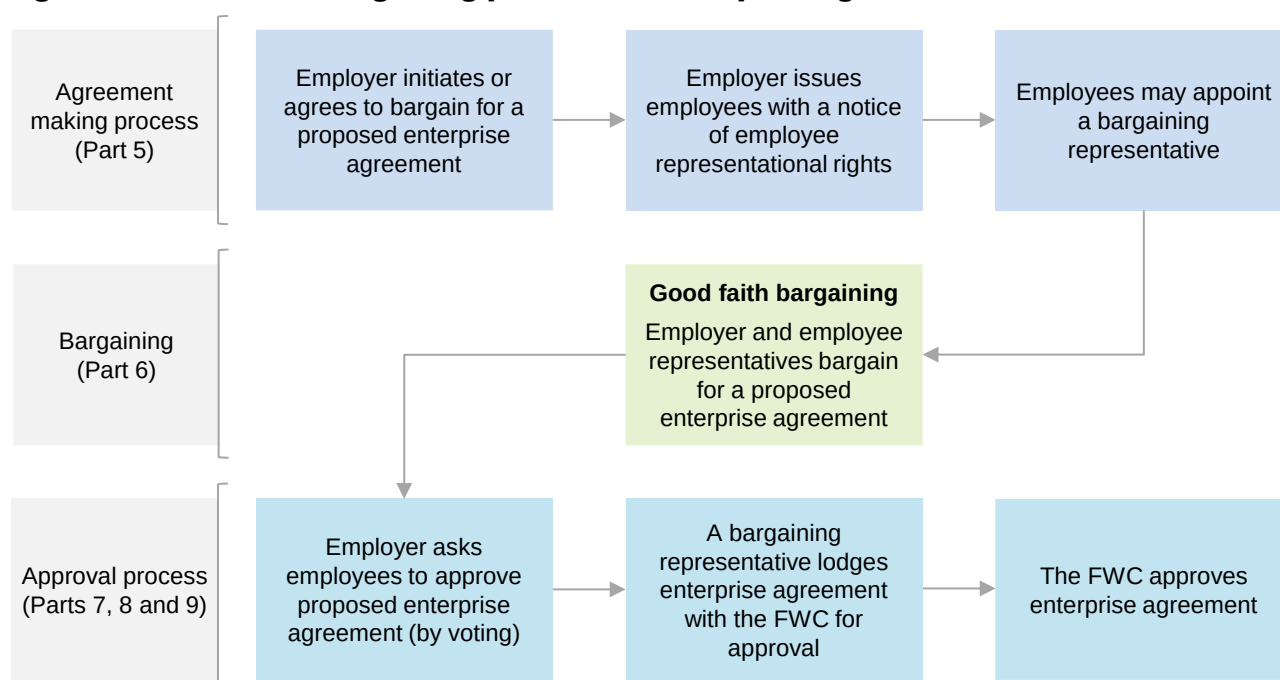
An overview of enterprise bargaining

The FW Act contains detailed rules around how enterprise bargaining is conducted and the process for Fair Work Commission approval of agreements. The standard bargaining process (figure 9.1) has three phases.

An enterprise agreement must include a nominal expiry date that is no more than four years after the day on which it is approved by the FWC (s. 186(5)). Bargaining on a new agreement can commence before the existing one nominally expires. An agreement continues to operate after it reaches its nominal expiry date until a new agreement is made or the agreement is terminated by the FWC.

Bargaining representatives (which may include the employer, employee representatives such as unions and individual employees) must meet good faith bargaining requirements set out in the FW Act. These include attending and participating in meetings at reasonable times, disclosing relevant information and giving genuine consideration to proposals put by other bargaining representatives (s. 228(1)). The good faith requirements do not require a bargaining representative to make concessions or reach agreement (s. 228(2)).

A bargaining representative found not to have engaged in good faith can be subject to a FWC bargaining order (s. 230) or, in the most serious cases, a serious breach declaration (s. 235), which can ultimately lead to termination of bargaining and arbitration by the FWC. These clauses allow the FWC to perform a limited supervisory role in relation to bargaining, although a bargaining party first has to seek involvement from the FWC. In the vast majority of cases the FWC would have no visibility over or involvement in bargaining.

Figure 9.1 – Standard bargaining process for enterprise agreements under the FW Act

Sources: PC (2015, p. 650); FWC (2021, p. 16).

All bargaining processes entail costs. Resources committed to the process are one source. Use, or the threat of, protected industrial action — which can only be taken during bargaining — is another.

Longer bargaining periods, by default, extend the time during which protected industrial action is allowed. This is not to say, however, that because protected industrial action is possible it will be taken or threatened. As the MUA (sub. 59, p. 114) stated, ‘for the vast majority of days [in the most recent container terminal bargaining round], work continued as normal’. The conduct and impact of industrial action are discussed in more detail in section 9.3.

Bargaining to reach container terminal operators’ current agreements was protracted

Bargaining periods across container terminal operators extended substantially in the most recent round of bargaining — conducted between 2018 and 2022. The average time spent on negotiations increased by about 80 per cent (to an average of about 525 days) compared to negotiations before 2018 (an average of about 295 days). In addition, the longest negotiating period was 971 days (for Hutchison) compared to 612 days (at DP World’s Melbourne terminal) in the period prior to 2018 (figure 9.2).¹¹

There is no data available on the average time enterprise agreements take to negotiate across the economy, so the extent to which container terminal operations are an outlier relative to other industries is unknown.

¹¹ As with figure 9.2 these numbers use DP World’s Melbourne terminal as representative of the length of their EA negotiations across all terminals.

Overlap in bargaining periods is another notable aspect of the recent round of negotiations. Across 904 days at least two operators were bargaining at the same time, and for 129 of those days, negotiations overlapped for four of the five operators.¹²

This situation has three main implications. First, it means that the largest container ports are potentially subject to protected industrial action at the same time. This confers substantial leverage to the MUA, even if chooses not to exercise it, through the ability to shut-down or heavily limit operations across an entire port. For example:

At one point during 2020, at the height of COVID, the MUA had [protected action ballot orders] in place that provided them with the ability ... to ban individual vessels and prevent them being subcontracted at 10 of Australia's 12 container terminals, including all terminals in Sydney, Brisbane and Fremantle.¹³ (DP World, sub. 49, p. 61)

Second, it can affect the extent to which container terminal operators can subcontract work to other operators — a common practice to manage a variety of disruptions (section 9.3). As Shipping Australia (sub. 11, p. 114) submitted:

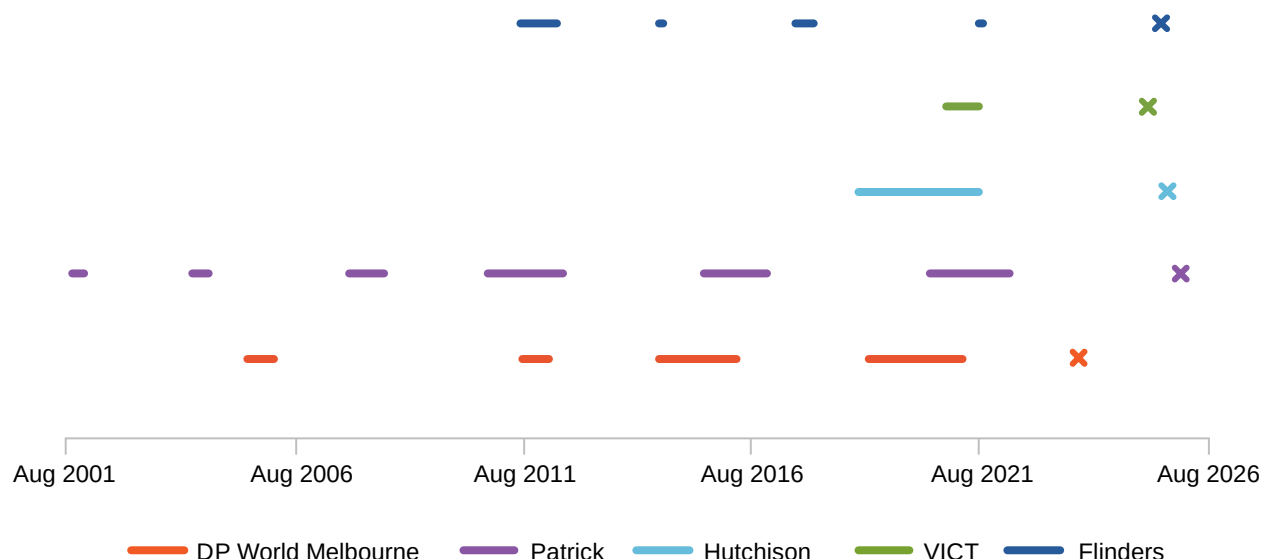
Requiring enterprise bargaining to take place at different waterfront companies on a staggered schedule and prohibiting any protected action from being taken simultaneously at more than one waterfront company would preserve the rights of employees to strike, would preserve the effectiveness of industrial action and would provide options for third parties to work around the disruption.

Third, it makes for a higher load on union resources, which in itself may lead to longer negotiating periods.

Another unusual occurrence is for nominal expiry dates of container terminal enterprise agreements to align. This was not the case in the most recent round — while nominal expiry dates differed, lengthy negotiations eventually led to bargaining occurring simultaneously across multiple operators. Further, four out of five container terminal EAs are now due to reach their nominal expiry date between March and December 2025 (dates marked by an 'x' on figure 9.2). This makes it very likely that these operators will be exposed to overlapping bargaining periods, with the additional disruption that can bring, in the next round.

¹² Of the operators with more than one terminal, Patrick and Hutchison each have a single agreement covering multiple terminals (which include terminal-specific clauses) and DP World has a separate enterprise agreement for each of its four terminals, which are negotiated over a similar period. In assessing the level of overlap in negotiations, DP World's Melbourne terminal was used as the representative terminal for this container terminal operator (figure 9.2, note c).

¹³ The exceptions were VICT and Flinders container terminals.

Figure 9.2 – Bargaining has been more protracted since 2018^{a,b,c,d,e,f}**Length of lines represent time spent bargaining for a new EA**

a. Length of line indicates the time between the nominal expiry date of the previous EA and the date the next EA was signed by all parties to the agreement (where available). When this is not available, the start date of the agreement is used instead. This will slightly overstate the negotiation period. **b.** The 'X' for each agreement represents when the current EA will expire. **c.** DP World has a separate enterprise agreement for each port and these agreements generally take a similar, but not the same time to negotiate. In 2019, DP World Melbourne had the most container moves of DP World operations in Australia (IHS Markit Port Performance Program data (dashboard)), so it has been used to represent EA negotiation times at DP World. **d.** In 2008, DP World extended the operation of its enterprise agreements negotiated in 2006 until 2011. It is unclear if there were negotiations over this decision nor, if there were, how long those negotiations lasted. **e.** The Sydney International Container Terminals Pty Limited Brisbane Container Terminals Pty Limited MUA Terminals Greenfields Enterprise Agreement 2013 was terminated in November 2015 and the Sydney International Container Terminals Pty Limited and Brisbane Container Terminals Pty Limited and MUA Enterprise Agreement 2015 was signed on the same day. It is unclear how long those negotiations for the 2015 EA lasted. **f.** This figure tracks container terminals through changes in ownership, where possible. Not all historical EAs are publicly available; the Commission has endeavoured to trace bargaining periods as far back as is possible.

Sources: FWC (2022a); Sydney International Container Terminals Pty Limited and Brisbane Container Terminals Pty Limited and MUA Enterprise Agreement 2015; Hutchison EA; P&O Ports West Swanson Terminal Enterprise Agreement 2002; DP World Melbourne Enterprise Agreement 2008; DP World Melbourne Enterprise Agreement 2011; DP World Melbourne Enterprise Agreement 2016; DP World Melbourne Enterprise Agreement 2020; Patrick Terminals Enterprise Agreement 1998; Patrick Stevedoring Certified Agreement 2001; Patrick Certified Agreement (Terminals) 2004; Patrick Terminals Extended Certified Agreement 2008; Patrick Terminals Enterprise Agreement 2012; Patrick Terminals Enterprise Agreement 2016; Patrick EA; Dubai Ports International Terminals Adelaide Enterprise Agreement 2005; Dubai Ports International Terminals Adelaide Enterprise Agreement 2005; DP World Adelaide Enterprise Agreement 2011; Flinders Adelaide Container Terminal Stevedoring Enterprise Agreement 2014–2017; Flinders Adelaide Container Terminal Stevedoring Enterprise Agreement 2017–2021; Flinders Adelaide Container Terminal Stevedoring Enterprise Agreement 2021–2025; VICT Operations Agreement 2016; VICT Operations Agreement 2021.

Inquiry participants' views about lengthy bargaining differ

Inquiry participants had divergent views about the recent period of lengthy bargaining.

Employers and employer groups pointed to the consequences of lengthy bargaining and resulting outcomes for the efficiency of port businesses and the broader supply chain (box 9.7).

The MUA (sub. 59, pp. 114–115), in contrast, stated that the COVID-19 pandemic was particularly disruptive for enterprise agreement negotiations at DP World, Hutchison and Patrick. From the MUA's perspective, in the face of initial uncertainty due to COVID-19, employers wanted to 'seek cost-cutting measures' by removing terms from

EAs and then, when the industry returned to profitability, 'workers were even less inclined to accept the concessions that many of the employers were still seeking'. That is, changing bargaining positions of employees and employers in response to contextual fluctuations contributed to longer bargaining.

Box 9.7 – Some negative consequences of lengthy bargaining periods

Employers and employer groups have raised concerns about lengthy bargaining periods.

VICT (sub. 7, p. 6) commented that:

... lengthy renegotiation processes with no viable means to bring the negotiations to a fair and expeditious conclusion creates an imbalance of power under the Australian system. This in turn creates potential for significant damage to the supply chain by entrenching inefficiencies secured by threats of disruption.

Shipping Australia (sub. 11, p. 114) submitted that:

A major issue is that industrial action can take place across multiple waterfront companies at the same time, which causes a lot of the problems for ocean carriers, shippers, importers and exporters.

Maritime Industry Associated Limited (sub. 46, p. 14) observed that the broad range of matters that may be subject to bargaining often had 'very little if any relevance to the terms and conditions of employment at a particular workplace' and resulted in 'protracted negotiations' and created 'significant strain on internal resources'.

Similar issues were encountered in bargaining in the marine towage sector:

It has become common for negotiations to extend for many months and often years after the expiry of an agreement. During this period the operator is subject to the threat and reality of protected industrial action. This threat is even applied to managerial decisions that are available to the company under existing arrangements.

The indefinite continuation of historical agreements, the deliberate extension of bargaining processes and the constant threat of very damaging industrial action, with consequences well beyond the direct employer, combine to hinder the achievement of efficiencies in the maritime logistics supply chain. Further, the lengthy renegotiation processes with no viable means to bring the negotiations to a fair conclusion operate to deny operators the stability they are seeking from making an agreement. (Svitzer, sub. 5, p. 7)

Qube (pers. comm., 27 May 2022) commented that 'extended bargaining and disputation can have lasting negative impacts on relationships between management and employees'.

Not all employers, however, considered their recent lengthy bargaining experience to be a negative. Hutchison¹⁴ (pers. comm., 8 July 2022) commented that:

EA negotiations with the [MUA] are extremely difficult and take a long time to conclude and often become protracted. Hutchison Ports took over two years to conclude negotiations in the last EA (2021) without the need for conciliation or arbitration with the FWC. The lengthy negotiations

¹⁴ As noted above, Hutchison had the longest bargaining period in the latest round of negotiations.

occurred because [Hutchison] needed an EA that provided flexibility to meet customer requirements, remove unnecessary costs and waste from the business, whilst offering the workforce generous pay and working conditions in return.

Finally, not all bargaining has been lengthy. The fastest negotiations over the past 25 years have been at the Adelaide container terminal since it was taken over by Flinders Port Holdings in 2012 (51 days for 2021 negotiations and 43 days for 2014 negotiations). There has been no industrial action at Flinders Container Terminal since 2017 (MUA supplementary submission, sub. 72, p. 2). However, Flinders Port Holdings (sub. 55, p. 7) noted that while their EA negotiation concluded quickly, the port was affected by drawn out negotiations and protected and unprotected industrial action at other ports because of ‘numerous bypasses directly attributed to industrial delays from other interstate terminal operators’.

Existing FW Act mechanisms have not prevented lengthy bargaining

The FW Act includes a number of mechanisms that parties can seek to use to resolve disputes or rectify problems with the bargaining process (figure 9.3). The primary avenue available is the FWC’s power under s. 240 of the FW Act to deal with a bargaining dispute. This is a flexible provision that allows the applicant to specify the level of intervention required, from help in resolving a single issue to more extensive involvement. The FWC may deal with the dispute through conciliation or mediation, making a recommendation or, if the parties agree, arbitration.

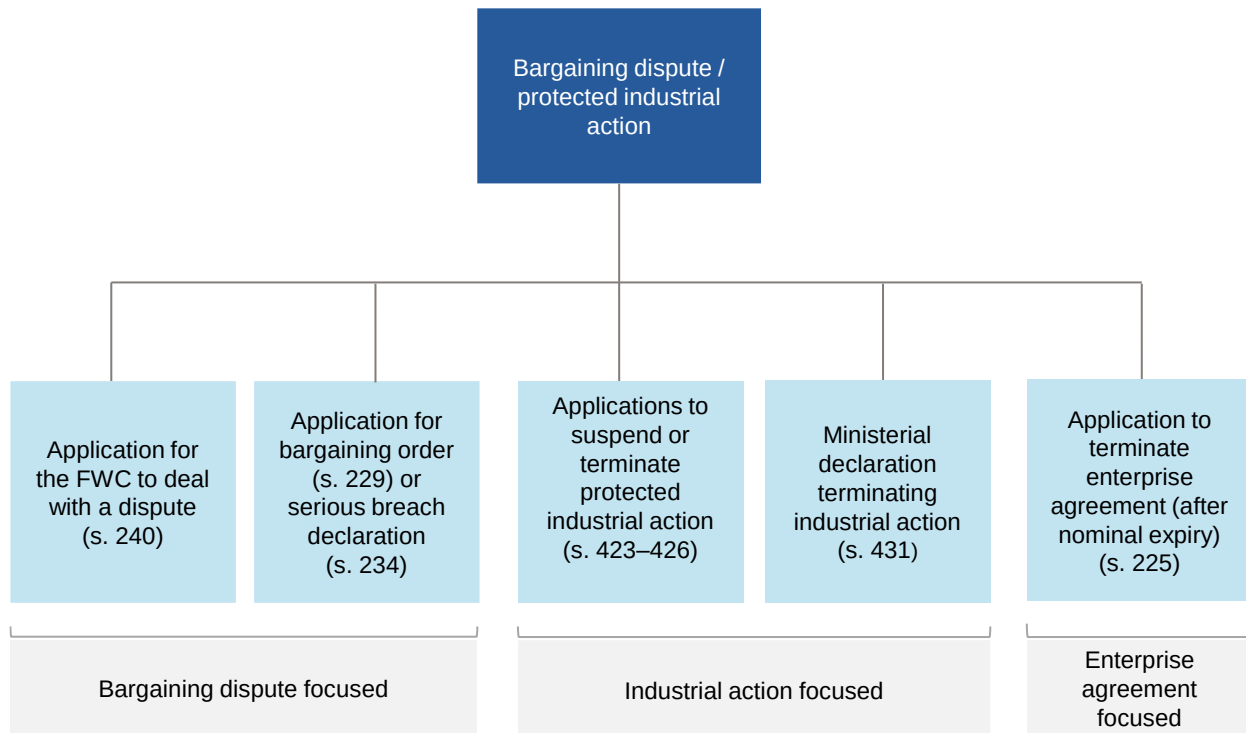
The s. 240 process was initiated by both container terminal operators, and employees and unions during the recent bargaining round, suggesting it can be useful in some circumstances. Its key limitation, however, is that it is a party-driven process. The processes of conciliation and mediation rely to a significant extent on the willing participation of the parties, and the express agreement of both parties is needed in order for the FWC to arbitrate. The ability of the FWC member dealing with the dispute to use their standing and experience to encourage constructive engagement by participants can be an important factor in the effectiveness or otherwise of the conciliation process.

Other forms of intervention may be available in specific circumstances. For example, parties may seek a bargaining order (s. 229) if they allege there has been a breach of good faith bargaining requirements. Submissions to this inquiry did not draw a link between lengthy bargaining and these good faith requirements. Bargaining in the ports can be hard fought and time consuming but, of themselves, these characteristics are not an indicator of bad faith. The Commission (2015, p. 35) has previously found that, at a national level, ‘good faith bargaining requirements appear to be working relatively well’. The views of participants to this inquiry are not at odds with that position.

Other mechanisms that are designed to address protected industrial action may also, indirectly, address protracted bargaining, for example, by creating a cooling-off period during which protected industrial action is paused, potentially creating space for more productive negotiations to occur. However, the thresholds for accessing these mechanisms are relatively high and their focus on protected industrial action and its impacts means they are not always well suited to addressing issues with inefficient bargaining (section 9.3).

Patrick (pers. comm., 4 July 2022) has commented that ‘[t]he range of options available to employers [under the FW Act] are limited and lack proportionality to the business and economic impact sustained. Patrick pursued some of the limited range of available options. We are unable to provide specific details given sensitivity in relation to future negotiations’.

Figure 9.3 – FW Act mechanisms that play a role in bargaining



Source: *Fair Work Act 2009* (Cth)

Another mechanism that has been used by some employers in response to protracted and heavily disputed bargaining recently observed in the ports has been applying to the FWC to terminate nominally expired enterprise agreements (box 9.8).

Box 9.8 – Applications to terminate agreements have been one recent response to lengthy bargaining periods

In the past year, three employers have applied to the FWC to terminate nominally expired enterprise agreements.

- In October 2021, Patrick (2021) applied to terminate the Patrick Terminals Enterprise Agreement 2016. Patrick and the MUA reached agreement on the terms of a new agreement before the application could be heard (Marin-Guzman 2022a).
- In December 2021, Smit Lamnalco applied to the FWC to terminate two agreements with the Australian Maritime Officers Union (AMOU) and Australian Institute of Marine and Power Engineers (AIMPE) at Gladstone. An agreement with the MUA had been reached. Smit Lamnalco reached agreement with both the AMOU and AIMPE on terms of the new agreements before the application to terminate the agreements could be heard (Marin-Guzman 2022b; Smit Lamnalco, pers. comm., 7 July 2022).
- In January 2022, Svitzer (2022) applied to terminate its 2016 national enterprise agreement with the MUA, AMOU and AIMPE, after a protracted period of bargaining had failed to produce an agreement.

Box 9.8 – Applications to terminate agreements have been one recent response to lengthy bargaining periods

Applications to the FWC to terminate enterprise agreements can be sought for a range of reasons by employees and employers both before and after the nominal expiry date (ss. 219–225). Applications to terminate enterprise agreement after nominal expiry (s. 225) are of most relevance to the bargaining context.

The FWC must grant an application to terminate under s. 225 if it is satisfied that it is not contrary to the public interest to do so and considers it is appropriate to terminate the agreement, taking into account all the circumstances including:

- the views of the employees, each employer, and each employee organisation (if any), covered by the agreement
- the circumstances of those employees, employers and organisations including the likely effect that the termination will have on each of them.

Termination of agreements is relatively uncommon. Of the thousands of agreements in force at any one time, the number terminated in a year is usually under 500 (FWC 2022b). An even smaller proportion involves applications for the termination of agreements during bargaining. For example, agreements can be terminated because of mergers and acquisitions or if a business closes.

The operation of the FW Act provisions to terminate enterprise agreements and their role in the bargaining process was not a focus of submissions, however, the Commission has observed that it has been used relatively frequently in the context of recent maritime disputes.

Termination of an agreement will cause the employer and employees to which it applied to revert to the underlying modern award, with bargaining and the taking of protected industrial action then continuing in that changed context. Applications to terminate agreements during bargaining can be a tool to exert bargaining pressure if award arrangements are substantially less attractive than those in the agreement. In container terminals, this may be the case for employees, for whom agreements provide wages and conditions well above the award, but may also present difficulties for employers due to operational inflexibilities contained in the award (section 9.1).

Seeking termination of an agreement is a serious step, due to the perceived or actual damage to ongoing bargaining relationships that may result. Its recent use in container terminal bargaining suggests the suite of options available under the FW Act have been insufficient to resolve disputes or ameliorate protracted bargaining.



Draft finding 9.5

Existing Fair Work Act mechanisms have not prevented lengthy bargaining in container terminals

Negotiations over recent agreements for container terminal operators involved lengthy and overlapping bargaining periods.

Mechanisms in the *Fair Work Act 2009* (Cth) do not appear to have offered a solution to protracted bargaining in Australia's ports. Recent applications to terminate agreements suggests other remedies to support the bargaining parties in resolving disputes were either lacking or not sufficiently effective.

Mechanisms to encourage efficient, timely bargaining in the ports are needed

As noted above, in some circumstances, longer negotiations may be desirable or necessary. For Hutchison, reaching a workable agreement took time, and the COVID-19 pandemic no doubt added to the duration of the most recent round of container terminal bargaining.

But inquiry participants also pointed to the lasting efficiency costs of protracted bargaining (box 9.7). Moreover, extended bargaining brings with it greater potential exposure to protected industrial action. This can impose greater economic harm on bargaining participants, and on third parties who have no role in the bargaining process, than would otherwise be the case (section 9.3).

Mechanisms to encourage more efficient and timely bargaining would mitigate these costs.

Earlier intervention by the FWC should be required

There would be value in encouraging early involvement by the FWC in bargaining in the ports. The FW Act's bargaining and dispute resolution processes tend toward leaving bargaining parties to their own devices, with recourse to FWC intervention available where self-resolution has failed. The intractable and lengthy nature of bargaining in the ports mean a different approach is needed, structured around low-level interventions early in the bargaining process and scaling up to more significant measures in response to excessively lengthy and costly bargaining.

To support this, the FWC should be resourced to establish a fast-track process for applications involving port employers and employees (and their representatives), and it should ensure that members with requisite skills, experience and standing are available to deal with cases in this fast-track stream for the ports. Fast-tracking, together with specialist members, will ensure applications are dealt with as quickly as possible and that barriers to engagement with the FWC are as low as possible. This will create an incentive to make use of the FW Act's processes for dispute resolution (s. 240) and, by providing a pathway for disputes to come before the FWC at an early stage, increase the likelihood of successful resolution. (Draft recommendation 9.9 in section 9.3 covers supports for the FWC to enable it to perform this role.)

Further, where bargaining has not reached a conclusion despite sustained negotiations, and where this is coupled with protected industrial action, enhanced supervision and access to mechanisms to encourage resolution would be appropriate. These responses should be graduated, scaling from mandatory FWC conciliation as an initial intervention, to termination of bargaining and arbitration by the FWC for lengthy and intractable disputes.

Compulsory arbitration would be triggered after a specified period of negotiations and disruptive protected industrial action, to address harm which may not exceed the threshold in a single instance, but collectively does. It would also provide a 'circuit-breaker' in the most extreme cases of protracted and disputed bargaining that could provide an alternative to seeking the termination of enterprise agreements.

The Commission does not yet have a view about the types of thresholds that would trigger each of these graduated responses, but has previously noted that there would be risks in a threshold that would trigger arbitration (2015, p. 670). For example, it could create an incentive for parties to hold out until arbitration, instead of genuinely bargaining and trying to reach agreement. This would be an important issue to address in implementing any thresholds.

Giving greater weight to the existence of protracted bargaining in FW Act mechanisms for the suspension of protected industrial action could also help to reduce the duration of bargaining. These are discussed in section 9.3.

The Commission welcomes feedback on the extent to which these draft recommendations would address protracted bargaining and how these measures could be practically implemented.



Draft finding 9.6

Additional or improved mechanisms are needed to help address excessively lengthy bargaining and its costs in container terminals

Bargaining in container terminals is excessively lengthy, creating costs for participants and third parties.

Arrangements that explicitly target protracted bargaining, with appropriate weight given to duration, would more clearly signal the intent to address this issue and give parties and the Fair Work Commission greater flexibility to do so.



Draft recommendation 9.2

Improving bargaining practices in the ports

The Australian Government should amend the *Fair Work Act 2009* (Cth) to create a mandatory requirement for Fair Work Commission (FWC) intervention when certain thresholds in bargaining activity in the ports are reached (these could include time limits and/or thresholds linked to the number or scale of protected industrial actions).

The interventions should scale from FWC conciliation as a first step, to termination of bargaining and arbitration by the FWC for lengthy and intractable disputes.



Information request 9.9

The Commission invites feedback on draft recommendation 9.2, including options to supplement or enhance the effectiveness of the proposed reforms in addressing protracted bargaining. Feedback is also sought on the best approach to implementation, in particular:

- whether mechanisms to address protracted bargaining should apply only to some subsectors within the ports, such as container terminal operations
- the design of the thresholds
- any technical or legal issues.

9.3 Addressing the harmful impacts of industrial dispute

The right of parties engaged in enterprise bargaining to exert or resist economic pressure by taking legally protected industrial action is an established feature of the Australian workplace relations system.

The point of industrial action is to impose costs on the other party to apply pressure to secure a desired outcome. Disputes involving industrial action come at a short-term cost to all parties. Employers lose profits from the output normally produced by their employees, who in turn must forego the wages that they would otherwise have earned from their labour. However, the FW Act limits employers' responses to employee actions, meaning the costs may fall more heavily on employers.

Protected industrial action can also impose costs on third parties, including supply chain participants other than the bargaining parties, consumers and the broader economy. Disruptions to cargo flows are one example. Costs of this type are much more concerning than those borne by the parties engaged in bargaining. It is more difficult for third parties to side-step these costs when protected industrial action occurs in the ports than in other industries because cargo owners have few alternatives if they want to move goods in or out of Australia. In addition, third parties, by definition, have no direct influence in the bargaining process and no capacity to directly influence its conduct.

Costs to third parties mean there is a role for government to regulate industrial action as part of the workplace relations framework; and the right to take industrial action in Australia is already heavily regulated. A key aspect of the Australian regulatory regime is that protected industrial action can only occur during bargaining periods. As such, as noted in section 9.2, protracted bargaining means greater exposure for all participants in the maritime logistics system to the possibility of industrial action in ports.

As discussed below, FW Act mechanisms designed to prevent excessive costs to third parties and the rest of the economy have not been effective in the context of the ports. The Commission has made draft recommendations designed to improve the operation of these mechanisms. If implemented, they will reduce the excessive costs that industrial action can cause to container terminal operators and other supply chain participants, while balancing the right of employees to take action in support of claims for improved wages and conditions.

An overview of protected industrial action

Industrial action by employees can take many forms (discussed below). In contrast, the only industrial action available to an employer is to lock out its workforce for some period (FW Act, s. 19). And an employer can only initiate that action (described in the Act as employer response action (s. 408 and s. 411)), in response to employees' industrial action.

The provisions in the FW Act on industrial action are extensive and complex. Numerous conditions and procedural steps must be satisfied by employees to obtain authorisation for lawful ('protected') industrial action. And employers must be provided with notice in advance of the action, creating the opportunity for them to respond with contingency plans or a lockout. Industrial action that is not authorised or is taken outside the bargaining period is not protected and exposes those taking it a range of sanctions and liabilities.

The FW Act provides that protected industrial action may be taken once an enterprise agreement has passed its nominal expiry date or where there is no agreement in place. Employees engaged in bargaining can then apply to the FWC for a protected action ballot order. If the order is issued, eligible employees then vote to authorise the proposed industrial action. Authorised industrial action is protected, provided notice is given to employers (usually three days) and it is taken within 30 days of the declaration of the ballot (or longer, if the period is extended by the FWC) (PC 2015, pp. 852–853).

'Protected' means employees, unions and employers are immune from civil liability in respect of the action — unless the action involves personal injury or the damage, destruction or taking of property (s. 415). Employers cannot threaten to dismiss or discriminate against an employee who chooses to take part in the action.

There are few limits in the FW Act on the type or number of protected industrial actions employees can take. The Act defines industrial action by employees to include:

- performing work in a manner different from how it is normally performed
- adopting a practice that restricts, limits or delays the performance of work
- a ban, limitation or restriction by employees on performing or accepting work
- a failure or refusal by employees to attend for work or perform any work (s. 19).

While strikes are the most commonly understood form of industrial action, there are also more graduated lawful options that employees can use to exert pressure on employers during bargaining. Partial work bans — where employees refuse to undertake certain types of work or work at a slower pace than usual ('go slows') — are one example.

Another industrial strategy used by employees and their representatives is to notify, but then abort, protected industrial action. That is, after an employer has borne the costs of preparing for the expected disruption, employees call off the action at the last moment. The employees avoid lost wages or other costs that would have arisen had the action proceeded and employers bear the costs of any preparation (PC 2015, pp. 855–856). Although aborted strikes impose costs on an employer, these do not translate into working days lost. As such, they will not show up in measures of disputation, because, by definition, no industrial action has occurred.

Even after approval through the protected action ballot process, a range of limitations and constraints can apply to the taking of protected industrial action. Some of these are indirect. For example, it is unlawful for employers to pay employees during a period of industrial action, other than partial work bans,¹⁵ or for employees (or unions) to request or accept pay while taking action. Further, because enterprise agreements do not take effect until they have been voted up by employees and approved by the FWC, protracted bargaining may delay the commencement of any wage increases or other improvements contained in the proposed agreement.

Other arrangements directly limit the taking of protected industrial action. The FW Act includes mechanisms for the suspension or termination of protected industrial action by the FWC (box 9.9). In most instances, the right to make an application under these provisions extends beyond the bargaining parties to affected third parties, the responsible Australian Government minister (currently the Minister for Employment and Workplace Relations) and the corresponding minister in the state where the action is occurring. The responsible Australian Government Minister can also terminate protected industrial action if they are satisfied the action is or would endanger life, personal safety, health or welfare; or is causing (or threatens to cause) significant damage to the Australian economy or a part of it (s. 431). This sort of intervention is rare, but the threat of intervention may contribute to the resolution of industrial disputes. In October 2021, the MUA's decision to suspend an 11 week period of rolling strikes coincided with a threat by the Australian Government Minister to apply to the FWC to terminate the industrial action on the basis that it was damaging the Western Australian economy (Marin-Guzman 2021a).

If the FWC or the Australian Government Minister terminates protected industrial action, a post-industrial action negotiating period commences. If at the end of that period the parties have not settled all matters that were at issue during bargaining, a full bench of the FWC must make an 'industrial action related workplace determination' (s. 266–268). The workplace determination effectively replaces the proposed enterprise agreement and contains both terms that had been agreed between the bargaining parties and terms that the FWC considers deal with the issues that were unresolved.

¹⁵ For partial work bans, employers can (with notice) reduce pay proportionately, but they are not required to do so. Employers can also give notice that they refuse to accept the modified work, meaning the work would not go ahead or be paid for.

Box 9.9 – Mechanisms for the FWC to suspend or terminate protected industrial action

The FWC may suspend or terminate protected industrial action that:

- is causing (or is threatening to cause) imminent and significant economic harm to an employer and employees engaged in bargaining (s. 423).

The FWC must suspend or terminate protected industrial action that is or threatens to:

- endanger a person's life, personal safety, health or welfare
- cause significant damage to the Australian economy or a part of it (s. 424).

The FWC must suspend, but cannot terminate, protected industrial action where:

- a 'cooling off period' would assist the bargaining participants to resolve the matters at issue in the bargaining (s. 425)
- the action is adversely affecting the employer or employees engaged in bargaining *and* is threatening to cause significant harm to a third party (s. 426).

Impact of protected industrial action within container ports

The capacity to use protected industrial action can, in some circumstances, give employees substantial bargaining power, especially if employers have large capital commitments that must be paid for and are therefore highly sensitive to revenue losses or they have time-critical operational processes (chapter 8.3).

Ports have both characteristics. Container terminal operators make large capital commitments to establish the quayside infrastructure necessary to move containers between ship and dock and to integrate with the landside transport system. The type of infrastructure used and the operational set up also creates 'bottleneck' points in the system — for example, the operation of cranes — where protected industrial action can cause significant disruption to the whole business and supply chain. Moreover, container terminal operations are highly time-critical because of the necessity to service container vessels when they arrive within short, fixed windows over which terminal operators have little control.

While other industries may share some of these characteristics, container terminal and towage services are notable in the extent to which employees are able to exert bargaining power through sustained, effective protected industrial action. (Examples of the types of industrial action adopted are set out in box 9.10.) While there are no aggregate data series available on the number of industrial disputes or working days lost because of industrial action in the ports, generally, industrial disputes in Australia are rare. Since 2007, there have been between 100 and 264 industrial disputes across the economy each financial year,¹⁶ and the overall level of disputation in Australia has undergone a significant decline since the early 1990s (ABS 2022b; Stewart et al. 2016, pp. 921–922).

¹⁶ The number of disputes during the COVID-19 pandemic has been particularly low. Industrial disputes are included in the data if the work stoppages amount to 10 or more working days lost within a month. Disputes which involve the equivalent of less than 10 working days lost are excluded. Work-to-rules, go-slows and work bans are also excluded (ABS 2022b).

Box 9.10 – Forms of industrial action in the ports

Examples of the types of industrial action that can take place in the ports have been outlined by inquiry participants.

Patrick (pers. comm., 9 June 2022) commented that '[a]ction taken by the MUA has included a broad range of ongoing duty bans, prolonged operational stoppages, and bans on subcontracting from other stevedores'.

Shipping Australia (sub. 11, p. 112) noted that:

[a]n enormous range of industrial actions can be authorised. These typically include, but are not limited to, stoppages of various durations ranging from hours to days, bans on the performance of overtime, bans on working standby shifts and bans on the performance of shift extensions. The action also includes bans on the performance of "upgrades", which refers to the practice of asking employees to work at a higher-level job. A ban on upgrades will restrict the scope of work that a category of employees can do. Unions have also obtained authorisations for a variety of performance-reducing actions such as working more slowly, only working with the non-dominant hand, and driving vehicles at the lowest possible safe speed.

The MUA (sub. 59, p. 42) noted that '[w]hile some of the protected industrial action involved work stoppages of 4, 12 or 24 hour duration, most of the protected industrial action involved bans on overtime, maintenance and use of casuals'.

Reports of frequent protected industrial action in the ports therefore suggest this sector is relatively unusual (box 9.11).

Box 9.11 – Protected industrial action was common at container terminals in the last round of bargaining

Patrick (pers. comm., 9 June 2022) was given notice of 265 protected industrial actions between the commencement of bargaining in September 2020 and November 2021. Of these, 212 went ahead and 53 were suspended, withdrawn or cancelled during the course of the action.

As noted in chapter 8.4, DP World (pers. comm., 27 May 2022) estimates that it lost over 60 000 individual working hours due to protected and unprotected industrial action during the last bargaining round. Similarly, Patrick (pers. comm., 9 June 2022) commented that 'close to 35,000 productive hours were lost since commencement of bargaining in September 2020 and November 2021, causing significant business interruption across the supply chain'.

Industrial action in the ports can be costly for the businesses involved

Submissions to this inquiry highlighted the variety of effects that industrial action can have on operations at Australia's ports (box 9.12). However, the point of industrial action is to harm the counterparty to the bargaining (in this case the container terminal or towage operator) to induce a preferred outcome for the party engaging in the costly action. As Shipping Australia (sub. 11, p. 113) noted:

... unions and employees in these circumstances are exercising their lawful employment rights and that the purpose of industrial action is to cause disruption and economic loss to the employer to force it to enter into negotiations.

Because the FW Act limits employer responses to employee actions, these can mean that costs of industrial action are more likely to fall on employers.

Costs from protected industrial action imposed on those that are not party to the bargaining (third-party businesses and the broader economy) are of greater concern and are discussed in the following section.

Box 9.12 – Effects of industrial action on the operation of ports

Inquiry participants commented on the impacts of industrial action on the operation of ports.

Shipping Australia (sub. 11, p. 112) observed that industrial actions:

... devastate the performance of the strike-hit container terminal. They reduce crane and yard capacity and the ability to operate cranes. The impact of the bans on upgrades are particularly severe as they limit the supply of labour for crane driving and team leader roles, which means that whole teams cannot be allocated to cranes. That gang is left idle, or stood down, and the loss of a single crane prevents hundreds of box lifts per shift. Bans on upgrades, overtime, and employees on standby, also hinder the ability of terminal managers to work around disruptions.

DP World (sub. 49, p. 62) expressed the view that, at times, 'there was little proportionality between the bans, limitations and stoppages and the claims being advanced by the MUA'. For example:

- DP World's entire operations became the subject of a 24-hour stoppage, over a dispute as to whether a union official should receive a standing invite to a local employee representative committee meeting.
- At one terminal, a 96-hour stoppage was notified and commenced, despite the fact that key terms including wage increases had already been agreed.

Patrick (pers. comm., 14 July 2022) observed that:

[the] subcontracting ban was particularly damaging across August, September, and October 2020 where Patrick and its competitors were simultaneously facing aggressive industrial action as well as union implemented subcontracting bans. This strategy not only prevented stevedores from mitigating impacts to customers, it also meant that the industrial action impacted the flow of imports into the country and Australian exporters and contributed to material additional costs being incurred within the supply chain — including by stevedores.

Hutchison (pers. comm., 8 July 2022) reported that:

[a]ll forms of protected and unprotected industrial action led to interruptions to operations, either to stop work loading/unloading a vessel, or a "go slow" in cargo operations to delay the output. The ability by the bargaining agent to take prolonged or persistent industrial action is a major cause of damage to the supply chain.

Qube (sub. 64, p. 7) found that:

... when a major dispute arises, unions can cause significant disruption to operations through threatening and then taking protected and unprotected industrial action. As a result of the fact

Box 9.12 – Effects of industrial action on the operation of ports

that the reliability of the supply chain is heavily dependent on the availability of labour at critical times, threats of action and covert disruption can have a very serious impact well beyond the direct parties.

In marine towage, relatively small and interdependent crewing makes it easy to ‘shut down’ a vessel. This in turn means that towage services are another example of a ‘bottleneck’ in the ports where industrial action can cause an outsized level of disruption and cost. For example, Maritime Industry Australia Limited (sub. 46, p. 15) commented that industrial action affecting harbour towage ‘has the capacity to significantly affect international and domestic shipping in and out of major Ports, with the consequential flow on effects both landside in Australia and from the shipping perspective, causing significant disruption’.

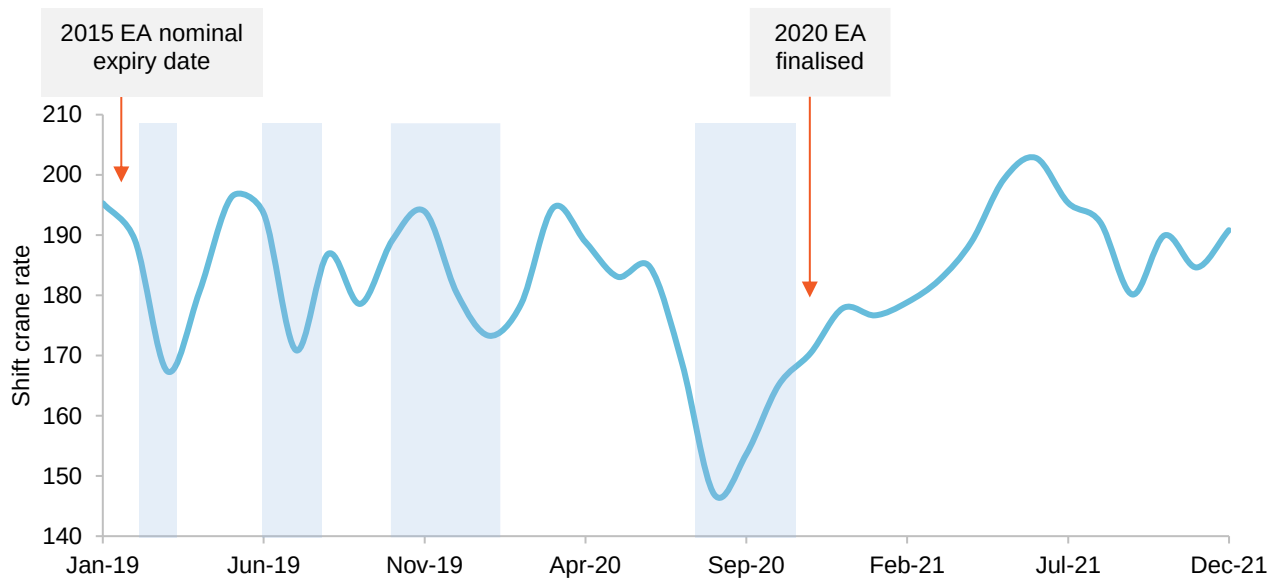
Svitzer (sub. 5, p. 7) stated that:

There are multiple service providers operating in a port for each vessel serviced and the efficiency of the supply chain depends on reliable and responsive cooperation between all operators. Any disruption has significant flow-on effects for the overall efficiency of all operators and the supply chain generally.

Figures 9.4 and 9.5 illustrate the direct impact that protected industrial action can have on productivity in container terminals. Figure 9.4 shows gross crane rates per eight hour shift at DP World’s Port Botany terminal over the 2019–2020 bargaining round. Gross crane rates indicate the capacity of a terminal to handle containers, with no ‘discount’ applied for the time that cranes are allocated to a ship but are not fully operational. The data provided by DP World does exclude delays outside the control of the terminal operators, for example, if a vessel is delayed or if the terminal cannot operate due to inclement weather. As such, while multiple factors may affect the availability and productivity of cranes at a given time, this measure can illustrate the effects of protected industrial action on terminal container movement rates, whether due to strikes or other forms of industrial action that can cause cranes to be offline or operate at reduced rates.

Figure 9.4 – Impact of protected industrial action on the shift crane rate at DP World's Port Botany terminal

Blue shading represents periods of protected industrial action



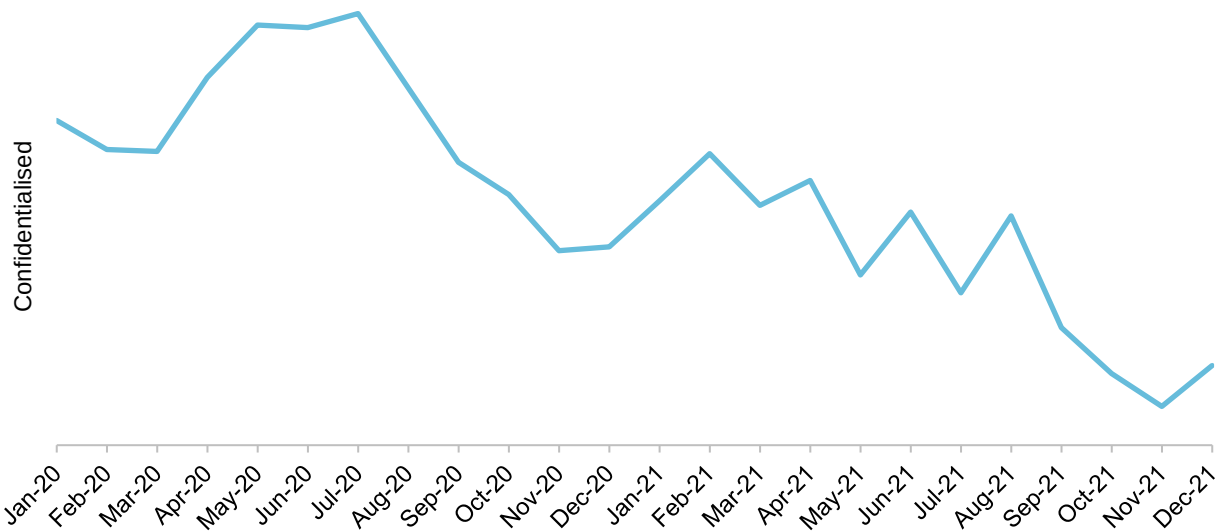
Source: DP World, pers. comm., 27 May 2022.

The figure shows a correlation between periods of protected industrial action and falls in crane rates of approximately 20 movements (or over 10 per cent) per shift. There is a much larger fall in the period of protected industrial action from July to mid-October 2020. In addition, crane rates began to decline at least a month before protected industrial action commenced. This coincided with the beginning of the COVID-19 pandemic from March of that year. 'For clarity, DP World has confirmed that global disruptions to shipping in the early part of COVID-19 would not affect the crane rates in this data' (pers. comm., 18 July 2022).

Similarly, figure 9.5 shows crane lifts per shift on aggregate across all Patrick terminals in 2020 and 2021. Patrick have commented that '[a]t its lowest, productivity was 15% below targeted productivity' (pers. comm., 23 June 2022) and that 'industrial action has had a material adverse impact on Patrick's crane productivity across the past two years' (pers. comm., 9 June 2022).

The figure shows the rate of crane lifts per shift dropping after EA negotiations commenced in June 2020 (at the nominal expiry date of the 2016 EA). As with DP World, this period coincided with the COVID-19 pandemic, so this additional disruption may have also contributed to lower crane rates over this period.

Figure 9.5 – Shift crane rates decline during EA negotiations on aggregate across all Patrick terminals



Source: Patrick, pers. comm., 9 June 2022.

One type of protected industrial action that is unusual in other industries and appears to have played a significant role in the recent bargaining round in ports is the practice of banning subcontracting between container terminal operators. A container terminal operator subject to protected industrial action may seek to minimise disruption to its customers by subcontracting the servicing of a vessel that will be disrupted by the protected industrial action to another operator. Consultations indicated this is a widely used measure that can be effective in reducing the third-party harm from protected industrial action. However, such subcontracting cannot occur if the alternative container terminal operator, who would service the vessel via a subcontract, is itself subject to protected industrial action that prevents such subcontracting. This occurred during the most recent bargaining round due to the alignment of protracted bargaining periods across the major operators (discussed further in the secondary boycotts section below).



Draft finding 9.7

Extensive protected industrial action in the ports during recent bargaining caused disruption and impacted productivity in container terminals

Disruption and, to some extent, reduced productivity are an expected consequence for bargaining parties of protected industrial action. But high levels of protected industrial action in the ports over an extended period during the recent bargaining round translated into markedly lower productivity at affected container terminal operators.

Impact of protected industrial action on the supply chain and consumers

The deep integration of ports in the freight supply chain means that protected industrial action has resulted in significant cost and disruption to third parties completely outside the bargaining process. Inquiry participants have outlined these costs in detail (box 9.13).

Box 9.13 – Impact of protected industrial action on third parties

Submissions to this inquiry have detailed the impact of protected industrial action on participants in the supply chain.

During the last bargaining period (2018 to 2020) DP World conservatively estimates that the value of goods disrupted in each day of industrial action was over \$200 million across DP World's four terminals. (DP World, pers. comm., 27 May 2022)

... farm machinery destined for the Port of Fremantle was instead diverted to Port Melbourne, creating millions of dollars in additional costs to freight the machinery back to Fremantle via land, and weeks of delay. (NFF, sub. 14, p. 10)

At least five iron ore and gold mining companies in Western Australia were impacted by industrial disruption at the Port of Fremantle resulting in delays to the receipt of mining equipment, including spare components, haul trucks, wheel loaders and dozers. (MCA, sub. 25, p. 5)

... in July 2021, the MUA took protected industrial action at Patrick in Port Botany resulting in the stevedore closing most rail windows for regional NSW customers forcing freight to be double handled through third party Sydney metropolitan intermodal terminals, with the containers subsequently being delivered to the port by road. This type of congestion and uncertainty caused shipping lines to reevaluate Sydney and how they price and offer available equipment and space. Some shipping lines during this period omitted Sydney with multiple vessels a month because of ongoing congestion. Between four exporters interviewed as a part of [Australian Peak Shippers Association] case studies, a reported A\$495,000 was paid in double handling and staging costs over a three week period (estimated impact on affected grain consignments was \$12\$15/mt). (FTA and APSA, sub. 31, p. 21)

Industrial strike action at shipping ports has led to significant anxiety and stress for business operators in the food and grocery sector. Industrial dispute action has led to a delay in container movement and warehousing backlogs impacting local businesses and the consumer. This has significant implications for the [fast moving consumer goods] sector where inputs, ingredients and finished goods have limited shelf-life and are prone to infestation ... The [Australian Food and Grocery Council] has received consistent feedback of missed shipping windows and significant cost implications leading to a loss of business and product wastage. (AFGC, sub. 21, pp. 8–9).

Shipping Australia (sub. 11, p. 113) submitted that:

... the consequences [of protected industrial action] are experienced across the economy. Container terminals work to narrow tolerances and whatever little operational buffer-space they have is quickly lost. Extreme port disruption causes large ship queues and delays which, as

Box 9.13 – Impact of protected industrial action on third parties

explained elsewhere in this submission, causes ships to incur extremely high costs and delays. These costs and delays are too high for the ocean shipping company to absorb. Shipping companies have in the past issued surcharges to recover costs or have used operational management tools to manage delays such as skipping port calls, re-routing loops, re-arranging port rotations, blanked sailings¹⁷ (owing to the size and speed of container ships, blanked sailings represent a massive cut in the supply of freight transport), slowing down ships and the like.

... the industrial disruption causes severe landside issues. Goods get “stuck”, which can ruin the economic value of the goods (owing to ongoing costs of storage), perishables can spoil, commercial relationships can be severely harmed, medicines can be held up, time-sensitive events (shows, conferences, events and the like) cannot go ahead, industrial input goods (goods used to make other goods) fall into short supply which cause production problems, empty containers build up in trucking yards which imposes a wide range of financial costs along with dangerous health and safety issues for yard workers ... in short there is a cascading effect across a wide variety of industries.

**Draft finding 9.8****Protected industrial action in the ports caused substantial disruption and economic costs to third parties in the supply chain**

The integration of container terminal operators in the supply chain means that protected industrial action in the ports has an outsized impact on importers, exporters and other third parties. The extent and seriousness of protected industrial action seen during recent bargaining in the ports resulted in substantial economic harm to these third parties.

Is further action required to address unlawful industrial action and secondary boycotts?

While submissions primarily raised concerns about the prevalence and negative effects of protected industrial action, unlawful action was also identified as an issue by some participants (DP World, sub. 49, pp. 61–63; HIA, sub. 40, p. 5). Recent court and Fair Work Commission decisions demonstrate that unlawful or unprotected industrial action does occur in the ports, with varying penalties imposed.¹⁸

Use of unlawful industrial action raises the question of whether current regulatory settings contain adequate penalties. The Commission (2015, p. 899) has previously considered this question and found that the ‘imbalance between the potential gains from unlawful conduct and the existing penalties [under the FW Act] means that [the penalties] are currently unlikely to provide effective deterrence’.

¹⁷ A blank sailing occurs when a shipping company cancels a previously announced journey (SAL, sub. 11, p. 29).

¹⁸ For example, see *Patrick Stevedores Holdings Pty Limited v Construction, Forestry, Maritime, Mining and Energy Union (No 4)* [2021] FCA 1481; *Chevron Australia Pty Ltd v Construction, Forestry, Maritime, Mining and Energy Union (No 3)* [2020] FCA 451.

There have been incremental increases in penalties over time, as the amounts attached to penalty units set under the *Crimes Act 1914* (Cth) (ss. 4AA, 4B) have increased, with penalties per contravention currently sitting at up to \$13 320 for an individual and \$66 600 for a body corporate, with higher penalties attaching to serious contraventions (FWO nd). However, the case for increased maximum penalties available under the FW Act for unlawful industrial action that the Commission articulated in its 2015 inquiry remains relevant (PC 2015, pp. 899–901). This would give the federal courts the discretion to impose penalties for contraventions of the FW Act that are more commensurate with the losses resulting from unlawful behaviour.

The Commission invites feedback on how the penalties regime is operating in the ports and whether increased maximum penalties would be a more effective deterrent of unlawful action.



Information request 9.10

Is the current level of penalties providing effective deterrence of unlawful or unprotected industrial action in the ports? If not, what level of penalties would achieve this outcome?

The Commission would also appreciate further information on secondary boycotts to help with the development of findings for this inquiry.

In the workplace relations context, a secondary boycott occurs when two or more people (such as union officials and/or employees) hinder or prevent a third party from:

- supplying goods or services to a business
- acquiring goods or services from a business
- engaging in interstate or overseas trade or commerce, where the target business is not the employer of those people imposing the boycott (PC 2015, p. 949).

Secondary boycotts are prohibited under Part IV, division 2 of the CCA, with breaches subject to civil penalties.

Nonetheless, actions that have some of the characteristics of secondary boycotts can arise in the context of the ports when bargaining is occurring simultaneously between the employees and multiple operators. For example, as noted above, protected industrial action can include a ban on servicing subcontracted vessels. When such bans are in place simultaneously across multiple terminal operators in a port they can have the effect of preventing a 'third party' operator from supplying services to a shipping line through a subcontract. Such a situation can magnify the impact of a dispute between a container terminal operator and its workers on supply chain participants and the broader economy.

As discussed in section 9.2, the recent period of protracted bargaining created a situation where the MUA had protected action ballot orders in place across a significant proportion of the nation's ports. DP World (sub. 49, p. 61) commented that this contributed to the disruption caused during this period. It provided several examples of protected industrial action that it considered targeted third parties, including:

- refusal to conduct work on vessels that were subcontracted to or outsourced by another stevedoring company for an indefinite period
- refusal to work on particular ships or shipping lines as nominated by the CFMMEU
- bans on the performance of work on vessels delivering particular cargo.

Bans on performing work subcontracted from another container terminal operator are notable. As discussed above, subcontracting is one of the few effective tools available to container terminal operators to mitigate

the disruption to vessel loading and unloading (the timing of which is largely outside their control) caused by protected industrial action. Patrick (pers. comm., 4 July 2022) commented that '[a] ban on sub-contracting (which was pursued as part of the MUA's Protected Industrial Action in 2021) has a significant effect on movement of cargo into and out of Australia. A ban on sub-contracting was unprecedented'.

Simultaneous bans on working subcontracted vessels can be a means of exerting bargaining pressure on the container terminal operators at both ends of the subcontracting chain — the operator prevented from subcontracting the work and the operator who loses the opportunity to pick up that work — even though the container terminal operator seeking to subcontract is effectively a third party in this context. It also magnifies the harm from the industrial dispute on other supply chain participants, including the shipping line and Australian cargo owners.

Recent experiences in the ports highlight the difficulties in having protected industrial action that has a similar effect to, and may potentially be classified as, a secondary boycott. These issues have long been recognised (see, for example, Harper et al. 2015, pp. 390–392; PC 2015, p. 958). The Commission invites feedback on whether the provisions in and enforcement of the CCA are working effectively in the ports to deter secondary boycotts.



Information request 9.11

Part IV, division 2 of the Competition and Consumer Act 2010 (Cth) prohibits secondary boycotts, other than in prescribed circumstances. Are changes needed to these provisions, or supporting compliance and enforcement activities, to ensure secondary boycott conduct is appropriately regulated in the ports?

FW Act mechanisms to support effective bargaining and reduce the harmful effects of industrial action should be strengthened

This section sets out the Commission's draft recommendations to improve the operation of the workplace relations system in the ports. These incremental changes seek to build on the existing framework, rather than replace it, and in doing so to minimise the risk of unintended consequences in what is a complex operating environment.

The draft recommendations fall into two groups. The first seeks to expand the options available to employers in the ports when faced with protected industrial action (draft recommendations 9.3 to 9.5). The second deals with improvements to the FW Act's mechanisms for suspension and termination of protected industrial action (draft recommendations 9.6 to 9.8). Draft recommendation 9.2 (above) which addresses protracted enterprise bargaining is also intended to reduce the level of dispute in the ports.

Most of the draft recommendations made in this section repeat recommendations made by the Commission in its 2015 inquiry into workplace relations. The Commission's view remains that these should be applied across the economy, as was recommended in 2015. For draft recommendations being made for the first time in this inquiry, the Commission has only considered evidence from the operation of workplace relations in the ports and, therefore, is not in a position to recommend economy-wide changes. It will be for future work to evaluate whether or not these draft recommendations should be applied more broadly.

Employers need more options when faced with protected industrial action

Limiting employer response actions in the face of protected industrial action by employees to a lockout means employers must take an 'all or nothing' approach in order to exert counter-pressure during bargaining. In some cases, employers may be forced to choose a dramatic and potentially disproportionate response, even where the industrial action being undertaken by employees may appear to be relatively minor. Further, the variability in, and absence of control over, the timing of ship arrivals means the potential operational risk and cost to an employer of a lockout will often be prohibitive.

One option to address these drawbacks would be to allow employers more graduated options in response to employee industrial action. The Commission recommended this change in 2015 (recommendation 27.7) on a system wide basis and it remains particularly relevant to the circumstances of the ports. The Commission is also restating recommendation 27.6 from the same inquiry, designed to give employers more flexibility in whether they pay workers when protected industrial action is very short.

Another policy issue to be addressed in considering the impacts of industrial action relates to aborted strikes. These actions involve employees notifying and then aborting protected industrial action as an industrial strategy. This allows employees to impose costs on employers, as they put in place contingency plans to mitigate the impact of the action, while bearing little or no costs (such as lost wages) themselves. This poses a problem for public policy. Industrial action should be supported by law where it is a necessary (if undesirable) step to settling a dispute. However, where industrial action imposes no cost on one of the parties, it will not provide balanced incentives to resolve the dispute.



Draft recommendation 9.3

Add options for protected industrial action by employers to the Fair Work Act

The Australian Government should amend the *Fair Work Act 2009* (Cth) to allow employers to engage in more graduated forms of protected industrial action in response to employee industrial action. Forms of employer response action that should be permitted could include:

- instituting limits or bans on overtime (analogous to employee overtime bans)
- directing employees to only perform a particular subset of their normal work functions and adjusting their wages accordingly (analogous to employee partial work bans)
- reducing hours of work (analogous to employee work stoppages).

Employers should also be able to choose to either deduct wages or continue to pay employees for protected industrial action which lasts for less than 15 minutes.

Where an employer restricts employees' work duties or hours of work, employees should be permitted in response to refuse to perform any work (as is currently the case for employers with respect to employee partial work bans).

Graduated forms of protected industrial action by an employer would still count as employer response action and be subject to employee response action and potential suspension or termination by the Fair Work Commission.



Information request 9.12

Would the broader range of employer industrial action in draft recommendation 9.3 be practical for employers to use? Are there other approaches, including forms of employer response action other than those cited in draft recommendation 9.3 that should be considered?

If employees can identify whether their employer has put in place a contingency plan, they can choose whether to proceed with strike action or not based on what will maximise damage to their employer. This asymmetry of information and risk can make aborted strikes an effective industrial tactic.

Given that strikes may be withdrawn for legitimate reasons, such as a sign of good faith or if a negotiated outcome is reached, a blanket prohibition on aborted strikes would be counter-productive. Instead, the Commission restates recommendation 27.5 from the 2015 inquiry — employers that implemented a reasonable contingency response to what ultimately was an aborted industrial action should be given the capacity to stand down the relevant employees, without pay, for the duration of that response.



Draft recommendation 9.4

Increase disincentives for employees to notify and then abort protected industrial action

The Australian Government should amend the *Fair Work Act 2009* (Cth) so that where a group of employees have withdrawn notice of industrial action, employers that have implemented a reasonable contingency plan in response to the notice of industrial action may stand down the relevant employees, without pay, for the duration of the employer's contingency response.



Information request 9.13

The Commission invites feedback on draft recommendation 9.4, including on the best approach to implementation and any technical or legal issues and how a reasonable contingency plan should be defined.

Given that port operations are highly time sensitive and the effect of industrial action is significant, the Commission's view is that it should be easier to obtain an extension of the notice period required to be given before protected industrial action can be taken in the ports. Currently, the FW Act provides that notice of three working days must be given (s. 414(2)(a)). If the FWC is satisfied that there are exceptional circumstances justifying a longer period, it may extend the period to up to seven working days (s. 443(5)).

A number of submissions argued that this notice period be increased to give employers in the ports sufficient time to put contingency plans in place before protected industrial action commences (box 9.14). This would also help limit the impact of protected industrial action on third parties.

Box 9.14 – Support for extending the notice period for protected industrial action

Shipping Australia (sub. 11, p. 114) submitted that the notice period should be extended to 64 days, to enable alternative plans to be made before containers are committed to a voyage. This would align with the maximum duration of the longest voyage to Australia with buffers built in.

DP World (sub. 49, pp. 63–64) argued that seven days' notice was the minimum required to enable a work around to potential disruption to be put in place through subcontracting:

... industrial action has a significant and “cascading” effect on the supply chain. Wherever possible, stevedores try to mitigate the direct impact on the supply chain by taking steps such as sub-contracting vessels to be worked by other stevedores, if industrial action is otherwise preventing stevedoring. However, subcontracting by a stevedore typically requires:

- at least 6–7 days' notice, which is greater than the default of 3 clear working days prescribed in the FW Act; and
- a second operator with available berths at the relevant time and that is prepared to take the subcontract knowing that it is occurring during to the impacts of industrial action (risking its own employees being treated as ‘scabs’ by the MUA).

Where work cannot be subcontracted, delays can generally only be ameliorated by shipping lines by steaming faster (i.e. increasing the transit speed of the vessel to get to the next port faster), reduction in container exchanges, port omissions and occasionally vessel service cancellations. All of these alternatives come at a cost.

There is merit in making the existing extension from three to seven days' notice more readily accessible to operators in the ports. This would provide a reasonable balance between the rights of employees to take protected industrial action and the desirability of facilitating some degree of effective contingency planning to reduce disruption and cost to the supply chain.

Options to give effect to this draft recommendation could include amending the s. 443(5) ‘exceptional circumstances’ test for participants in the ports to introduce a lower threshold or requiring the FWC to grant such an extension where it is in the public interest to do so.



Draft recommendation 9.5

Make it easier for employers in the ports to extend the notice period for protected industrial action

The Australian Government should amend the *Fair Work Act 2009* (Cth) to lower the threshold for applications to extend the mandatory three-day notice period for protected industrial action to seven days for operators in the ports to enable employers to better prepare for industrial action.



Information request 9.14

The Commission invites feedback on draft recommendation 9.5, including on the best approach to implementation and any technical or legal issues and how any lower threshold should be defined.

FW Act mechanisms for suspension and termination of protected industrial action need strengthening

Turning to the second group of draft recommendations, the Commission is proposing changes designed to lower the barriers to intervention to suspend or terminate protected industrial action that is causing significant cost and disruption in the maritime logistics system and to third parties in the supply chain.

Under the FW Act, the concept of ‘significant’ harm or damage is an important part of the legal threshold that must be satisfied before an order is made to terminate or suspend protected industrial action (ss. 423–424 and s. 426). The Commission has previously found that, while there are good reasons for setting a relatively high threshold for the suspension or termination of industrial action, the ‘significant harm’ test sets too high a bar. It noted that FWC jurisprudence had, in relation to s. 423 and s. 426, defined significant as being ‘exceptional in its character or magnitude when viewed against the sort of harm that might ordinarily be expected to flow from industrial action in a similar context’ (PC 2015, pp. 885–888, citing *Construction, Forestry, Mining and Energy Union v Woodside Burrup Pty Ltd and Kentz E & C Pty Ltd* [2010] FWA 6021; see also *Linfox Australia Pty Ltd v Australian Federated Union of Locomotive Employees; Australian Rail, Tram and Bus Industry Union* [2019] FWCFB 5861).

The interpretation clearly raises issues in the context of the ports, where protected industrial action during bargaining causes substantial cost and disruption both to participants and third parties. While such action and its consequences may not be ‘exceptional’ in container terminal operations and towage services, there may nonetheless be strong public policy grounds for intervention to limit or prevent it. Indeed, the frequency of impactful protected industrial action is itself a contributor to the bargaining imbalance in the sector and to the extent of cost and disruption experienced by third parties.

Lowering the threshold to make use of the existing mechanisms for suspension or termination of protected industrial action would help to address these issues. Several submissions share this view (box 9.15).

In 2015, the Commission recommended that to make mechanisms for suspension or termination of protected industrial action more workable, the word ‘significant’ should be interpreted as having a plain meaning of ‘important or of consequence’ (recommendation 27.2). This recommendation continues to have merit, particularly in the context of the ports.

These changes should be applied both to s. 423 and s. 426, as recommended by the Commission in 2015, and to s. 424. Extending its application to this provision will ensure that both bargaining parties (under s. 423 and s. 426) and third parties (under s. 424) are able to access a mechanism based on the lower threshold, consistent with the objective of reducing the cost and disruption to the supply chain caused by protected industrial action in container terminal and towage services sectors.

Box 9.15 – Calls for easier access to arbitration

Several submissions sought reforms to lower the threshold for the FWC to terminate protected industrial action where it is having a significant impact on the national economy, or part of it (FW Act, ss. 423–424 and s. 426).

The Chamber of Commerce and Industry Western Australia (sub. 43, p. 3) argued that '[i]n considering the definition of significant economic harm, the Fair Work Commission has established a very high bar which makes such applications difficult to establish in all but the most extreme of situations'. It also (sub. 43, p. 4) called for greater use of the Australian Government Minister for Employment and Workplace Relations' power under s. 431 of the FW Act to terminate maritime industrial action and refer disputes to the FWC for arbitration. The National Farmers Federation recommended that the Australian Government 'as a matter of urgency refer any potential waterfront industrial relations dispute to arbitration, as per the powers afforded to it by the Fair Work Act based on national interest considerations' (sub. 14, p. 13). And Container Transport Alliance Australia (sub. 50, p. 14) submitted that existing mechanisms do not:

... adequately or specifically take account of the "critical service" nature of Australia's international supply chains. While employees and their representative unions should have the right to protected industrial actions during the Enterprise Agreement bargaining process, no union or employer should be able to hold critical international trade gateways "to ransom" in pursuit of their industrial agenda. In circumstances where industrial bargaining disputes do arise in defined "essential industry sectors", including the container shipping and logistics sector, there should be clearer pathways to arbitration outcomes by the Fair Work Commission (FWC), and stronger powers to suspend or cancel such industrial actions if supply chain continuity is significantly threatened.

Draft recommendation 9.6 Make it possible to suspend or terminate industrial action that could cause 'important or consequential' economic harm

The Australian Government should amend the *Fair Work Act 2009* (Cth) to clarify that when determining whether to suspend or terminate industrial action under s. 423, s. 424 or s. 426, the Fair Work Commission should interpret the word 'significant' as 'important or of consequence'.

The impact of protected industrial action in the ports will often be felt down the supply chain, including on small and medium enterprises (SMEs) who may not have the capacity to make and prosecute an application seeking the suspension or termination of that action where it is causing, or threatening to cause, significant harm.

At present, industry groups or other organisations representing the interests of those affected by industrial action, including SMEs, do not have explicit standing to make an application under s. 424 or s. 426 in their own right. Clarifying that they may do so for industrial action occurring in the ports, without requiring a member enterprise to act as a nominal applicant, will increase the likelihood that instances of harm to third parties (particularly SMEs) in the supply chain will be brought before the FWC.



Draft recommendation 9.7

Allow a broader range of third parties to apply to terminate protected industrial action occurring in the ports

The Australian Government should amend the *Fair Work Act 2009* (Cth) to widen the range of third parties who can make applications to suspend or terminate protected industrial action under the Act for operators in the ports, to include entities, for example, with an interest but who may find it difficult to show they are directly affected (such as employer associations, employee organisations or third parties like importers/exporters).



Information request 9.15

The Commission invites feedback on draft recommendation 9.7, including on the best approach to implementation and any technical or legal issues.

Section 423 of the FW Act should be amended to provide a more effective tool where protected industrial action is causing significant economic harm to an employer. In its current form, to suspend or terminate industrial action initiated by employees under this provision the action must cause significant economic harm to both the employees and the employer. By contrast, to suspend or terminate a lockout by an employer requires that only the employees be significantly harmed. The apparent effect of the current wording is that s. 423 is ineffective for dealing with employee industrial action that is causing significant harm only to an employer. It is common for protected industrial action to involve some cost to both the party initiating the action as well as its target. The prohibition on employees being paid wages while taking strike action, discussed above, is an example of this, though these costs can sometimes be mitigated through careful framing of protected action or other measures such as union 'strike pay' funds.

Section 423 would provide a more balanced and effective mechanism for limiting significant harm from protected industrial action if it were sufficient to demonstrate that the action caused harm to either employees or employers (recommendation 27.3 in PC 2015). Such a change has particular merit in the ports, where employers are more likely to experience significant economic harm as a result of protected industrial action.



Draft recommendation 9.8

Enable protected industrial action to be suspended or terminated when it is causing harm to either party, rather than both

The Australian Government should amend s. 423(2) of the *Fair Work Act 2009* (Cth) such that the Fair Work Commission may suspend or terminate protected industrial action where it is causing, or threatening to cause, significant economic harm to the employer or the employees who will be covered by the agreement, rather than harm to both parties (as is currently the case).

FWC capability and resourcing

The Commission's draft recommendations in this chapter would require the FWC to perform an extended role in the ports. While in many respects this role would require the FWC to draw on its existing expertise in dispute resolution and arbitration, investment may be required to ensure it is appropriately resourced for this more intensive role and has the necessary depth of experience and expertise in the operation of workplace relations in the ports.

Consultations generally with employers and employee representatives indicated that the experience and standing of FWC members were an important factor in determining their engagement with, and confidence in, FW Act dispute resolution processes. The involvement of FWC members with a deep understanding of operational and workplace relations issues in ports was viewed positively.

Given the public interest in the timely resolution of industrial disputes in the ports, there is merit in reforms to encourage early engagement with FWC dispute resolution processes. The FWC should be resourced to establish a fast-track process for applications involving port employers and employees (and their representatives). This will create an incentive to make use of the FW Act's processes for dispute resolution and, by providing a pathway for disputes to come before the FWC at an early stage, increase the likelihood of successful resolution.

It is also important that FWC members with the requisite skills, experience and standing are available to deal with cases in the proposed ports fast-track stream.

The FWC previously operated on an industry-based panel system that was designed to promote expertise and standing in particular industries. It has subsequently moved to a regional allocation model, while maintaining a focus on preserving industry-based expertise within that model. Whether formally or informally, ongoing investment in industry-specific capability will make an important contribution to the willingness of ports participants to engage with the FW Act mechanisms to deal with protracted bargaining and excessively harmful protected industrial action, particularly where arbitration may be the end-point of those processes.

Consideration should also be given to reforms to give the industry a voice (employers and employee representatives) in the selection process for the FWC members (and possibly external industry experts) who would deal with ports cases. The focus of the process should be to identify candidates who are able to attract the support and / or respect of both employers and employees. This would help to build confidence across the industrial spectrum that an application to the FWC will be dealt with by a member with a perspective and capability that will be conducive to achieving timely and balanced outcomes.

Such a model would be novel and require careful design. As a starting point, reference should be made to the principles of merit-based appointment articulated by the Commission in its 2015 report (chapter 3).

Consideration should be given to how such a process would integrate with FWC's matter allocation processes and its standing as an independent tribunal, particularly if both existing FWC members and external candidates could be nominated. For external candidates, it may be desirable to allow part-time appointments (potentially with standing similar to that accorded to expert panel members appointed under s. 620). There may also be merit in putting the nomination process at arms-length from the parties themselves, for example by involving peak representative bodies in the process. Irrespective of the process, good faith engagement from industry participants would be essential.

Increased use of multi-panel (full bench) decision making in matters concerning the ports would also help to build confidence and minimise perceived variability in decision making. Consideration should be given to the best approach to enable this to happen, noting the President of the FWC currently has power under s. 615 of the FW Act to direct that a function or power be exercised by a full bench, either generally or 'in relation to a particular matter or class of matters'.

The Commission's draft recommendations in this chapter involve measures that would give the FWC an expanded role, impose limits on agreement content and address imbalances in bargaining power. Whether they strike the right balance or involve unforeseen complexities and inefficiencies will need to be tested. The Australian Government should commission an independent evaluation of these interventions once they have been in operation for five years.



Draft recommendation 9.9

Equip the Fair Work Commission for an extended role in the ports

To enable the Fair Work Commission to perform an enhanced role in supervising bargaining on the ports, it should (supported by amendments to the *Fair Work Act 2009* (Cth) where necessary):

- establish a fast-track process for dealing with applications involving port employers and employees and their representatives
- ensure members with requisite skills, experience and standing are available to deal with cases in the ports fast-track stream
- enable more decision-making by full benches to assist consistency of decision making
- be resourced appropriately to give effect to these draft recommendations.

The Fair Work Act should also be amended to allow input from employers and employee representatives in the selection of Fair Work Commission members dealing with port matters, with the objective of identifying nominees who have the confidence of employers and employees.

There are several reasons for this. Regulatory intervention in any complex, evolving environment has the potential for unintended consequences. In the ports, there is no one factor that unambiguously drives outcomes such as labour productivity, with workplace culture, industry practice, and market factors all important determinants of outcomes in addition to the regulatory environment. And implementation of the draft recommendations will require thought to be given to potentially significant technical issues around legal effect and drafting. Independent evaluation will enable an evidence-based assessment of outcomes that takes into account these factors.



Draft recommendation 9.10

Independent evaluation of changes to improve workplace relations in the ports

If the draft recommendations in this chapter are introduced, the Australian Government should commission an independent evaluation of the state of workplace relations in Australian ports after five years of operation. The purpose of the evaluation would be to make an evidence-based assessment of productivity and efficiency outcomes following the introduction of the changes proposed to the workplace relations system.

10. Skills and labour supply

Key points

- ✳ **Many different skillsets are required to transport goods through Australia's ports.**
 - The ways in which port workers acquire skills differs substantially for different occupations. For example, on-water occupations like marine pilots, tug masters and engineers usually combine vocational education and training and (sometimes) higher education qualifications with extensive blue-water experience; container terminal operators rely more on onsite unaccredited and informal training in developing their workforce.
- ✳ **Port workers appear to acquire the skills they need.**
 - Inquiry participants have raised very few concerns about the system that delivers skills and training for port workers — the system largely appears to be functioning well.
- ✳ **Container terminal operators' reliance on unaccredited and informal training reflects site-specific needs and workplace relations arrangements.**
 - A lack of formal qualifications could be a barrier to labour mobility if prior experience is not recognised at another company or port. However, workplace arrangements seem to be creating a larger barrier to labour mobility than either the absence of formal vocational education and training qualifications or any gaps in the mutual recognition of occupational licensing.
- ✳ **High risk work licences are not required to operate some types of heavy machinery in the sector. While this seems unusual compared to other industries, it does not appear to be causing adverse outcomes.**
- ✳ **There is no strong evidence of skills shortages in the maritime logistics system.**
- ✳ **If they arise, skills shortages for seafarers can be solved through immigration and industry-led solutions such as cadetships.**
 - Access to blue-water experience for marine pilots has become more difficult as Australia's coastal fleet has reduced but this is being addressed through immigration and cadetship programs. Subsidising the creation of a 'strategic fleet' for training purposes would be costly and unnecessary.
- ✳ **The skills needs in parts of the industry are likely to change as automation and other technology is adopted. However, it is likely this adjustment will be gradual, as it has been in the past.**
 - Adjustments are being made to vocational education and training courses to include future-focused content.

Training is critical to ensuring workers can work safely and productively in their roles and that there is an adequate supply of labour with the right skills available for employment within a sector.

This chapter focuses on skills, training and labour supply in on-water roles within ports and in stevedoring roles within container terminal operations because these are the parts of the system that inquiry participants have provided information on to date.

Inquiry participants have raised very few concerns about the system that delivers skills and training for people working at Australia's ports. While the system has some unusual characteristics, it largely appears to be functioning well. There is scope for improvement in some areas, but extensive redesign is not necessary. Workplace relations arrangements seem to be hindering labour mobility between container terminals, however, skills shortages appear to be rare.

That said, the Commission would appreciate evidence about any issues in the ports that have not been identified through this chapter.



Information request 10.1

Are there any skills or labour supply issues in Australia's ports that are not identified in this chapter, and that should be addressed?

Key terms used in this chapter are defined in box 10.1. In particular, the discussion refers to lower-skilled, medium-skilled and higher-skilled employees. These terms align with the Australian and New Zealand Standard Classification of Occupations (ANZSCO) codes and the National Skills Commission's approach for grouping skill levels. However, the Commission recognises that the many people working within our ports have valuable skills notwithstanding how their roles are technically classified.

The chapter: outlines how skills are acquired in on-water roles within ports and stevedoring roles (section 10.1); examines whether there are skills shortages in the ports and impediments to labour supply (section 10.2); and assesses the training system's capacity to adapt to future skills needs (section 10.3).

10.1 Skills and training in Australia's ports

Skill needs in Australia's ports

A variety of skills are required to move freight in or out of ports. The journey of a container relies on many workers, from those in lower-skilled, entry-level jobs such as lashing, to medium-skilled workers such as electricians, through to higher-skilled professionals such as marine pilots (figure 10.1).

The specific skills needed for roles can vary between ports and even different firms conducting the same task at the same port due to differences in equipment. For example, terminals that export bulk minerals or grain require different equipment (such as grabbers and bulldozers) to container terminals (forklifts, reach stackers and straddles). And some container terminal operators use slightly different equipment for the same tasks. Patrick, for example, uses two different types of quay cranes — Liebherr and ZPMC (Patrick Terminals 2020, pp. 99–100) This means that skills acquired at one terminal operator may not be immediately transferrable to the same task at another, or even the same operator at a different port.

Box 10.1 – Definitions of key terms used in this chapter

Occupations

On-water roles within ports involve the movement of a ship in and out of the harbour and include jobs such as marine pilots, tug masters and engineers, and harbourmasters.

Stevedoring roles within container terminal operations involve moving a container on or off the ship and in or out of the port and include jobs such as lashers, forklift drivers and crane drivers.

Skill levels

Lower-skill means occupations based on ANZSCO skill levels 4 and 5 with a skill level commensurate with completing year 10 or a Certificate I, II or III (ABS 2021b; National Skills Commission 2021b, p. 88).

Medium-skill means occupations based on ANZSCO skill level 3 with a skill level commensurate with a Certificate III with a minimum of two years training on the job or a Certificate IV (ABS 2021b; National Skills Commission 2021b, p. 88).

Higher-skill means occupations based on ANZSCO skill levels 1 and 2 with a skill level commensurate with a diploma, bachelor degree or higher qualification (ABS 2021b; National Skills Commission 2021b, p. 88).

Training

Accredited or formal training is a program of training leading to higher education or 'vocational qualifications and credentials that are recognised by the attainment of a formal qualification or award. This can include whole courses or selected modules of a course' (White, De Silva and Rittie 2018, p. 8).

Unaccredited training is 'a program of structured training or instruction that does not lead to the attainment of a formal qualification or award, for example, short courses, product-specific training and industry- or organisation-specific training' (White, De Silva and Rittie 2018, p. 8). This could also include a training package tailored to the needs of a business delivered by a registered training organisation (RTO).

Informal training is 'unstructured training that usually occurs on the job through interactions with co-workers as part of the day-to-day work, for example, on-the-job coaching, mentoring or reading on the internet' (White, De Silva and Rittie 2018, p. 8).

Onsite training is any accredited, unaccredited or informal training which occurs at the place of employment. It includes accredited training delivered by an in-house RTO or an external RTO coming onsite, or any unaccredited and informal training taking place onsite.

New technology can substantially change the demand for skills. For example, at Victoria International Container Terminal (pers. comm., 23 May 2022) container movement operations are 'largely automated and its workers are generally younger and, due to the high level of automation, they have a deeper understanding of information technology'. Other container terminal operators in Australia use less automation and need workers skilled in the manual operation of quay cranes. However, even terminals that are considered fully automated maintain similarities with their less automated counterparts — for example, both terminal types rely on lashers to physically secure containers on vessels.

Figure 10.1 – A variety of skills are required to move freight in and out of ports^{a,b,c,d}

Lower-skill	Medium-skill	Higher-skill
7,573 employees Lashers, forklift drivers and crane drivers. 	1,353 employees Electricians, metal fitters and machinists. 	4,990 employees Marine pilots, tug masters and engineers. 

a. This data is from the 2016 Census using Australian and New Zealand Standard Industrial Classification group water transport support services. ANZSCO occupation codes were used to determine the number of employees in lower-, medium- and higher-skill roles using the definitions in box 10.1. **b.** Water transport support services includes stevedoring, container terminal operations, bulk loader operations, mooring services, pilots, towage services, lighterage services, ship registration and salvage services. Note it includes people working in water passenger terminal operations. It does not include water freight transport. **c.** These figures are based on individuals' self-reported occupation and industry which may lead to misclassifications. **d.** This 'point in time' estimate of 14 000 employees differs from the average estimate over 20 years of 17 000 people used in chapter 8. An average estimate is needed in chapter 8 because it gives a more rounded picture of employment in Australian ports over time.

Sources: ABS (ANZSCO — *Australian and New Zealand Standard Classification of Occupations, 2021*, Cat. no. 1220.0; Tablebuilder, *Census of Population and Housing, 2016*, Cat. no. 2072.0).

Workers in different roles acquire skills in different ways

Variations in skills requirements between roles, together with occupational licensing rules and workplace arrangements, contribute to different skills acquisition processes for workers across ports.

Vocational education and training (VET) is the main source of accredited training and qualifications

Most workers in on-water or stevedoring roles who undertake formal training do so within the VET sector. Training packages in the VET sector 'specify the knowledge and skills required by individuals to perform effectively in the workplace, expressed in units of competency' (ASQA nd). Training for many on-water roles within ports is covered by the Maritime Training Package. The exception is training in marine mechanical technology which is delivered under the Automotive Retail, Service and Repair Training Package (Australian Government 2022a). Training for stevedores is covered by qualifications in the Transport and Logistics Training Package.

Regulatory requirements drive demand for formal training.

On-water roles are highly regulated and training requirements are governed by international conventions (MIAL 2019a, pp. 6–7).¹ People working in these jobs acquire skills through a combination of VET (and sometimes university) courses and extensive on-the-job training. For example, harbourmasters, marine pilots and tug masters need to complete an accredited VET or higher education course and many years of on-water experience to attain professional licensing.

Regulatory requirements also drive VET demand for some workers in stevedoring roles. Operators of many types of heavy equipment require a high risk work licence — attained via completion of individual VET modules. For example, the module *TLILIC0016 Licence to operate a bridge and gantry crane* is offered through the Certificate III in Stevedoring. Licences have to be renewed every five years and are recognised nationally. There are some gaps in the coverage of high risk work licences, discussed below.

¹ The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978.

Course completion data reflect these different training requirements. Many more people enrol in and complete VET courses which lead to on-water occupations than stevedoring courses (table 10.1).

Table 10.1 – Completion rates in maritime operations courses higher than in stevedoring

VET certificate enrolments and completions, 2019

Course	Enrolments	Completions
Marine mechanical technology		
Certificate II in Marine Mechanical Technology	15	15
Certificate III in Marine Mechanical Technology	375	75
Total marine mechanical technology	390	90
Maritime operations		
Certificate I in Maritime Operations (General Purpose Hand Near Coastal)	1015	645
Certificate I in Maritime Operations (Coxswain Grade 2 Near Coastal)	475	505
Certificate II in Maritime Operations (Linesperson)	70	55
Certificate II in Maritime Operations (Coxswain Grade 1 Near Coastal)	1945	1130
Certificate II in Maritime Operations (Marine Engine Driver Grade 3 Near Coastal)	210	165
Certificate III in Maritime Operations (Integrated Rating)	100	25
Certificate III in Maritime Operations (Marine Engine Driver Grade 2 Near Coastal)	745	600
Certificate III in Maritime Operations (Master up to 24 metres Near Coastal)	970	640
Certificate III in Maritime Operations (Master Inland Waters)	15	10
Certificate IV in Maritime Operations (Marine Engine Driver Grade 1 Near Coastal)	65	45
Certificate IV in Maritime Operations (Master up to 35 metres Near Coastal)	190	160
Diploma of Maritime Operations (Engineer Watchkeeper)	20	15
Diploma of Maritime Operations (Marine Surveying)	0	0
Diploma of Maritime Operations (Watchkeeper Deck)	35	20
Diploma of Maritime Operations (Master up to 500 GT or Master 80 metres)	0	0
Diploma of Maritime Operations (Master up to 500 GT)	20	10
Diploma of Maritime Operations (Marine Engineering Class 3 Near Coastal)	30	25
Advanced Diploma of Maritime Operations (Marine Engineering Class 2)	15	10
Advanced Diploma of Maritime Operations (Master Unlimited)	30	15
Advanced Diploma of Maritime Operations (Marine Engineering Class 1)	5	5
Total maritime operations	5955	4080
Stevedoring		
Certificate II in Stevedoring	55	0
Certificate III in Stevedoring	105	20
Certificate IV in Stevedoring Operations	0	0
Total stevedoring	160	20
Total	6505	4190

Source: National Centre for Vocational Education Research (2021a).

The data indicate, for example, that the Certificate III in Maritime Operations (Marine Engine Driver Grade 2 Near Coastal) records many more enrolments and completions than the Certificates II and III in Stevedoring.

While the data is not a flawless indicator of completion rates — as observed completions in 2019 are from individuals who enrolled years earlier — it is useful for illustrating variations in the way that skills are acquired across the ports.

The formal training system mostly works well

Inquiry participants have not reported that the formal training system is failing. However, the Commission has identified two issues (and are discussed further below):

- the difficulties that Australians in on-water roles face in gaining blue-water experience on Australian vessels (MIAL 2019a; Offshore & Specialist Ships Australia Ltd, sub. 42, pp. 2–5)
- low qualification completion rates for employees at container terminal operators.

Inquiry participants have also raised some skills and training issues for landside freight outside the port gate (box 10.2). While these are important, the Commission does not consider that they are within the scope of this inquiry, but they might warrant further investigation in other forums.

Box 10.2 – Skills and training in landside freight

Inquiry participants raised some issues with skills development for roles in rail and road.

The Australasian Railway Association (sub. 61, p. 13) noted that some rail skill shortages are affecting 'the efficiency and productivity of port operations'. The National Skills Commission (2021a, p. 7) has also identified skill shortages for train drivers and that there will be moderate demand for this occupation over the next five years.

Views about labour supply of truck drivers are mixed. While the National Skills Commission (2021a) has not identified a shortage of truck drivers, Container Transport Alliance Australia (CTAA) (sub. 50, p. 12) noted that 'there is an underlying structural concern with the attraction, training and retention of skilled (and semi-skilled) labour in the freight transport sector'. Deakin University (sub. 39, p. 5) stated that skill shortages in truck drivers that existed before 2020 have been exacerbated by the COVID-19 pandemic. Australian Industry Standards (2021a, p. 18) also commented that there may be shortages in the transport and logistics industry within 10 to 15 years when older workers retire.

Another concern in the trucking industry is that licences are based on 'time served' rather than competency. CTAA (sub. 50, p. 13) is urging action by state-based licensing authorities to modify the time-served aspects of licensing arrangements (that is, the requirement to have held a Medium Rigid or Heavy Rigid licence for 12 months before applying for a Heavy Combination licence, and to hold the Heavy Combination licence for 12 months before applying for a Multi-Combination licence). National Cabinet has endorsed a proposal to develop a Heavy Vehicle Driver Apprenticeship based on competencies in the VET Certificate Level III in Driving Operations (CTAA, sub. 50, p. 13).

Employer engagement with VET is low

Employer engagement is key to an effective VET system and has been identified as an issue previously (PC 2017c, p. 93). Prior to the onset of the COVID-19 pandemic, engagement across the system had been declining for many years (NCVER 2019, p. 11), but increased in 2021 (NCVER 2021b, p. 2). A major issue has been the time and complexity of approving training packages while maintaining sufficient and meaningful industry consultation (Fyusion 2018, pp. 29–33; PC 2020a, pp. 233–238; PM&C 2019, pp. 56–57).

The transport, postal and warehousing industry — which includes the maritime logistics sector — has low engagement relative to other industries (NCVER 2019, p. 12). Low engagement does not necessarily indicate a problem. It could reflect less reliance on formal training. However, it also entails risks — for example, that qualifications contain irrelevant content or are not updated as an industry's skills needs change.

Industry reference committees provide input on the quality and relevance of training provided through the VET system, as well as future workforce needs (Australian Industry and Skills Committee 2022, pp. 6–8). The bodies responsible for training for on-water and stevedoring roles — the Maritime Industry Reference Committee and the Transport and Logistics Industry Reference Committee — are being replaced with a new wholesale, retail, transport and logistics industry cluster in 2022 (DESE 2021b, p. 2, nd). It is anticipated that all of the new clusters under development will be fully implemented by 1 January 2023 (DESE nd).

The introduction of industry clusters is intended to 'enhance the role of industry in the national training system with a broader role and greater accountability to industry' (DESE 2021c, p. 1). However, it is unclear how this new structure will alter consultation on the design of VET courses, and it will not be possible to assess this change until the new system has been bedded down. The review of industry clusters one year after commencement, as agreed to by Australian, state and territory skills and training ministers, will be an important step in evaluating the new approach (DESE 2021a).



Information request 10.2

Do employers and employees in the ports receive the outcomes they are seeking from the VET system?

Gaps in requirements for high risk work licences seem unusual

Licensing requirements for operators of heavy equipment at container terminals are not universal. While operators of many machinery classes (including container cranes, forklifts, reach stackers and work involving dogging and rigging) must have a high risk work licence, some heavy machinery can be operated without a licence. Participants have pointed, for example, to gaps for drivers of ship's cranes, straddle carriers and auto-stacking cranes and, 'in some jurisdictions, rubber tyre gantry' cranes (MUA, sub. 59, p. 105). These gaps have been attributed to some equipment being unique to container terminal operators (Flinders Port Holdings, sub. 55, p. 12).

The absence of requirements for some container terminal operator equipment seems at odds with most common industry practice. For example, it has been noted that '[n]o licensing ... requirements apply' to the Certificate III in Stevedoring, while qualifications in other industries with large, complex and powerful equipment do have licensing requirements (Australian Government 2021, p. 3, 2022b, p. 2).

Some firms have responded to the gaps by recognising training for the operation of much heavier machinery — for example from the mining industry — as sufficient for the competent operation of equipment in the ports. However, this 'significantly increases training costs and time required to be considered proficient' (Flinders Port Holdings, sub. 55, p. 12). Where functions are not covered by the high risk work licensing regime, Patrick has comprehensive internal competency-based training and verification programs in place (Patrick Terminals, pers. comm., 23 June 2022). Straddle carrier drivers do not require a high risk work licence class but attend an intensive training course provided by the employer followed by hours of on the job training under supervision — this could take at least three months for someone with no prior experience to become proficient in operating a straddle carrier under a quay crane (Hutchison, pers. comm., 8 July 2022).

The MUA (sub. 59, pp. 105–106) recommended that '[a]t a minimum, licences should be developed to operate ship's cranes, auto-stacking cranes, straddle carriers, all rail track gantry cranes and other container handling equipment' because this will 'improve workers' career advancement and labour mobility'.

Inquiry participants have not raised concerns about workplace health and safety issues associated with the absence of licences. And lack of a formal licence does not necessarily mean that the training provided to operate a class of machinery is substandard. But the absence of licensing does have implications for labour mobility (section 10.2).

Safe Work Australia is currently reviewing the high risk work licence framework for cranes 'to ensure it remains relevant to contemporary work practices and equipment' (2022, p. 1), including cranes not covered by the current licensing system.

The Commission would appreciate feedback on whether licensing requirements, and associated VET training, should be introduced to ensure that all heavy equipment operators at container terminals are licensed.



Information request 10.3

What are the costs and benefits of formalising qualifications and licensing for heavy equipment that is unique to ports? Are there health and safety grounds for doing so?

Use of unaccredited and informal training is common in container terminal operations

Unaccredited and informal training are widely relied on by container terminal operators and play an important role alongside accredited training. These forms of training are:

- used to 'top up' accredited training for site-specific variation in job requirements
- combined with VET modules
- used to provide skills to workers in roles requiring little to no formal training.

Many container terminal operators in Australia recruit unskilled workers and train them in progressively more complex or senior roles. This starts with training in lashing and over time workers may progress to forklift driving, straddle driving and ultimately crane driving. Formal and unaccredited training are both used in this process (chapter 9.1 discusses the hierarchy of work conducted in container terminal operations).

While the existence of onsite training systems could point to failures in the formal skills system, it appears to be an adaptive response to site-specific variations between container terminal operations. For example, some employers and their RTOs are drawing on relevant VET courses and combining these with onsite training required for the equipment and layout at each port (Hutchison, pers. comm., 8 July 2022).

The Commission has heard a range of views about the extent to which training involves accredited VET training and content versus unaccredited or informal training and would appreciate feedback on this mix.

Some inquiry participants have called for a more formal system of training. The MUA (sub. 59, p. 105) recommended 'improvements to maritime logistics VET Qualifications and Skill Sets to improve workers' career advancement and labour mobility'. In addition, Ai Group (sub. 60, p. 11) stated that 'coordinating the implementation of skills requirements across the country through diplomas and other VET qualifications ...

[would allow] industries to better equip their workforce to enable greater automation and more efficient supply chains’.

Reliance on unaccredited and informal training also needs to be considered in the context of recognition of prior learning (PC 2017c, pp. 96–100). To the extent that skills acquired elsewhere are recognised by a new employer or provide credit towards a formal qualification, the use of unaccredited and informal training will be less of a barrier to labour mobility. The extent of recognition of prior learning in stevedoring roles is unclear, but the Commission has previously recommended that governments reduce barriers to recognition of prior learning across the VET system as a whole (2020a, p. 430).



Information request 10.4

What is the mix of accredited, unaccredited and informal training at container terminals?

What are the costs and benefits of that mix?

What costs and benefits would be created by a greater reliance on formal training?

Does credit for recognised prior learning occur and, if so, in what context?

Workplace relations has a profound impact on skills acquisition

Workplace relations significantly influences who can be trained and at what level at container terminal operators. For example, many enterprise agreements specify a points system that is used to determine who receives training. The effects of this are two-fold. First, the system restricts the number of people who can be trained and in which areas. Second, it overwhelmingly rewards time served rather than competency. While time served can be important for delivering competency, an overreliance on this characteristic can lead to inefficiencies, such as skill mismatches. The restrictions to training also have implications for how easily firms can allocate labour and access the skills needed to operate equipment at any given time. These issues are discussed further in chapter 9.1.

Workplace relations also influences training requirements for some roles. Multiple enterprise agreements, for example, have potentially unnecessary training requirements for engineers working on tugs. These workers require a trade qualification alongside their marine engineering qualifications. This qualification can be either a fitter and turner, diesel fitter or electrical fitter (Smit Lamnalco and AIMPE Marine Engineers Harbour Towage Enterprise Agreement 2017, cl. 33.14; Svitzer Australia Pty Limited National Towage Enterprise Agreement 2016, cl. 16.2.1). The longer training requirements for a trade qualification means this can be a barrier to people moving from deck-hand positions to engineering positions on tugs or from people with different trade qualifications working as engineers. Ultimately, this limits labour supply (Smit Lamnalco Australia, pers. comm., 24 May 2022).

The Commission would appreciate further information from inquiry participants about the relationship between workplace relations and skills acquisition in the maritime logistics system.



Information request 10.5

How does workplace relations influence training, including the content of training, who provides the training, who is trained and when they are trained in the maritime logistics system?



Draft finding 10.1

Port workers appear to acquire the skills they need

Inquiry participants have raised very few concerns about the system that delivers skills and training for port workers — the system largely appears to be functioning well.

10.2 Labour supply and mobility

There are impediments to labour mobility in the ports

Labour mobility is important. A workforce that is highly mobile allows workers to move to where they are most productive — which also helps the economy adjust to structural change (D'Arcy et al. 2012, p. 1). Workplace arrangements appear to substantially limit inter-firm and inter-state mobility for workers in container terminal stevedoring roles. For example, at least some enterprise agreements require that all new hires start in casual, lower-skilled roles and most promotions to equipment operation roles are limited to existing employees and based largely on time served. It appears to be the case that a container crane operator, for example, who changes employer would step back to a lower rung of the promotion hierarchy. These provisions are discussed in more detail in chapter 9.

While workplace arrangements are likely the largest barrier to labour mobility for the stevedoring workforce they are not the only barrier.

- The extensive use of onsite training may mean that labour is less mobile between different employers and ports than would otherwise be the case. Flinders Port Holdings (sub. 55, p. 12) reported that more individualised training and licence accreditation 'can result in decentralised training management and record keeping [which] ... reduces the ability for employees to work across businesses'.
- State and territory governments have made progress in eliminating unnecessary barriers to mobility through automatic mutual recognition of occupational licensing (PM&C 2021b).

Few mobility issues have been identified by the Commission for on-water roles — but the lack of mutual recognition between jurisdictions for marine pilots is one (Department of Treasury and Finance 2021). Another is responses to the 'free rider' problem created where firms have an incentive to benefit from the onsite training of competitors by recruiting trained workers. Maritime Industry Australia Limited (MIAL) (pers. comm., 1 June 2022) noted that 'some employers seek a written commitment — either through enterprise agreements or other contractual arrangements — that cadets/trainees remain employed by the firm once training is completed for up to 2 years, but such arrangements are reportedly extremely difficult to enforce'.

The Commission is interested in gaining more understanding about labour mobility issues from inquiry participants and in whether there is greater mobility in bulk and general stevedoring operations.



Information request 10.6

Would greater use of merit-based hiring and promotion in container terminal operations result in greater labour mobility?

Would recognition of prior learning, mutual recognition of occupational licencing and/or use of accredited training need to be expanded if there was a greater reliance on merit-based promotion systems?

Which occupational licences used in the ports are not mutually recognised across all states and territories? What are the costs to businesses and firms from these arrangements?

Is there more labour mobility in bulk and general stevedoring compared to container stevedoring?

Are there more standard qualifications for bulk equipment operators that foster mobility?

Skills shortages do not appear to be a pressing issue

Skills shortages occur:

when employers are unable to fill or have considerable difficulty filling vacancies for an occupation, or significant specialised skill needs within that occupation, at current levels of remuneration and conditions of employment, and in reasonably accessible locations. (Boyton 2022)

However, skills shortages can be difficult to identify and have been the subject of disagreement. The term skill shortage has been described as ‘a slippery concept with many meanings’ (Richardson 2007, p. 7). The quality of workers is multifaceted. A worker with appropriate technical skills may lack other qualities demanded by the employer causing a shortage that will be difficult to fix in the short term.

Skills shortages are, or should be, remedied in the longer term by changes in wages or conditions that incentivise increased labour supply and moderate labour demand. But there can be impediments that prevent this from happening. For example, lengthy training requirements can slow adjustments in labour supply.

No current skills shortage concerns have been raised by inquiry participants in relation to container terminal operations. And the submission from Flinders Port Holdings (sub. 55, p. 12) is indicative of responses from a range of inquiry participants: there have been no issues accessing the labour they require due to the highly attractive wages and conditions on offer. Hutchison (pers. comm., 8 July 2022) noted that:

The high wages and generous benefits in the industry more than compensates for providing some of the flexibility required by the business. HPA has no difficulty in recruiting employees to work in the industry. Stevedoring jobs are highly prized because of the income levels and favourable working conditions.

But the availability of labour for on-water roles has been raised as an issue by inquiry participants.

On-water roles have lengthy training requirements

Entry into marine pilot, tug master and harbourmaster roles takes many years. The Australian Maritime Safety Authority (AMSA) (2020, p. 1) requires masters to hold a certificate of competency as well as 36 months qualifying sea service. Gaining this practical blue-water experience in Australia is an additional challenge for people who have completed their theoretical training (discussed further below). This may be restricting the pipeline of some specialist skills and extending the time taken to get the requisite qualifications.

Marine pilots have been nominated as one occupation that might be in shortage

MIAL (2019a, p. 49) projected a shortage of shore-based roles noting also that '[i]t is becoming increasingly difficult to retain qualified and experienced pilots due to regional location'. Shipping Australia, however, noted that 'the invisible hand of the market moves in such a way as to ... alleviate [the] threat of potential seafarer shortfalls' (sub. 11, p. 37). And they noted that:

In Australia, today, there are already 66,000 domestic certified seafarers and a further 28,000 uncertified crew and volunteers without the need for any policy prescriptions such as a national fleet. (Shipping Australia, sub. 11, p. 38)

Moreover, the National Skills Commission (2021a) has not identified a shortage in the occupational category that marine pilots belong to. (That said, this is a relatively broad category which also includes ship, dredge and tug masters.)

The many years of on-water experience, in addition to formal qualifications, required to work as a marine pilot means that there is a significant cost in training for these roles and that the labour market might be slow in responding to changes in demand over time. MIAL (sub. 46, p. 14) estimated that it costs in the range of \$200 000 to \$300 000 to fully sponsor a cadetship for a deck officer or engineering officer which includes 'wages, college fees, accommodations and food allowances and incidentals'. This hinders the pipeline of marine pilots as they require a 'career at sea gaining the necessary qualifications and experience' (MIAL, sub. 46, p. 12). Further, MIAL (sub. 46, p. 14) argued that the government does not contribute to the blue-water experience required for the AMSA certificate of competency — only the VET qualification.

It has also become more difficult for marine pilots to gain blue-water experience domestically as Australia's coastal fleet has reduced over time (chapter 12).

MIAL (2019a, p. 9) are concerned that Australia will lose its capacity to train domestic marine pilots. In addition, closed borders during the COVID-19 pandemic raised concerns that Australia should maintain a sovereign capability in what is viewed as an essential skill.

Immigration is one economical option for addressing a skills shortage

A well-targeted skilled migration scheme designed to alleviate skills shortages can enable businesses to source skilled labour in peak labour demand periods and access a global pool of specialised labour that may not be available domestically. Moreover, '[s]killed immigrants are also more likely to generate spillover benefits through enhanced productivity, innovation, and greater flexibility to move to other occupations in response to changing labour markets' (PC 2016a, p. 3). However, designing and operating a well-targeted skilled immigration system is not straightforward, not least because, as discussed above, identifying genuine skills shortages is complex (PC 2016a, pp. 28–29).

Professional seafarers operate in a global labour market and skilled migration has often filled gaps. In 2021, there were approximately 1.9 million seafarers globally of which 860 000 are officers and 1.0 million are ratings² (UNCTAD 2021a). Of the approximately 7800 marine transport professionals³ working in Australia in 2016, 11 per cent were temporary and permanent migrants (ABS 2018c). Moreover, the Logistics & Defence Skills Council (2020, p. 2) in Western Australia noted that while employers prefer to hire locally for harbourmaster roles, most are sourced from overseas (from the United Kingdom, Indonesia, South Africa

² Ratings are seafarers who have fewer educational requirements than officers and technicians on vessels and assist in a wide range of tasks on board (for example, as deck hands and cooks) (Deloitte 2011, p. 3).

³ Marine transport professionals include master fisher, ship's engineer, ship's master, ship's officer and ship's surveyor.

and New Zealand) and approximately only one third of deputy harbourmasters are from Australia. The evidence indicates that the migration system is capable of delivering workers to the maritime sector.

However, MIAL (2019b, p. 1) are concerned that ‘Australia cannot rely solely on immigration to fill those [shore-based] roles given the global imbalance in supply and demand for quality seafarers’.

It must also be noted that immigration is not always a perfect substitute for local experience. Australian seafarers are often required to have qualifications above the minimum international standard and pilots must also have intimate knowledge of a local port and conditions. But the use of immigrants in harbourmaster roles indicates this barrier is not insurmountable.

Cadetships are important to train the next generation of seafarers

Seafarers can gain the experience they need through local cadetships or working on international shipping lines. Offshore & Specialist Ships Australia Ltd (sub. 42, p. 5) suggested that ‘sea time beyond Australia could be negotiated on the international fleets of companies currently operating within Australia’, noting that cadetships on international vessels have ‘been very effective historically’. Two local cadetship programs that offer international sea time have been established in recent years (box 10.3).

Differences in wages may make these opportunities unattractive for trainees, but tax settings can be designed to address this issue. The seafarer tax offset — equal to 30 per cent of gross eligible withholding payments to Australian seafarers — is designed to incentivise Australian seafarers to gain skills overseas (DITRDC 2021f).

Some inquiry participants sought greater government intervention. MIAL (sub. 46, p. 23) proposed changes to personal income tax settings for seafarers on the grounds that the current system is too narrow, for example, only applying to seafarers working on Australian-flagged trading ships with at least 91 days of international service. Offshore & Specialist Ships Australia (sub. 42, p. 6) proposed other solutions such as:

- developing a system to ensure the equitable sharing of the cost of training from all industry users — including government
- an obligation to provide a cadet program for any government contract for use of ships.

However, the case for further government intervention to solve potential skills shortages is unclear, particularly with the emergence of local cadetships.

Is a strategic fleet the answer?

Some inquiry participants have called for the establishment of a strategic fleet to respond to the gap in domestic blue-water training opportunities for trainee seafarers and address concerns of potential skills shortages (MIAL, sub. 46, p. 13; MUA, sub. 59, p. 16).⁴ MIAL (2019b, p. 19) has previously estimated that a 20-vessel strategic fleet would require approximately \$200 million in annual government support, and would provide about 800 seafarer jobs and training for a further 100 seafarers each year.

The Australian Government's policy on a strategic fleet announced prior to the election, however, does not specify the size of the proposed fleet, nor if it will play a specific role in supporting seafarer skills and training. Instead it notes that the fleet will have a role in growing Australia's maritime seafarer workforce, this being vital to economic sovereignty and national security (ALP 2022). It also expects the fleet will be privately owned and operate on a commercial basis. As a commercial operation, access to training positions on board will likely face similar costs and impediments to those faced by other international vessels operating on a competitive footing in the global market. The Commission expects that private investment in the strategic fleet on a commercial basis would also require significant government incentives and ongoing subsidy

⁴ A strategic fleet is defined in chapter 12.

(chapter 12). Other options available, including the current mix of cadetships and skilled migration, appear to offer lower cost solutions that directly address skills and training issues without the associated costs and risks to Australian taxpayers of support for a commercial national fleet.

Box 10.3 – Blue-water cadetships in Australia

Blue-water experience has been noted as a significant barrier to skilling local seafarers. However, some port authorities have established cadetships to build blue-water skills in Australia.

Pilbara Ports Authority (2021, p. 48) started a cadetship program in 2018 to meet its future skills needs. Cadets gain experience from major shipping lines overseas and undertake training onsite to qualify as a third officer on any ship around the world under International Standard for Maritime Pilot Organisations certification. Pilbara Ports Authority focuses on recruiting local marine cadets on the grounds that they will be more likely to stay in the region after training (Roger Johnston, Chief Executive Officer, Pilbara Ports Authority, pers. comm., 17 June 2022).

The Port Authority of NSW (2018, 2020) developed a similar program in 2018 where cadets are placed on merchant ships to achieve the 18 months qualifying sea service required by the Australian Maritime Safety Authority before they can undertake further studies to qualify as a deck watchkeeper.

Pilbara Ports Authority (2021, p. 28) noted that 'five marine cadets are progressing through the cadetship program' and the Port Authority of NSW (2021, p. 49) have had three cadets complete the program since inception. Although these programs are small scale, they show that it is possible for employers to facilitate comprehensive training.



Draft finding 10.2

If they arise, skills shortages for seafarers can be solved through immigration and industry-led solutions such as cadetships

There is no strong evidence of skills shortages in the maritime logistics system.

Skills shortages can, and have been, solved through targeted immigration and industry-led initiatives such as cadetships. without the need for a strategic fleet.

10.3 Is the skills system equipped to deliver future skills needs for the ports?

An efficient and effective skills system would deliver the skills required as the needs of operators in the ports change over time. This section considers the changing nature of skills needs and whether the skills system will be able to deliver in the future.

Changes in technology used on the ports have, historically, been gradual; so too, the associated changes in skill needs. If this continues, it is likely that the formal and informal training systems can keep pace with the adjustment. The Maritime Industry Reference Committee and Transport and Logistics Industry Reference

Committee are continually reviewing training package qualifications and units of competency to ensure the skills and knowledge align with industry and licensing requirements (AIS, pers. comm., 24 May 2022).

Shifts to more automated operations in recent years (chapter 11) have been reflected in nationally recognised training. The Transport and Logistics 2018 Skills Forecast flagged the revision of Certificates II, III and IV in Stevedoring to adapt to the use of emerging technologies such as automated straddles and automated stacking cranes (AIS 2018, p. 33). This resulted in the development of new units such as: prepare and monitor automated operations; coordinate terminal/wharf equipment operations; and move materials mechanically using automated equipment (AIS 2021a, p. 12).

While the way that employers and RTOs use VET modules to create unaccredited onsite training could mean that RTOs may not immediately pick up changes in training packages, the widespread use of employer-specific training is likely to be an asset as it gives employers greater flexibility to adapt employee training as new technology is implemented.

Near-term, automation is likely to occur in quayside terminal operations, but the industry is also preparing for some marineside changes — for example, the linesperson qualification is being reviewed (AIS 2020, p. 15).

In a sign of developing technologies on the marineside, the Yara Birkeland, a 120 20-foot equivalent unit coastal container ship, is beginning a two-year trial in Norway that would make it the first fully autonomous cargo ship (Shipping Australia, sub. 11, p. 36). Similar trials of autonomous technology are happening, yet the scale is not large enough to be a disruptive factor in skilling now or in the near future (chapter 11).

As ports become increasingly automated, there is a risk that current licensing requirements will fail to keep up with the changing nature of work. However, the case for further licensing for supervising automated operations is unclear. Further, inquiry participants have not called for greater regulation of automated operations. Rather, Ai Group state that:

The workforce will need to be familiarised with the regulatory framework surrounding safety and compliance involving the operation of autonomous vehicles. (sub. 60, p. 11)



Information request 10.7

How has automation changed the skill profile of the workforce to date?

How well equipped is the skills system to deliver the skills which will be required in the future?

How well equipped is the licensing system to support the transition to automation?

What are the costs and benefits of using old licensing regimes to govern automated operations?

11. Technology, information and innovation

Key points

- * There is no 'best' level of automation and ICT adoption for container terminal productivity and Australia's major container terminals have implemented varying degrees of both automation and ICT adoption, in line with internationally comparable ports.
- * Evidence does not clearly demonstrate the impact of automation on productivity and efficiency. However, automation can lead to other benefits including improved safety, reliability and consistency of terminal operations.
- * Data sharing in the maritime logistics system has enabled innovation, but more data sharing could provide additional value. Government has commenced initiatives such as the National Freight Data Hub to increase access to private and public sector data while improving the processes by which this data is collected. Though nascent, these initiatives can complement existing sources of data and drive future innovation.
- * Australia's maritime sector relies on a range of private ICT systems that facilitate document sharing and allow cargo to flow efficiently through the maritime logistics chain. These systems continue to be developed through the adoption of new technologies that increase the safety and usability of ICT systems. Implementing a government-run port community system would risk simply adding further administrative costs for users in the maritime ICT landscape.
- * The Australian Government's cargo and vessel clearance systems are convoluted and challenging for stakeholders to use, with repetition in data entry and outdated ICT systems. A government taskforce is working to address these issues. Successful reform will require the elimination of duplicative application processes, adequate resourcing for the departments performing clearances and a stable 'single window' ICT platform that can integrate with privately operated port community systems.

This chapter provides a snapshot of how technology, data, information and innovation are used overseas and in Australia's maritime logistics system. It identifies technologies, information and innovations that appear to be the most significant in the pursuit of productivity, efficiency and resilience. The chapter also examines frameworks that can support the development and use of technology and information.

11.1 Why technology, information and innovation matter

Technology, information and innovation are critical to achieving a supply chain that is efficient (maximises the collective wellbeing of the members of the community), productive (sees maximal growth in output from changes to inputs) and resilient (continues to function when exposed to shocks and adapts to changes) (PC 2013, p. 3,11, 2021b, p. 36).

In the context of maritime logistics, 'technology' can be thought of as the assets used at each stage of the logistics chain, such as machinery, equipment, vehicles and tools (whether tangible or intangible). Use of the most effective current and emerging technologies can help to ensure that services are provided efficiently, productively and safely. New assets aimed at maximising cargo throughput can improve terminals' productive efficiency and reduce their operating costs. The effective use of technologies also has the potential to lessen the impact of supply chain disruptions. For example, where vessel arrival windows have been missed resulting in congestion, technology can: reduce the time required to berth and unload vessels; aid in communicating along the logistics chain about what cargo is now incoming; and help to coordinate the collection and delivery of that cargo. Similarly, assets aimed at reducing manual inputs can lower the chance of injury or death for workers. New technologies can also reduce the environmental impact of activities within the supply chain.

Information is produced through the gathering and analysis of raw data generated by activity within a production process. Access to accurate and timely information can enable businesses and governments to identify areas where performance in the maritime logistics system can be improved. However, while greater transparency is generally efficiency enhancing, there can also be risks associated with information sharing, particularly in relation to privacy, security and competition concerns. A unilateral disclosure of pricing intentions to competitors, for example, would clearly pose competition risks and the publication of other details, for example, about scheduling or capacity truck movements could also carry a risk of dampening competition.

Innovation involves the creation and adoption of knowledge, ideas, products, processes and ways of doing business (PC 2017a, p. 1). In maritime logistics, innovation largely takes the form of private and public research and development (R&D). These processes drive the creation of new technologies that can make business processes or the physical movement of cargo more efficient.

11.2 Inquiry participants focused on three key technology, information and innovation issues

In response to the call for submissions, inquiry participants have emphasised the importance of technology, information and innovation for improving the performance of Australia's maritime logistics chain. They highlighted a number of developments, often situating them within the broader context of 'Industry 4.0' — a term describing global uptake of technologies that promote interconnectivity, transparency and autonomous operation (for example, artificial intelligence, big data and Internet of Things platforms).

The major themes that recurred in submissions were:

- automation (as a process or in relation to particular machinery)
- the availability of information
- cargo clearance processes.

Automation

Automation is the technique of making an apparatus, process or system operate automatically, replacing (or significantly reducing) the need for human labour. This is in contrast to mechanisation, which is the process of applying the use of mechanical apparatus with human labour in carrying out a task. Automation goes beyond mechanisation in that the processes are not only supported by machines, but able to be executed by a program that regulates the behaviour of the machines (Kamaruddin, Mohammad and Mahbub 2016, pp. 112–113).

Automation emerged as a dominant theme in submissions from a wide range of groups. Port and container terminal operators claimed it has enabled improvements in the efficiency of their operations and expect it to further enhance operations in the future (Patrick Terminals, pers. comm., 9 June 2022, FPH, sub. 55, p. 13; Port of Newcastle, sub. 62, pp. 20–23; Port of Melbourne, sub. 65, p. 25). However, some academics have suggested automation has a negligible impact on the productivity of container terminals (Dr. Greig Taylor and Dr. Matthew McDonald, sub. 35), while the Maritime Union of Australia submitted that it has been detrimental (sub. 59, attachment, pp. 25, 26).

Information sharing

‘Data’ refers to representations of facts that are produced by stakeholders’ activity in the maritime logistics system. ‘Information’ refers to the meaning drawn from the facts represented by data. Information can be derived once data has been organised for interpretation (PC 2017b, pp. 54, 55). For example, the time spent by a single crane to unload a container from a ship is a piece of data. The crane rate (the number of containers handled each hour a crane is operating) is information that can be obtained from the available data.

Challenges in accessing data and information were identified across the supply chain. Participants suggested that improving the quality and extent of data sharing would help them to: gauge the effectiveness of various operations; make informed decisions about possible investments; or respond to disruptions more quickly and effectively (GTA and AGECE, sub. 4, p. 6; Ports WA, sub. 12, p. 3; GrainGrowers, sub. 22, p. 2; MCA, sub. 25, p. 9; IFCBAA, sub. 34, p. 11; Ai Group, sub. 60, 6). Looking to the future, other submissions highlighted ongoing state government initiatives to collate and share government data (CTAA, sub. 50 pp. 2–4; NSW Gov, sub. 58, p. 15) and provided recommendations for improving information sharing capabilities through new technologies or national coordination (SAFC, sub. 53, p. 2; FPH, sub. 55, pp. 17, 18; ALC, sub. 57, pp. 3–6; Port of Melbourne, sub. 65, pp. 5, 22–23; NSW Ports, sub. 66, pp. 1, 2, 14–17; Victorian Department of Transport, sub. 70, pp. 3, 4).

Vessel and cargo clearance

Participants also submitted that the processes required to clear cargo and vessels for import and export to and from Australia are arduous, convoluted and slow (SAWIA, sub. 17, PP. 7, 11; AFGC, sub. 21, p. 7; FTA/APSA, sub. 31, p. 22; IFCBAA, sub. 34, p. 12; Metcash, sub. 38, p. 1, FCAI, sub. 23, pp. 12–14; TMA, sub. 36, p. 3). Inquiry participants called for reform to the biosecurity and customs system (NSW Government, sub. 58, p. 18), pointing to the development of a new national single window system under the Simplified Trade System (discussed in box 11.6, below).

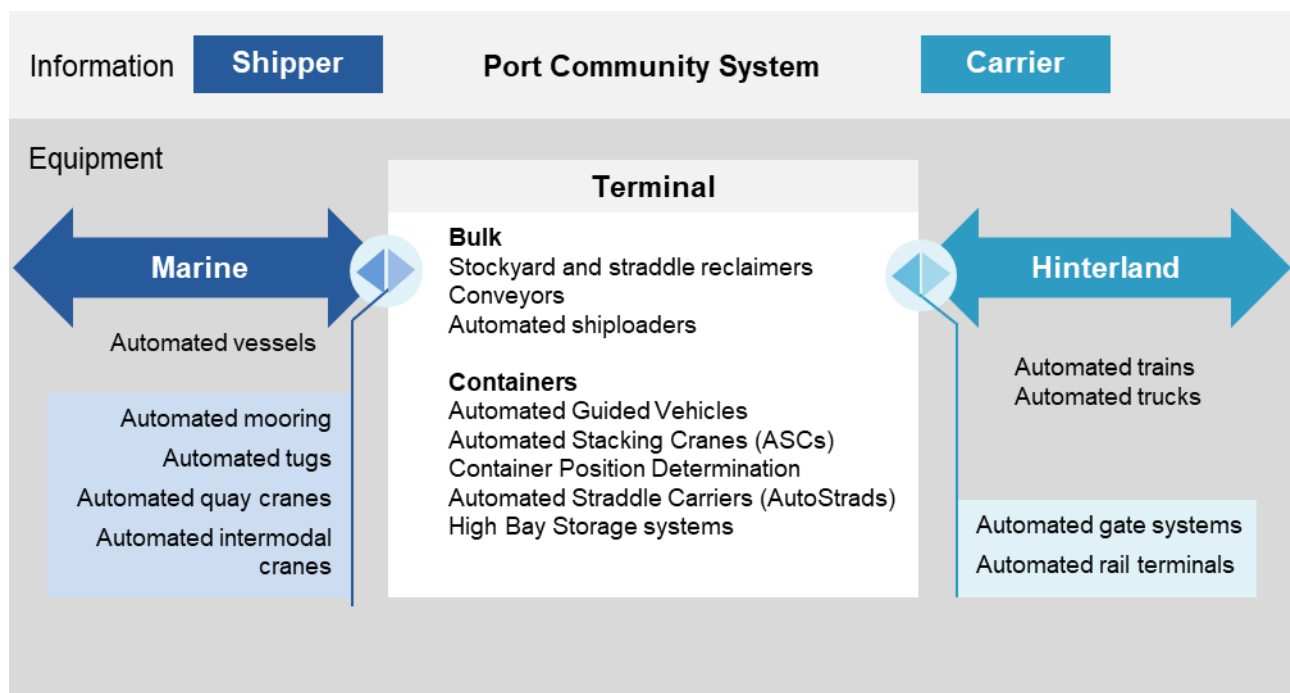
11.3 Automation and related technologies

How automation is applied in maritime logistics

There has been a trend towards the use of automation across the maritime logistics chain, particularly in the operation of container terminals, from the 1980s (Acciaro, Renken and El Khadiri 2020). Degrees of automation are now commonly applied in all stages of the logistics chain. Globally, container and bulk terminal operations are automating processes and using robotics to assist in each stage of cargo movement from the mooring of vessels to the loading and unloading of cargo at the port gate (Notteboom, Pallis and Rodrigue 2022b, pp. 158–159).

Figure 11.1 illustrates the various services and equipment that can be automated in the maritime freight logistics chain.

Figure 11.1 – Automation in maritime freight logistics^a



a. Port community systems are discussed in section 11.5.

Source: Adapted from Notteboom, Pallis and Rodrigue (2022d, p. 8).

The following subsections discuss key fields of automation and related technologies relevant to cargo vessels, port operations, bulk terminals, container terminals and heavy vehicles, rail and empty container parks.

Cargo vessels

Globally, there are more than 1000 Maritime Autonomous Surface Ships (MASS) in operation and automation in cargo carrying vessels has advanced to a stage where short unmanned sailings are being trialled (box 11.1) (Dougherty 2021). A range of small remotely operated and autonomous vessels is being used in Australia for oceanography, hydrography, the off-shore oil and gas industry and scientific research (AMSA 2021).

The International Maritime Organisation (IMO) states that most predictions are for autonomous or semi autonomous liner operations to be limited to short voyages (IMO 2022), but longer autonomous ocean voyages may occur in the future.

The IMO has defined four degrees of autonomy that describe the extent of automation in MASS.

1. Automated processes and decision support.
2. Remotely controlled ships with crew on board.
3. Remotely controlled ships without crew on board.
4. Fully autonomous ships (IMO 2018).

Once MASS technology is mature, there will be scope for autonomous vessels to have lower bunker (fuel) consumption than equivalent manned vessels because they will not need to dedicate energy or space to systems and facilities that would ordinarily be required to accommodate a crew (such as heating, cooling, cabins and amenities) (SAL, sub. 11, p. 37). Development and trials are underway abroad for cargo carrying MASS utilising degree 3 and degree 4 automation, as described in box 11.1.

Box 11.1 – International autonomous vessel trials

In November 2021, the world's first electric and self-propelled container ship, the Yara Birkeland, completed its maiden voyage in the Oslo fjord in Norway. The Yara Birkeland has a capacity of 120 20-foot equivalent units (TEU — the standard unit of measurement for shipping containers, one TEU is equivalent to one 20-foot shipping container) and sails between Herøya and Brevik (approximately 7 nautical miles or 13 km) carrying chemicals and fertiliser (Buckley 2021; Schuler 2022; Yara International 2021). Svein Tore Holsether, CEO of Yara, says the ship will 'cut 1000 tonnes of CO₂ and replace 40 000 trips by diesel-powered trucks a year' (Midtbo 2021).

In January 2022, Mitsui OSK Lines conducted the first sea trial of an unmanned autonomous containership, the M/V Mikage. The ship travelled from Tsuruga Port to Sakai Port, performed autonomous berthing and unberthing and carried out 'automated mooring' tests using a drone to transport its mooring line to the pier (Schuler 2022; Ship & Bunker 2022). Japan's Nippon Foundation is targeting the introduction of autonomous shipping by 2025 and 50 per cent of Japan's shipping to use unmanned navigation by 2040. Japan's vessel automation ambitions have arisen against the backdrop of an aging and limited labour supply, as more than half of ship crew members are older than 50 years and human error accounts for 80 per cent of maritime accidents (The Nippon Foundation 2020). Laws in Japan do not currently allow fully autonomous vessels to operate without personnel on board and there may be ambiguity around accident liability in the event of a collision between autonomous vessels and regular ships (The Nippon Foundation 2019).

The large liner shipping companies do not appear to be prioritising automation of vessels. In 2018, Maersk CEO Søren Skou said in an interview with Bloomberg: '[e]ven if the technology advances, I don't expect we will be allowed to sail around with 400-meter long container ships, weighing 200 000 tonnes without any human beings on board.' (Wienberg 2018). The article notes that advances in technology and automation of discrete systems on container ships have meant Maersk is able to sail with less than half as many sailors as it would have required 20 years ago, despite vessels growing over that time (Wienberg 2018).

The small appetite for further automation shown by liner shipping companies could reflect their relatively low labour costs relative to other operating expenses — Hapag Lloyd's FY2021 Annual Report recorded

personnel expenses of €810 million in 2021 and €630 million in 2020 compared with other transport expenses of €10 323 million in 2021 and €9140 million in 2020. This suggests that it may be preferable to pursue measures to improve the operating efficiency of ships or reduce the cost of their maintenance rather than automation (Hapag-Lloyd 2022, pp. 183–184; Rivero 2022).

In 2016 the Advanced Autonomous Waterborne Applications Initiative anticipated the following timeline for the deployment of MASS (AAWA 2016):

- 2020 — vessels with reduced crews with remote support and automated operation of certain functions
- 2025 — remote controlled unmanned coastal vessels
- 2030 — remote controlled unmanned ocean going ships
- 2035 — autonomous unmanned ocean going ships.

The IMO recently assessed how existing regulatory instruments might apply to ships with varying degrees of automation. The assessment highlighted the importance of determining appropriate and internationally accepted definitions for MASS, 'master', 'crew' and 'responsible person'. The exercise also highlighted the need to attribute appropriate responsibility to the remote control centre, potentially designating remote operators as 'seafarers' (IMO 2021).

Similar challenges apply in Australian waters. Autonomous and remotely operated vessels are regulated by the Australian Maritime Safety Authority, which categorises vessels as either domestic commercial vessels (if they are Australian vessels operating domestically), regulated Australian vessels (if they are Australian vessels that travel internationally), or foreign vessels (if they are not Australian vessels but operate in Australian waters). All vessels, regardless of category are subject to the same regulatory framework (including crewing requirements), due to the definition of 'vessel' in the Maritime Safety (Domestic Commercial Vessel) National Law Act 2012 and Navigation Act 2012 (Cth). Because these laws were written for traditional vessels with human crews, autonomous vessels working in Australian waters are reliant on exemptions from the Australian Maritime Safety Authority (AMSA) that permit their operation (AMSA 2021). While exemptions appear to be sufficient for current needs, over time updated regulations governing the operation of vessels would be more appropriate to support the widespread adoption of MASS.

Port operations

There is scope for pilots, tugs and mooring vessels to make greater use of technology and autonomous vessels. Some of these technologies are already in use or being trialled in Australia and other countries.

Remote or shore-based pilotage places a pilot ashore so that navigational assistance can be provided from a control room rather than a vessel. Remote pilots can use information from radar, global positioning system (GPS) receivers on the vessel and electronic charts to determine the vessel's position and bearing to then relay instructions by very high frequency (VHF) radio to the vessel. By operating in this way, pilots may be able to access better information and avoid the risks that would otherwise be present from boarding and disembarking vessels, particularly in poor conditions (FPH, sub. 55, p. 18; (Lahtinen et al. 2019). However, the ships receiving guidance may be at risk if these technologies malfunction and pilots may not get the 'feel' of the vessel or communication barriers might arise (Marine Insurance P&I Club 2020). Nonetheless, remote pilotage is undertaken in Australia with various levels of equipment sophistication.

A 2016 research paper found that the benefits of remote pilotage for ports was likely to be driven by the potential for improved utilisation of port resources. The paper found the greatest benefits to be the reduced requirements for pilotage support services (for example, helicopters and support crews), improved navigational performance and safety (that is, pilotage errors could be reduced from 1 in about 15 500 vessel movements, to 1 in 95 000) and improved pilot utilisation (by removing the need for pilot transfers) (Brooks,

Coltman and Yang 2016, p. 9). Use of remote pilotage has the potential to reduce pilotage costs and enable pilots to assist more vessels in a given period.

Tugs operated in Australia are currently crewed, but significant developments are being made overseas in their automation. In October 2021, the 'Nellie Bly' completed a 1027 nautical mile (1902 km) journey around Denmark's coast in 129 hours, operating autonomously for 97 per cent of that time while supervised by United States Coast Guard mariners stationed in Boston (The Maritime Executive 2021). Similarly, Svitzer, Kongsberg Maritime and the American Bureau of Shipping have announced their intention to develop a commercial tug that is fully operable from a remote operations centre on shore, noting that such boats are likely to be several years away (Svitzer 2021). Autonomous tugs would likely come with similar safety and economic benefits to those discussed in the context of autonomous cargo vessels above (Shipping Australia, sub. 11, p. 36); the extent to which automated tugs could replace their conventional counterparts is unclear. Brent Warhust, Eastern Area president of the Australian Maritime Officers Union, indicated that: '[y]ou wouldn't be able to get away with [automating] all of [the tugs used to service a vessel], because you'd need that human operator to steer very quickly if the situation demanded it' (Dunn 2020).

Automation is also becoming more common in processes for mooring vessels. While a novel drone-based solution was noted in box 11.1, automated mooring systems more commonly use remote-controlled vacuum pads mounted to the quay. These systems can reduce the time and fuel needed for vessels to moor, reduce mooring worker needs and deliver safety benefits. Automated mooring systems are currently used in ports overseas, including Helsinki, Beirut, Salalah and Ngqura (Howie 2017; Port of Helsinki 2019). In 2015, the Australian Maritime Safety Authority (AMSA) identified mooring operations as among the most dangerous tasks carried out on board ships and noted that Australia had seen two fatalities during mooring from 2005 (AMSA 2015).

Bulk terminals

While this report is focused on containerised freight, Australia's bulk terminals have been identified as among the most efficient in the world, particularly Port Headland (iron ore) and Newcastle (coal), and use a range of automated equipment (Merk and Dang 2012). Given the significance of the bulk trade to Australia's economy, the use of automation in bulk terminals merits some discussion.

Automation is applicable to a wide range of information systems and machinery used in terminals handling bulk commodities (for example, coal, iron ore, bauxite, grain and fertiliser). Bulk commodities are commonly moved between offsite locations (where they have been produced or will be collected) and a stockyard in the port by trains or heavy vehicles. Within the port, 'reclaimers' scoop up the material from the stockyards with rotating buckets and deposit it onto conveyor systems which transport the commodities to machines that feed it into the bins of a 'shiploader' that deposits it into the hull of a waiting ship or barge at berth (ABB Australia Pty Ltd 2009).

The extent to which mechanisation and automation are applied to the transport of bulk commodities through terminals and their stowage in ships depends on the type and volume of the commodity being handled. Distribution of cargo can be highly manual (for example, shovelling grain), partly mechanised (using front end loaders to lift bulk commodities into holds), or highly mechanised (using automated ship loaders or on-board conveyors).

Australia's largest bulk export ports use a range of automated systems. An Australian-based electrical and automation company, MRA, offers automated stockyard management and shiploading technologies which uses laser scanner data and analytics to operate stockyard reclaimers, allowing for operations to be monitored from a remote control room. MRA claims its 'Smart Stockyard Management System' has increased throughput across six stacker reclaimers at Queensland's Abbot Point coal terminal by more than 11 per cent (Zakharia 2021). Shiploaders can be designed for local manual control, manual remote-control,

semi-automatic unmanned operation and fully-automatic unmanned operation (TechSolutions 2021). For example, autonomous grab ship-unloader systems are in operation at the Port of Hamburg and Port of Rotterdam. Much of the Hunter Valley Coal Chain (the coal network that links to the Port of Newcastle) is automated, ranging from its coordinating systems to technologies specific to landside efficiency and safety. BMT WBM's (a maritime-orientated design house and technical consulting firm) robotic wagon vibrators, for example, are capable of detecting and removing coal blockages in bottom-dump rail wagons, reducing the need for dangerous manual blockage removal (Austrade 2018). The Chain is also supported by MRA's range of automated technologies, including ship loaders, machine collision avoidance systems, train loaders and stockyard management systems. These technologies have been steadily adopted in mineral supply chains throughout the Indo-Pacific from 2000 (Austrade 2018).

The extent to which mechanisation and automation are implemented is usually related to the quantities of material handled, both in regard to size of shipments and number of shipments handled over a given year. As such, investment decisions between automated versus labour-intensive solutions will generally be driven by commercial considerations and bulk terminals in Australia that are not already mechanised and automated are unlikely to see conversion to more highly automated systems unless their throughput increases significantly.

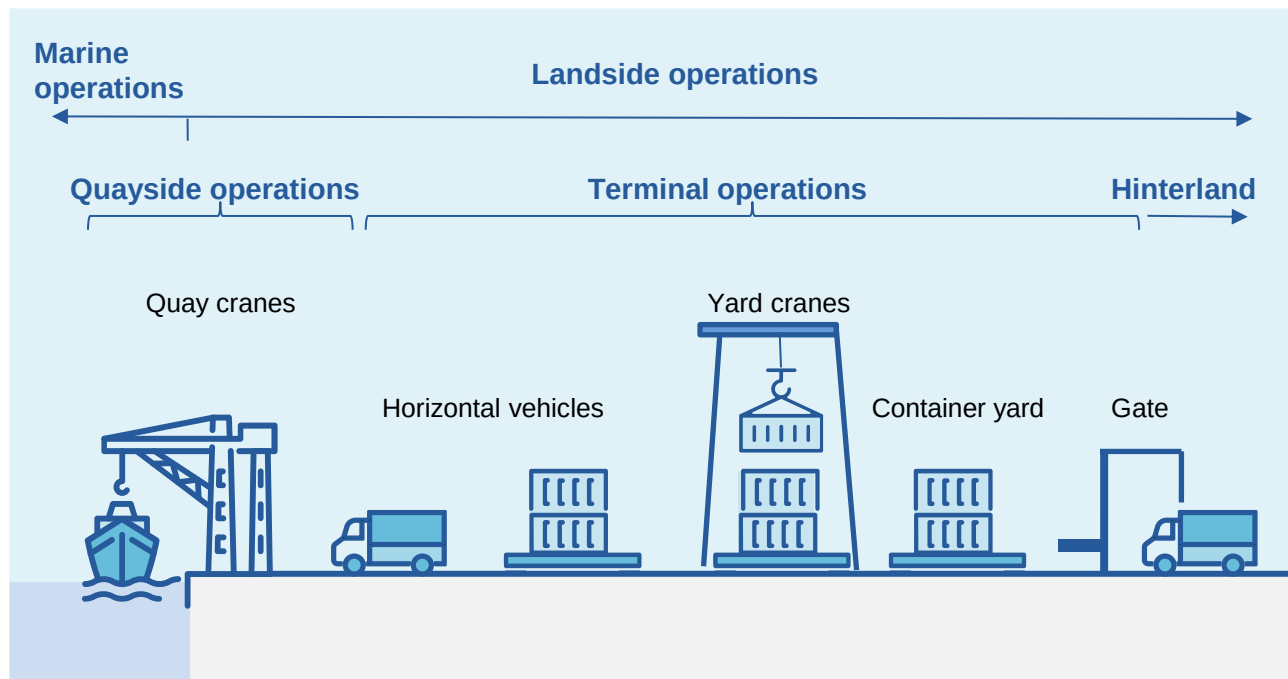
Container terminals

It is now feasible for a suite of automated systems to handle each element of the operations undertaken by container terminals. Extensively automated systems are becoming standard for major container terminals being constructed as greenfield projects, while existing terminals more typically elect to automate discrete parts of their operations due to the cost and disruption of converting to fully automated systems (Notteboom, Pallis and Rodrigue 2022d, p. 8). Figure 11.2 illustrates the key operations and hardware in container terminals.

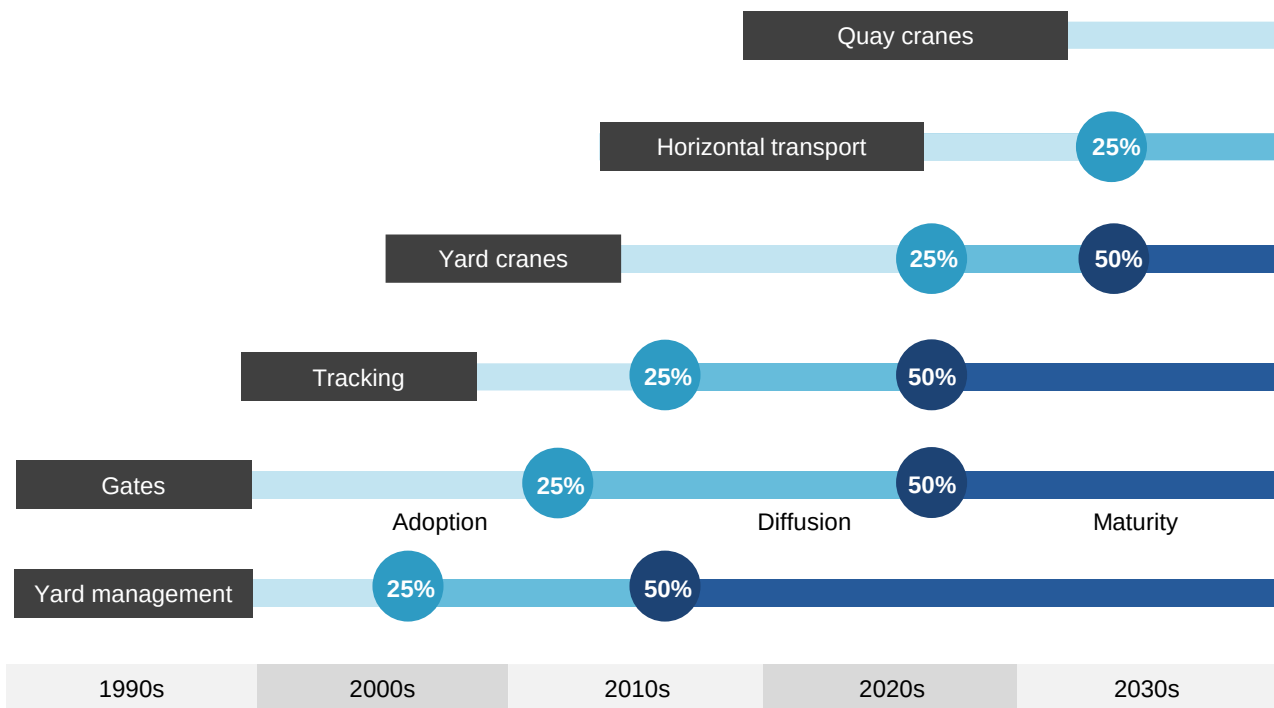
Over time, automation has become available for a growing range of equipment and ICT systems supporting waterside, yard and landside operations. Figure 11.3 illustrates the timeline for the development, adoption (up to 25 per cent uptake), diffusion (25 per cent to 50 per cent uptake) and maturity (greater than 50 per cent uptake) of automation in key terminal technologies.

To assist in describing the extent to which automation has been implemented in container terminals, this chapter uses the following scale.

- **High** — Automation is present in most of the equipment and systems required to transfer cargo between ships and the hinterland, including gate systems, (un)stacking, the horizontal movement of cargo through yards and the (un)loading of vessels. Automation either eliminates the need for human operators in each process or substantially reduces the input required from them.
- **Medium** — Automation is present in a range of the equipment and systems required to transfer cargo between ships and the hinterland, but some processes rely on manual operators and cannot be performed remotely. For example, automation may be present in gate systems and equipment for (un)stacking containers, but human operators are required for the horizontal movement of cargo through yards and (un)loading of vessels with quay cranes.
- **Low** — Most of the equipment and systems required to transfer cargo between ships and the hinterland are operated or administered manually, with only a small number of machines or processes utilising automation.

Figure 11.2 – Key operations and hardware in container terminals

Source: Adapted from Wang, Mileski and Zeng (2019).

Figure 11.3 – Timeline for adoption of automation technologies in container terminals

Source: Notteboom, Pallis and Rodrigue (2022b, p. 267).

Automation currently plays a limited role in processes to (un)secure cargo and move it between ship and shore. Stacked containers on vessels are 'lashed' together using twist locks that are generally manually unlocked before the unloading process can begin. The process of fixing and removing twist locks is often considered the most

difficult process to automate in container handling, but automatic and semi-automatic systems exist which can lock a container using its own weight and release a container using a crane's lifting force (ITF 2021, pp. 9–10; KALP GmbH 2011). Investigations into twist locks have shown that automated twist lock handling is still rarely used and manual twist lock handling remains the prevalent method of (un)securing containers. Barriers to greater uptake of automated twist lock handling are primarily attributed to issues with reliability, limited compatibility with twist-lock types, investment costs, conflicts with trade unions around automation and a lack of cooperation between stakeholders (Kugler, Brandenburg and Limant 2021, p. 2,15).

Once a container is unlocked, quay cranes lower a tool called a 'spreader' that locks on to four locking points on the corners of the container (corner castings). Quay cranes are generally run by an operator who sits in a suspended cabin or in a remote operations room. While automation of quay cranes is possible, the high level of complexity involved in crane operations (primarily relating to aligning the container spreader with the container slots while compensating for the movement of vessels) has rendered quay crane automation among the least developed and seldom implemented stage in terminal operations (ITF 2021, p. 10). The most advanced quay cranes in Australia have been deployed by Victoria International Container Terminal (VICT), which uses five neo-Panamax twin-lift cranes (that is, each crane is designed to lift two TEU at a time) which are not completely autonomous, but are operated remotely by staff situated 1.2 km from the wharf (VICT 2022a).

Modern container terminals frequently employ automation in yard operations. Automated decision making can be incorporated into the IT systems that manage the organisation and stacking of inbound and outbound containers. Artificial intelligence can use information about cargo destinations, contents and the time at which it will be loaded/unloaded to make decisions as to where each container should be placed in the yard and which vehicle should move it, relaying instructions back to terminal operating systems (or in some cases, automated yard machinery) for execution (FPH, sub. 55, p. 17).

Hardware to move containers within yards is often also automated. Containers can be moved across yards using automated guided vehicles such as straddle carriers (like the 'AutoStrads' used by Patrick Terminals in Sydney and Brisbane), rubber-tyred gantries (yet to be automated in Australian ports), auto stacking cranes (used by OneTerminal at VICT, Hutchison at their Brisbane and Sydney terminals and DP World's terminal in Brisbane) and container shuttles (used by VICT at the Port of Melbourne). The use of automated equipment in terminal yards depends heavily on sensor systems to relay the position and identity of containers in the yard and advanced ICT systems to manage equipment, often overseen by remote operators (MUA sub. p. 113; DP World sub. pp. 42 and 86–88; Kalmar 2019, 2022; Notteboom, Pallis and Rodrigue 2022b, p. 8).

Vehicle booking systems are used in Australia to regulate the interface between trucks and container terminals. Australian container terminals were the first in the world to use this technology, and have done so from the early 1990s (Chambers 2019).¹ These web integrated systems provide for appointment-based vehicle planning and gate operation, matching containers to vehicles to enable the terminal and vehicle operators to prepare for upcoming cargo movements. A range of vehicle booking systems are used by Australia's major ports (DP World, sub. 49, pp. 42 and 86–88). These include 1-Stop's Gateway (Patrick Terminals, DP World and VICT), Hutchison Ports' own Truck Appointment System and Flinders Adelaide Container Terminal's bespoke system. The Commission has not heard that the presence of multiple booking systems operating within ports has caused confusion or impeded coordination between transport operators and terminal operators.

Table 11.1 summarises the state of automation in each of the terminals at Australia's major ports.

¹ Prior to the introduction of vehicle booking systems, transport operators would phone terminals to check container and vessel availability and vehicles would arrive at the terminal gate with manual paperwork for processing the pickup or drop off of containers without prior notification of arrival time or date.

Table 11.1 – Automation at container terminals

Port	Terminal operator	Level of automation	Mode
Brisbane	DP World	Medium	Auto stacking cranes, automated gates, manual quay cranes
	Hutchison	Medium	Auto stacking cranes, automated gates, manual quay cranes
	Patrick Terminals	Medium	Auto straddle carriers, automated gates, manual quay cranes (but one semi automatic remotely operated quay crane is being trailed)
Sydney	DP World	Low	Automated gates, conventional rubber tired gantry, manual quay cranes
	Patrick Terminals	Medium	Auto straddle carriers, automated gates and rail terminal, manual quay cranes
	Hutchison	Medium	Auto stacking cranes, automated gates, manual quay cranes
Melbourne	DP World	Low	Automated gates, conventional straddle carriers, manual quay cranes
	Patrick Terminals	Low	Automated gates, conventional straddle carriers, manual quay cranes
	VICT	High	Auto stacking cranes, auto container shuttles, automated gates and semi automatic remotely operated quay cranes
Adelaide	FACT	Low	Automated gates, conventional straddle carriers, manual quay cranes, automation in yard planning systems
Fremantle	DP World	Low	Automated gates, conventional rubber tired gantry and forklifts, manual quay cranes
	Patrick Terminals	Low	Automated gates (implementation is underway), conventional forklifts and trucks, manual quay cranes

Sources: FPH, sub. 55, p. 13; MUA sub. 59, p. 113; VICT, sub. 7, pp 3, 4; DP World, sub. 49, pp. 31, 32, pers. comm., 30 June 2022; FACT, pers. comm., 27 June 2022; Hutchison, pers. comm., 8 July 2022; HPA (2022); ITF (2021, p. 18); Patrick Terminals (2022a); VICT (2022a).

Most of Australia's major container terminals have a low to medium level of automation, with all terminals using (or implementing) a degree of automation in the operation of their gates. Terminals utilising a medium level of automation have removed the need for human operators from stacking equipment. The only highly automated terminal in Australia, VICT has automated systems in place from the gate to the quay but continues to rely on a human operator for its quay crane, albeit with provision for remote operation.

Rail and heavy vehicles

Australia saw the deployment of the world's first fully autonomous train in July 2018. RioTinto sent three locomotives carrying approximately 28 000 tonnes of iron ore from its mining operations in Tom Price to the port of Cape Lambert, over 280 km away. The train was monitored remotely by operators in Rio's operations

centre in Perth. The 'AutoHaul' project was made fully operational in June 2019 and has eliminated the need to transport drivers to and from the train and the three stoppages that would otherwise occur while drivers change between shifts (a time saving one hour per journey) (RioTinto 2020). Automated trains are also operating in Australia's major cities, with a 36 km section of Sydney's metro system hosting driverless trains that have carried passengers from May 2019 (Zasiadko 2019). With rail already serving bulk and container ports in Australia, automated trains may come to provide an increasingly important link in carrying cargo to and from ports into the future.

Automation has also been deployed in heavy vehicles servicing mining sites and farms in rural Australia but is not being used for trucks carrying cargo on public roads. As the Port of Melbourne noted in its submission, Australia's truck fleet is relatively old compared with other Organisation for Economic Co-operation and Development (OECD) nations' fleets, with an average vehicle age of 15 years — for context, the average age of trucks is 13.9 years in the European Union (ACEA 2022). Automation of Australia's fleet would present an opportunity to reduce operational costs and improve safety through the transition to more modern vehicles (Port of Melbourne, sub. 65, p. 25). In November 2016, Australian transport ministers agreed to a phased program so that 'conditionally automated vehicles' (with a supervising human driver) could operate safely and legally before 2020, while highly and fully automated vehicles could do likewise from 2020 (PC 2020b, p. 260).

The Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) is leading the National Land Transport Technology Action Plan, which aims in part to keep Australian Design Rules relating to automated vehicles up to date with international standards. The 2016–2019 Action Plan led to the delivery of foundational work including regulatory reform, trials and research on 'intelligent transport systems', geo-positioning and security (Transport and Infrastructure Council 2019, p. 2). In 2017, guidelines were released to clarify who is in control of — and legally responsible for — automated vehicles and how law enforcement should interact with such vehicles (NTC 2017a). The National Transport Commission (NTC) also released 'Guidelines for trials of automated vehicles in Australia' in 2017 to enable the testing of autonomous vehicles in real-world conditions, and these guidelines were updated in 2020 (NTC 2017b).

The NTC's 2020–23 Action Plan is now in place and has prioritised exploring technology in the freight sector and how connected and automated vehicles will influence future infrastructure and land use planning. The Action Plan notes that work is ongoing for issues concerning:

- safety, security and privacy
- digital and physical infrastructure
- data standards and interoperability
- positioning for disruption and change.

For the rail sector, the NTC found in 2016 that there are no regulatory barriers to automated rail (including light rail) in Australia (NTC 2016a, p. 8). However, the implementation of automated systems on the rail network faces challenges in operator accreditation requirements under rail safety regimes, interoperability across network providers' varying infrastructure standards and equipment (such as signalling and control equipment) and managing interactions with other parties accessing the rail network (such as risk management at public road crossings) (NTC 2019a, p. 6). The NTC has identified harmonisation of components and standards and interoperability of train control and signalling systems as critical areas of reform in its *National Rail Action Plan* that will feed into a range of projects to be delivered over the next 10 to 15 years (NTC 2022a).

For the heavy vehicle sector, many laws and regulations will need to change to accommodate increasing automation. Some of these changes are being considered by the NTC and could be incorporated as part of the Heavy Vehicle National Law (HVNL). In November 2018, the NTC recommended that a safety assurance system for automated driving systems be administered by a government authority, preferably on a national basis (NTC 2018, pp. 1–4). The NTC has since completed a HVNL review (conducted over 2019–2021) and

is currently developing policy positions and a draft law reflecting feedback and insights from that review, with draft law scheduled for release in 2023 (NTC 2019b).

Barriers to uptake of automation

Market forces and commercial motivations drive firms to explore the opportunities that new and emerging automation might offer. However, a number of obstacles can prevent efficient uptake.

Workplace relations

Workplace relations appears to be a major influence on investment decisions concerning container terminal automation. DP World stated that it ‘... sees no policy or other impediments to innovation and technology, other than the impact of the workplace relations framework on the introduction of automation’ (DP World, sub. 49, p. 86).

As discussed in chapter 9 and illustrated in appendix B, a number of enterprise agreements covering container terminal operators impose complex consultation clauses that create obstacles to automation. These requirements add risk and uncertainty to already complex decisions involving significant capital investment and workplace change.

As draft recommendation 9.1 proposes, it would be beneficial to prohibit enterprise agreement content that impose excessive constraints on innovation and workplace change. The Commission is inviting comment on how the most restrictive content in agreements could be curtailed without limiting the rights of workers to be consulted on issues including major workplace change.

Skills to support emerging technologies

Automation needs appropriately skilled labour that can operate new assets as they are implemented. Flinders Ports noted in their submission that:

... as technology is increasingly adopted the skillset requirements of employees at the user interface differ from traditional requirements necessitating a different approach to selection and training processes. It follows that container terminal operators are now required to identify employees who are capable of upskilling and are comfortable with increasingly complex technological interfaces, particularly as container terminal operators and the broader supply chain undertake digital transformation. (sub. 55, p. 13)

The Australian Maritime College (AMC) also submitted that a talented workforce with advanced skills will be required over the next 30 years as the maritime logistics sector undergoes a transformation driven by technological change and decarbonisation. To achieve this, the AMC submitted that attention should be given to ensuring there is suitable provision for ongoing professional development for the existing workforce and attraction of new, young talent to the industry. AMC identified, in particular, that the demand for digital literacy, technology knowledge, data management and analytical skills increases with the uptake of automation and digitalisation (sub. 9, p. 5).

Looking ahead, the skills needed in parts of the industry are likely to change as automation and other technology is introduced. However, it is likely this adjustment will be gradual, as it has been in the past. Adjustments are already being made to vocational education and training courses to include future-focused content (chapter 10). Where enterprise agreements unduly restrict merit-based hiring, promotion and training, there may be challenges in securing appropriately skilled workers to complement automated systems and machines (section 9.1).

Regulatory lag

It is a common challenge for laws and regulations to keep pace with advancements in technology. The Commission's National Transport Regulatory Reform inquiry report ('the Transport Reform Report') noted that autonomous technologies remove or reduce the need for a human operator, but many Australian laws and regulations assume human drivers (PC 2020b, p. 227). Reforms are underway to address many of the challenges that could otherwise hamper the uptake of automation in relation to rail and heavy vehicles (see discussion above).

Designating responsibility to operators and updating definitions to ensure laws apply appropriately to automated road and maritime vehicles are potential issues for automation in Australia and have proved to be an obstacle overseas. As discussed above, it appears that the availability of exemptions from AMSA is proving a sufficient workaround to prevent lag in the development of maritime laws from hampering the use of MASS in Australia.

As the Commission noted in the Transport Reform Report, while the regulation of automated technology is in its early days, tensions are already emerging between traditional public governance structures and the code-based decision-making processes of automated technology (OECD 2019). Governments need to ensure that regulatory frameworks are designed to ensure appropriate safety requirements without imposing unnecessary regulatory burdens or stifling productivity and safety-enhancing innovation.

Australia's regulations addressing automated vessels and heavy vehicles are in a state where technologies can be trialled where relevant exceptions are granted, but broader reforms will be warranted as autonomous vehicle technologies diffuse and approach maturity.

Imperfect competition

The incentive for firms to maximise their profits provides powerful motivation for them to structure and refine their operations in pursuit of the highest total revenue with the lowest total costs. Where firms are operating optimally, this would see them seek to implement the most efficient technologies, processes and capital/labour mix. However, economic literature suggests businesses without strong competition can have weaker incentives to pursue efficient operating settings than those in more competitive markets.

Oliver Hart, winner of the 2016 Noble Prize for his work on the theory of (incomplete) contracts, noted that competition encourages firms to reduce 'slack' in their operations or, in other words, to strive to minimise costs (for a given level of output) or maximise outputs (from a given level of inputs) (Hart 1983). Hart observed that, while business owners will always be incentivised to take actions that maximise their profits, managers make the decisions that deliver this outcome, and this takes effort. Because managers cannot be perfectly monitored, they may become slack in their running of the business in the absence of competitive pressure. A recent examination of empirical studies of slack (referred to as x-inefficiency in economics), found the deviation from the optimal cost and output outcomes that would occur under perfect competition for firms in less competitive markets is, on average, approximately 20 per cent (Frantz 2019, pp. 95, 205).

This is significant in the context of the maritime freight industry as there can be low levels of competitive pressure at various stages of the logistics chain. As discussed in chapters 4 to 6, there is little competition between container terminal operators and landside operators, while major ports can exhibit natural monopoly characteristics in the short to medium term.

The impact of automation in container terminals

There are mixed views about how big an impact automation has had, or can bring about, in improving efficiency, productivity, resilience and safety in the maritime logistics chain.

VICT's submission to this inquiry stated that its fully automated terminal can operate 24/7 (including receipt and delivery of cargo, whereas gates at other operators may close their gates of an evening or during weekends) and brings a range of advantages including: a lower frequency and severity of safety incidents, a higher stacking density of containers in its yard and environmental benefits (because most automated equipment is powered with 'cleaner' electrical energy). VICT noted that on the quayside its ship rate is over 60 container moves per vessel berthing hour (sub. 7, pp. 3, 4).

However, the Port of Melbourne submitted that while automation does not lead to faster crane rates, it is beneficial for reliability, sustainability, productivity and cost. In particular, automated equipment is more precise and predictable than manually operated equipment, is capable of operating at night (without illumination) and in adverse weather, resulting in reduced waiting periods and fewer circumstances where operators would be put at risk. Improvements to productivity can be achieved through 24/7 operation and higher stacking densities in yards, enabling larger container exchanges for large ships without clogging terminals. The automation of cranes, and straddles reduces reliance on labour within the yard, removing the cost and risk of personnel. (Port of Melbourne, sub. 65, pp. 24, 25).

The Australian Chamber of Commerce and Industry (ACCI) submitted that championing automation would play a key role in creating a productive maritime logistics system, but also noted that the significant infrastructure investments focused on automation activities undertaken by container terminal operators at the major ports had not led to increased efficiencies and productivity gains. In support of this view, ACCI noted the Australian Competition and Consumer Commission (ACCC) *Container Stevedoring Report 2020-21* found productivity growth has fallen to one sixth the average of its 1999–2006 level in 2013–19 in TEU terms (down from 15.4 per cent per annum to 2.5 per cent), one quarter in labour terms (6.7 per cent per annum to 1.5 per cent) and one eighth in crane rate terms (5 per cent per annum to 0.6 per cent), and the investments in automation undertaken by container terminal operators may have largely been motivated by industrial relations issues (ACCI, sub. 73, pp. 24–25, 29).

In a supplementary submission to the inquiry, DP World (supplementary submission, p. 2) stated that:

The choice of terminal operating mode and technology is, ultimately, a commercial decision for each terminal operator. The decision can be informed by a range of factors, including:

- the size of vessels and volume of containers handled at a port;
- physical limitations of the terminal, including the quay line and yard area;
- cost and other commercial considerations; and
- legal or regulatory obligations, including lease commitments.

The choice of yard and crane technology – including the degree of automation – balances these factors in order to achieve the most cost-efficient and effective outcome.

Productivity

Productivity measures outputs relative to inputs. The most productive operational decisions and investments achieve maximal growth in output from changes to inputs.

As discussed in chapter 3, the productivity of marine operations is reflected in the time it takes for ships to get into and out of port (ship turnaround time or port hours). Automation only plays a small role in vessel arrival and departure processes at Australia's ports — no automated cargo vessels are serviced in Australia, remote pilotage is only occasionally used, automated mooring systems are not commonly used for container vessels and are generally limited to particular piers where used (rather than being deployed across ports). Automation has the potential to make a measurable impact on landside operations, particularly quayside and in container terminal yards.

Some evidence suggests that the impact of automation on productivity can fall short of expectations. In 2017 McKinsey & Company hosted a forum and conducted a survey of more than 40 participants from high performing ports in China, Europe, the Middle East, Singapore and the United States, suppliers of automation equipment, academics, port asset management firms and shipping companies to determine the status and outlook for container terminal automation (the McKinsey study). Respondents indicated that they expected that automation (would raise 'productivity' by 10 to 35 per cent. However, McKinsey's study observed 'productivity' levels fell by 7 to 15 per cent (McKinsey & Company 2018). It is unclear from the McKinsey Study what measure of productivity these figures relate to and whether the survey participants provided anecdotal evidence or operational data to McKinsey to enable their calculation.

Notteboom, Pallis and Rodrigue (2022b, p. 266) suggest that the push towards automation from the 1990s, in combination with growing ship sizes, has encouraged ports to improve their productivity, namely throughput and ship turnaround time. The authors observe that 'The expectations are that automation can reduce operating expenses by 25 per cent to 50 per cent and increase productivity by up to 30 per cent, but these expectations remain unfulfilled'.

Quayside productivity captures the efficiency of moving containers on and off ships using quay cranes, while landside operations cover the movement of containers through the container yard, temporary storage by terminal operators prior to collection, loading and unloading trucks and trains, and the customs and quarantine clearance process. As noted in chapter 3, two common partial measures of quayside productivity are crane rate and ship rate (section 3.6) which measure the amount of cargo moved by each quay crane in an hour and the number of containers moved on or off a ship in an hour, respectively. Because automation does not influence the number of cranes that will be used to (un)load cargo, the crane rate is the more relevant of these measures for assessing the productivity impacts of automation. A lack of data concerning landside operations impedes analysis of the efficiency of landside processes beyond quayside operations, with the exception of truck turnaround times, utilisation and backloading (chapter 3).

The ACCC's *Container Stevedoring Report 2020--21* observed that '[a]fter initial improvement through advancements in technology, quayside productivity and efficiency have stagnated in the past 10 years' (ACCC 2021a, p. 57). The ACCC asked stevedores to describe how their quayside productivity has improved over time. Stevedores responded that they have achieved significant improvement in quayside productivity including improved timeliness and reliability of quayside services due to upgrades or new investment in equipment and infrastructure and reductions in the number of injuries because of investment in automation and staff training (ACCC 2021a, p. 57).

The ACCC noted a widening gap between the ship rate and crane rate and attributed this to the increase in the measured crane intensity, on the basis of container terminal operators using more cranes over time to service the increasing number of containers coming to shore and the increasing proportion of 40-foot containers (chapter 3). The ACCC concluded that:

This shows that the key drivers for quayside productivity were stevedores increasing investment in technology and automation. Automated machines increase reliability and efficiency of operations and reduce human error. By having access to additional and more powerful and automated equipment, the stevedores manage to handle the fast-increasing volume with limited improvement in equipment operating hours. (2021a, p. 58)

The Maritime Union of Australia (MUA) pointed to two perceived flaws in these conclusions. The MUA stated 'the ACCC appears to have assumed that the large investments in automated terminal equipment by terminal operators includes investment in automated quay cranes. That is not the case' (MUA, sub. 59, p. 9). The MUA also observes that *Waterline* crane rate figures (which the ACCC relies on) are effectively a

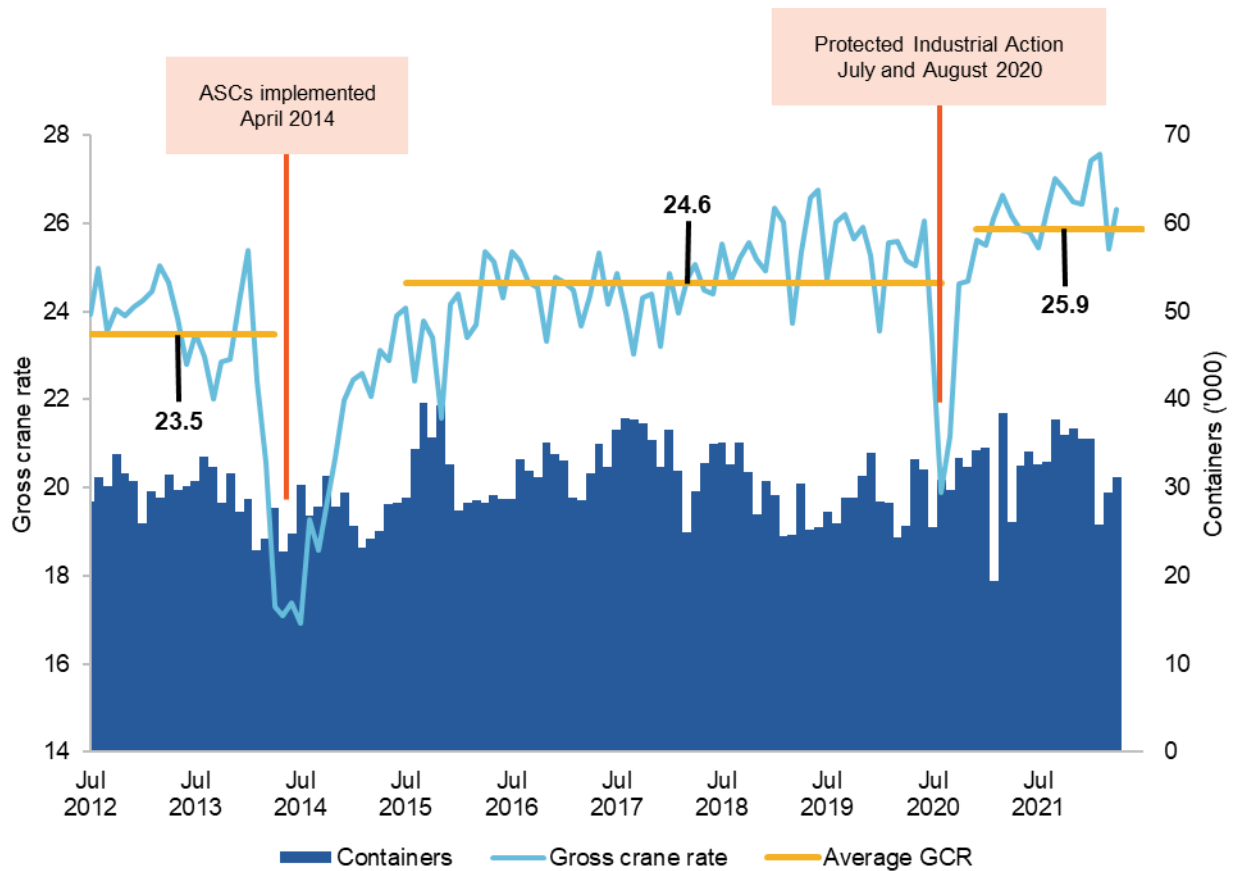
measure of quay crane productivity and do not reflect the performance of yard activities, where automation has taken place (MUA, sub. 59, pp. 9, 27–30).

The MUA submitted that data from DP World indicated that gross quay crane moves per hour at its Brisbane terminal fell from 27.00 moves per hour in 2011 (pre-automation) to 24.80 in 2013 (when the automated equipment was commissioned) and then held at levels between 24.9–26.7 in the period between 2017–2021. In 2021, the eighth year of automated operations, the gross quay crane rate was 26.2 moves per hour. The MUA suggested that quay crane productivity has decreased in ports where automated or semi-automated technology has been introduced because automatic stacking cranes do not have the speed or capacity to keep up with the manually operated quay cranes (MUA, sub. 59, p. 36).

In response to these submissions, DP World noted that automation in fact commenced in April 2014 (not May 2013), the data presented does not align with its own data over the relevant period and crane productivity following automation at the Brisbane terminal over the relevant period in fact increased (DP World, sub. 79, pp. 1, 2). DP World provided a figure illustrating container moves and gross crane moves per hour (GMPH) between 2012 and 2022, which is reproduced below with the addition of average gross crane rates in key periods (figure 11.4).

Figure 11.4 shows an increase in the average gross crane rates recorded after ASCs were introduced in the terminal (from 23.5 to 24.6 moves per hour), which have risen further to 25.9 moves per hour from July 2020.

The MUA also contrasted the crane rate at the VICT Webb Dock (18–20 lifts per hour) against DP World and Patrick Terminals' manual operations at Swanson Dock (26–30 lifts per hour) and queried whether the reduced labour required at VICT compensates in efficiency terms for the 32 per cent crane rate differential (MUA sub. pp. 36, 37). In response, VICT submitted that crane moves per hour do not reflect the entire impact of terminal automation and noted that it faces challenges around restrictive labour practices that impact its productivity and can result in cranes becoming idle. VICT suggested that berth moves per hour was a better measure of productivity, noting that it is very competitive when assessed using this measure and has recorded the highest slot availability, highest two-way truck utilisation and lowest truck turn times of the three container terminal operators in Melbourne in January to March 2022 (VICT, sub. 78).

Figure 11.4 – DP World Brisbane terminal performance, 2012–22

Source: Adapted from DP World, sub. 79 response to MUA, p. 2.

Dr Greig Taylor and Dr Matthew McDonald, academics at the University of New South Wales Business School, submitted that despite statements from terminal operators that automation equates to considerably more efficient and productive cargo-handling operations, statistics indicate that gains in this area are modest. In their view, greater automation has largely been ineffective in improving cargo handling efficiency and productivity at container ports in Australia according to the Bureau of Infrastructure and Transport Research Economics (BITRE) and ACCC statistics relating to the 'crane rate' measure (Dr Taylor and Dr McDonald, sub. 35, p. 3 and attachment p. 26).

On one reading, BITRE's (2021c) *Waterline* crane rate data appears to support claims that automation of container terminal systems does not yield sustained improvements in terminal crane rates.

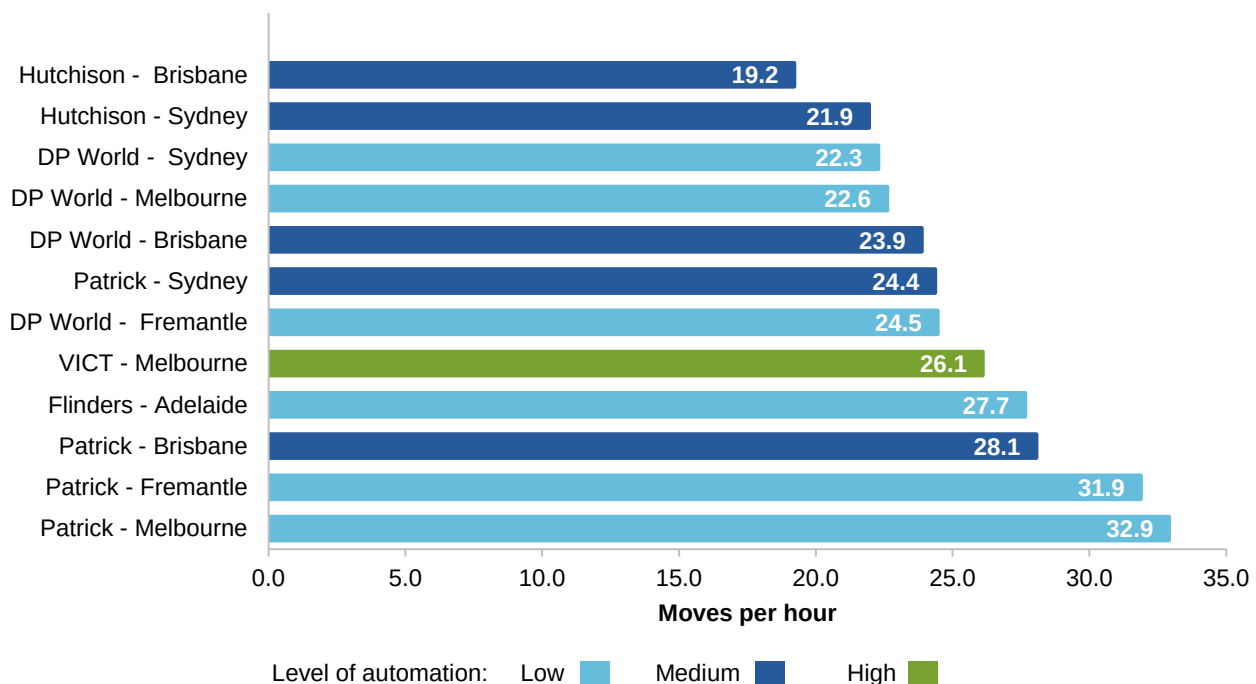
- **Melbourne** — OneTerminal at VICT opened in 2017 and the port level net crane rate rose from 29.7 to 31 container moves/hour from 2017 to 2019. Cranerates then returned to 29.7 in 2020.
- **Brisbane** — Patrick Terminals' AutoStrad terminal opened in 2005 and the port level net crane rate fell from 27.2 to 23.1 container moves/hour from 2005 to 2008 and did not return to pre automation levels until 2010. In 2014 HPA and DP World implemented automated stacking cranes. Port level net crane-rates in Brisbane fluctuated between 28.6 and 30.1 in 2020.
- **Botany** — Patrick Terminals' AutoStrad opened in 2015 and the port level net crane rate fell from 29.6 (in 2015) to between 25.4 and 27.4 container moves/hour until mid-2018. Port level net crane-rates in Port Botany fluctuated between 29.5 and 30.2 in 2020.

However, these figures are of limited use in measuring the impact of automation on terminal crane rates because *Waterline* data is provided at the port level, not the terminal level. As a result, impacts of automation at one terminal could be diluted by changing circumstances that impact the crane rate at other terminals at that port. To provide a more focused view of the impact of automation at particular container terminals, the Commission calculated the average gross crane rates for container terminals at Australia's major ports between 2017 and 2019.

Figure 11.5 shows that Australia's most automated terminal, VICT, had an average gross crane rate between Melbourne's two other terminals, that both employ a low level of automation — VICT (26.1 moves/hour), Patrick Terminals (32.9 moves/hour) and DP World (22.6 moves/hour). The top performing terminal by this measure was Patrick Terminals in Melbourne (31.7 moves/hour), followed closely by Patrick's Fremantle terminal (31.1 moves/hour), both of which employ a low level of automation. The lowest gross average crane rates were recorded by Hutchison's terminals at Brisbane (19.2 moves/hour) and Sydney (21.9), both of which utilise a medium level of automation.

Between the top and bottom two performers, it is not clear from examining average gross crane rates at the major container terminals that there is any correlation with levels of automation (figure 11.5). There are mixed results in productivity measures for container terminals that have implemented automation, with relatively high and relatively low gross crane rates achieved by terminals relying on low and medium levels of automation while VICT — the only highly automated terminal — is towards the upper-middle of the pack.

Figure 11.5 – Average monthly gross crane rate by terminal operator, 2017–2019



a. The first observation for VICT in Melbourne was in November 2018. One observation for VICT in February 2019 was excluded because it was an extreme outlier.

Source: IHS Markit's Port Performance Program data.

Anecdotally, Hutchinson ports observed:

Automated terminals provide a consistent level of productivity which is generally higher than a manual mode of operation. However, people (manual terminal) have the ability to deliver productivity in excess of automated terminals when in the right mood. People can also perform poorly when not in the mood or under the influence of other controlling factors. (pers. comm., 8 July 2022)

Similar observations have also been made by automated equipment manufacturer, Kalmar. Tony Desira, General manager of Operations at VICT wrote in 2018:

Industry experts in port automation, Kalmar, recognised there is a myth behind automation; that it will give higher productivity, reduce overall costs and have faster performance. In reality, automation brings consistency, predictability, reduces damages, improves planning and delivers accuracy. All of these factors provide a safer work place with less damage to equipment. (Desira 2018)

Some of the most productive container ports in the world, such as Yokohama (box 11.8), have achieved high performance levels through terminals that have implemented very low levels of automation, while others, such as Yangshan, have had success with terminals using a high level of automation (ITF 2021, p. 18; The World Bank 2022, p. 3).

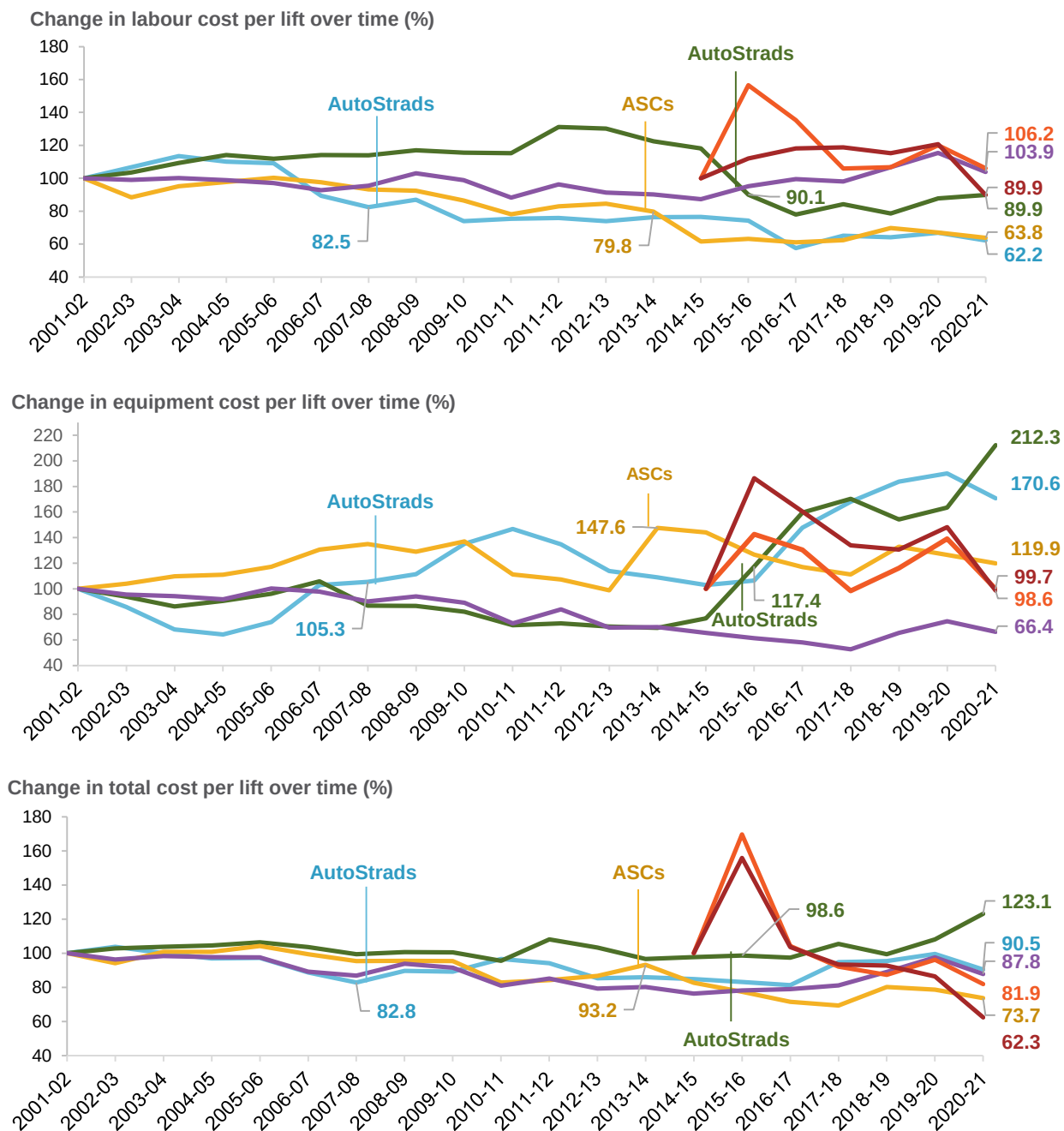
Efficiency

Putting aside the impact of automation on crane rates, automation reduces the labour inputs required for tasks to be completed, potentially reducing operating costs, but equipment costs will also be higher.

When Patrick Terminals' Sydney terminal was automated, at an estimated cost of \$350 million, the changes were said to approximately halve the labour required to operate their terminal (reducing the workforce from 511 with 462 on wharf, to 270 with 211 on wharf) at an estimated saving of approximately \$50 million per annum and maintenance savings of more than \$500 000 over the life of each AutoStrad (O'Sullivan 2014; Port Strategy 2014). Patrick Terminals then apparently recruited 90 additional staff 12 months later, bringing its workforce at the terminal to approximately 330 employees (Dr Taylor and Dr McDonald, sub. 35, attachment p. 27).

While the precise impact of automation on Patrick Terminals' Port Botany workforce is unclear, it is apparent that labour cost per lift fell (figure 11.6). In the year before the AutoStrads were introduced (in early 2016), Patrick's Port Botany labour costs per lift were 120 per cent of their 2001-02 level. This fell to 90 per cent of the baseline figure in the year automation was adopted and to 80 per cent in the year afterwards. But equipment costs per lift rose, leaving total costs per lift only slightly lower in the year following automation.

Figure 11.6 also provides insights into how costs have changed over time for terminals that have: always utilised a low level of automation (DP World Sydney); adapted existing terminals by installing automated equipment (Patrick Terminals Brisbane, Patrick Terminals Sydney and DP World Brisbane); or utilised a medium level of automation from commencement (Hutchison). The data do not suggest any clear correlation between costs per lift and automation — an observation consistent with mixed findings about the impacts of automation on efficiency from global studies.

Figure 11.6 – Change in costs per lift at Brisbane and Sydney terminals^a

Terminal	Legend	Level of automation
Patrick Terminals Brisbane		Medium
Patrick Terminals Sydney		Medium
DP World Brisbane		Medium
DP World Sydney		Low
Hutchison Brisbane		Medium
Hutchison Sydney		Medium

a. The cost information expresses changes in costs per lift up to financial year 2020-21 as a percentage compared against a baseline year (financial year 2014-15 for Hutchison and 2001-02 for Patrick and DP World).

Source: ACCC (2021a), supplementary tables.

Respondents in the McKinsey Study indicated that they expected that automation would cut operating expenses by 25 to 55 per cent but observed operating expenses at automated ports fell by less — 15 to 35 per cent (McKinsey & Company 2018). Notteboom, Pallis and Rodrigue (2022b, p. 266) made similar observations, noting that automation is often aimed at reducing costs per container handled, with expectations that operating expenses will fall by 25 to 50 per cent, but these expectations are generally unfulfilled.

The McKinsey Study also examined the likely return on investment from port automation. It found that to justify the high up-front capital investment, operational expenses of an automated greenfield terminal would have to be 25 per cent lower than those of a conventional terminal. Or productivity would have to rise by 30 per cent while operating expenses fell by 10 per cent. As noted above, McKinsey found that these efficiencies had generally not resulted at the terminals they examined (McKinsey & Company 2018).

An ITF–OECD study of the impacts of port automation found that the effects on efficiency were ambiguous, noting that the size and cargo specialisation (in terms of the size of ships serviced) of automated ports played a large role in determining the impacts, with the greatest benefits realised at large terminals with highly captive and regular container flows or where there were labour shortages (ITF 2021, p. 20).

Another study suggested that where labour is efficiently deployed and ports are operating at full capacity, automation reduces the number of labour hours required by 33 per cent, whereas lower-activity ports can achieve up to 50 per cent labour cost savings through automation (Oliveira and Varela 2017, p. 12). The ITF also observed that where labour costs were higher so were the potential savings from automation, provided that automation actually replaced workers. They also observed that most port automation projects have been implemented in high-wage countries where the potential savings are highest (ITF 2021, p. 21).

Safety

While evidence suggests that container terminal automation often does not yield the productivity and efficiency benefits that operators may have expected, it can bring benefits through improved safety and reliability of services. Automated terminals with fewer (or no) workers directly present are less prone to accidents and the ITF–OECD noted that company data suggested reduced accidents in many container terminals over time. That said, such data rarely distinguishes between improvements in operational practices where automation has been implemented and situations where there are fewer incidents because there are fewer workers (ITF 2021, p. 21).

A 2012 study estimated that converting conventional terminal yards to use auto stacking cranes and shuttles could reduce injury rates for tractor drivers (by 25 per cent), mechanics (by 25 per cent), foreman (by 50 per cent), clerk supervisors (by 50 per cent) and gantry crane drivers (by 50 per cent), with further improvements where shuttles were substituted for automated guided vehicles (Sisson 2012). However, Sisson's estimates were mainly based on anecdotal data and, as the ITF observes, there is little robust empirical data to support assumptions that automation improves safety (ITF 2021, p. 21; Sisson 2012, p. 72). The Commission also observes that differences in work, health and safety regulations in different countries are likely to impact safety records, and automation has the greatest potential to alleviate injury in terminals where the risk to workers is greatest (ITF 2021, p. 21; Sisson 2012, p. 72).

The Maritime Union of New Zealand submitted that Ports of Auckland Limited (POAL) used dangerous work practices to increase productivity (Maritime Union of New Zealand, sub. 30, p. 10). POAL saw two fatalities at its ports from 2017 and commissioned an independent Review of the H&S framework and culture at POAL. The Ports of Auckland Independent Health and Safety Review was released in March 2021 and noted that while the reviewers were impressed by the innovative approach to straddle automation at POAL, which made it clear that safety was a priority for the project, they were unable to make a robust safety case for the development and operation of the automated straddles at Fergusson Wharf. The review

recommended that a safety assurance framework be developed and implemented for automation and other major projects (Construction Health and Safety New Zealand Trust 2021, pp. 5, 16, 20, 21).

Automation of container terminals in Australia appears to have had a beneficial impact on safety. When Patrick Terminals introduced AutoStrads in Brisbane it was able to remove humans from the yard area and saw the number of lost time injuries (LTI) fall from approximately 40 LTIs a year (mostly ergonomic injuries from straddle driving) to one or two LTIs a year (which now primarily result from lashing activities) (Vrakas, Chan and Thai 2021, p. 286). Similarly, VICT submitted that its automated terminal has low frequency and severity of safety incidents, recording no LTIs in 2020 and 4 low severity LTIs in 2021 (VICT, sub. 7, p. 3).

Resilience

Because automated systems are insulated against some events that would require the operation of conventional equipment to cease and tends to perform at a regular performance level, automation can benefit terminals by improving the reliability and predictability of operations.

VICT's submission noted that unlike manually operated terminals, automated equipment does not require breaks and operates around the clock without incurring additional costs (sub. 7, p. 3).

That said, the ITF study observed that while automation brings operational and reliability benefits by enabling 24/7 operation without interruption, automated operations will be exposed to equipment malfunctions, breakdowns and the risk of accidents and delays from irrational machinery routing (that is, the path that machines take to collect and drop off cargo). Automated equipment is also less suitable for responding to novel circumstances (such as irregularities with cargo) or demonstrating flexibility in response to the peaks and troughs related to ever-larger container ships (ITF 2021, p. 20).

Terminals that face a relatively stable container throughput volume are more suitable for high levels of automation because of their regular cargo flows, whereas terminals with highly variable throughput are better served with low levels of automation because it can provide more flexibility. As container volumes are more volatile in transshipment terminals, these require more flexibility and generally are better served with low levels of automation. On the other hand, gateway terminals generally have more captive container volumes — implying less throughput uncertainty — so they tend to be more suitable for automation (ITF 2021, p. 15).

Conclusion

Evidence does not demonstrate a clear link between automation and how many containers can be moved in an hour. Automation can bring labour cost savings, particularly where wages are high, and can result in safer, more consistent and predictable operations. However, automation will not be suitable for all terminals and its appropriateness will vary on a case-by-case basis.



Draft finding 11.1

Technology use at Australia's major container ports is in line with international practice

There is no 'best' level of automation and ICT adoption for container terminal productivity and Australia's major container terminals have implemented varying degrees of both automation and ICT adoption, in line with internationally comparable ports.

However, automation can lead to a range of benefits including improved safety, reliability and consistency of terminal operations.



Information request 11.1

The Commission would appreciate data demonstrating the impact that automation has had on productivity (ideally, in terms of the total time taken for containers to move through each of the key steps from the ship to the hinterland), efficiency, safety and reliability where it has been implemented in Australian container terminals.

11.4 Data sharing technologies and trends

Maritime data and its importance

All participants in Australia's maritime logistics system engage in data creation to some degree. This ranges from data generated through interactions between stakeholders and contained in documents, to performance-based data generated by business activity or sensors on physical objects that is shared electronically (commonly referred to as the Internet of Things, or IoT).

The value of data lies in analysis. Analysis sees data used to provide performance insights and guide decision making. If the necessary data is unavailable or uninterpretable, then analysis is not possible. The Commission's 2017 inquiry into *Data Availability and Use* found that improved data access and use can enable the development of new products and services, drive productivity gains and facilitate better decision making (PC 2017b). For the maritime logistics system, data analysis has the potential to provide a range of benefits for individual operators and the overall functioning of the supply chain.

Data analysis can help optimise freight routes and schedules, ensuring that more cargo can flow uninterrupted. For example, using real-time geospatial and logistical data can help landside freight operators prepare for handling incoming and outgoing cargo and plan efficient routes.

Analysis can also improve long-term investment planning. The availability of high-quality, organised data can enable businesses to develop detailed key performance indicators, which they can then use to identify areas of underperformance and opportunities to improve efficiency. Governments, meanwhile, can analyse aggregated data to create an evidence base for policy at the local, state and national level. Visibility on cargo between port gate and destinations, for example, has the potential to allow governments to assess the impact that transporting cargo is having on Australia's road and rail networks and consequently factor that impact into future infrastructure planning and investment decisions.

Data analysis can also facilitate the creation of digital technologies that can improve operational efficiency within the maritime logistics system. New technologies using and generating IoT data have been seen throughout the maritime logistics chain as more data has become available. Such technologies have been used on ships, for example, to:

- avoid collisions and subsequent cargo loss by drawing upon real time location data from sensors (Tian et al. 2017)
- reduce ships' energy consumption by adjusting fuel usage and navigation in response to weather and ocean current data (Fruth and Teuteberg 2017)
- monitor the quality of vessels and identify when they need maintenance using hull condition data and performance measurements of internal computational components (Lacey et al. 2015; Lazakis et al. 2016).

New data-based technologies have also been implemented at Australian ports. AI analytics can automatically monitor and analyse large sets of data quickly and cheaply. Flinders Port Holdings has made use of AI analytics to optimise the allocation of straddles and positioning of containers in their yard, so that container flows are able to move through the system as efficiently as possible (sub. 55, p. 17). Similar advancements have been made at the Port of Brisbane (box 11.2).

Box 11.2 – NCOS Online

The Port of Brisbane's Nonlinear Channel Optimisation Simulator system ('NCOS Online'), as noted in chapter 7, allows larger vessels to safely pass through the Port's channel. The system makes millions of calculations per second using data on channel depth, weather conditions and vessel configurations to more accurately produce optimal sailing windows for larger ships. In the first eight months of operating NCOS Online, the Port tripled the number of large bulk carrier departures (carriers with a draft greater than 14 metres) and supported a 233 per cent increase in container ships with a draft greater than 13 metres compared to the year prior. NCOS Online has effectively eliminated the need for channel deepening and avoided associated administrative and time costs for the time being (Mortensen 2018; Port of Brisbane 2022).

In many ways, businesses treat their data analysis capabilities as they do other investments — determining whether to invest by evaluating the cost incurred against the potential commercial return. And costs incurred are partly linked to a business' access to useful sources of data.

Sources of data in Australia's maritime logistics system

Government sources

BITRE's *Waterline* series is the primary public source of information on Australian port productivity. An evaluation of *Waterline*'s methodology and utility for assessing port performance can be found in chapter 3.

Beyond BITRE, open access information related to maritime freight operations is also collected by bodies such as:

- the Australian Bureau of Statistics, through its publications concerning markets and the flow of goods into and out of Australia (for example, Characteristics of Australian Exporters and International Merchandise Trade, Australia). This data is principally collected from the Australian Border Force's (ABF's) Integrated Cargo System and may be subject to cleaning, such as for confidential commodities
- the DITRDC, who collect data on road conditions, roadworks and key freight routes
- Transport for New South Wales (TfNSW), who publish rail freight and port performance data on an Open Data Hub. The datasets are largely owned by New South Wales government agencies, and often include Application Programming Interfaces (APIs) which allow software developers to more easily create applications and websites using these datasets
- the Victorian Department of Transport, who provide data and mapping of landside corridor usage and rest points through Data VIC
- Western Australian port authorities, who publish annual reports including trade statistics and financial reporting.

Some government initiatives also publish these datasets in formats more usable for industry. The Commonwealth Scientific and Industrial Research Organisation, for example, provide a detailed map of the routes and costings of landside freight trips across commodities through their Transport Network Strategic

Investment Tool (TraNSIT). The National Freight Data Hub, meanwhile, provides a number of freight-related visualisations (described in greater detail below).

Private sources

Operators at various stages of the logistics chain hold an array of data about the cargo handled through the services they provide and the businesses they interact with.

Shipping lines record information about cargo onboard vessels. This is both container-level (through bills of lading) and aggregate-level (through manifests). Operational information is also generated and stored by technologies such as automatic identification systems (AIS). This information may include a vessel's real-time location, fuel consumption and the details of the crew onboard.

Port authorities, whether publicly or privately owned, collect a wide range of information concerning incoming and outgoing vessels and cargo in the process of calculating their charges. Port operators are also likely to collect information on terminal operators who hold leases and operate within their ports. These terminal operators collect information about the cargo that they receive and offload, including details about the time taken to complete these operations and to whom the cargo is passed. Logistics providers track the cargo they receive, its live location and final destination.

Data gaps

While existing data sources allow private and public entities to undertake analysis, there is scope to extend the value that they provide. Some inquiry participants have identified valuable information that is currently unavailable to them (box 11.3).

Box 11.3 – Unavailable information that participants identified as valuable

Submissions suggested the following (currently unavailable) information would be valuable:

- the inclusion of postcode location of container (un)packs in ABF origin–destination data (Port of Brisbane, sub. 6, p. 7; Ports Australia, sub. 45, p. 5). The Port of Brisbane suggested that this data is essential for long term land use and investment planning by port operators and governments. However, they have found that collecting origin–destination data as a port operator is resource intensive and limited by time constraints
- real time data on estimated ship arrival times to manage unplanned transshipments or blank sailings (AFGC, sub. 21, p. 7)
- corridor data across transport modes that extends beyond 2007 to ensure that data is current (Ports Australia, sub. 45, p. 5)
- rail data equivalent to what BITRE holds and reports for trucks (Ports Australia, sub. 45, p. 5)
- cost to serve data to produce a generalised cost model at each transport stage of bulk and containerised cargo (Deakin University, sub. 39, p. 4)
- data on quay crane and yard capacity improvements resulting from terminal operator investments in landside equipment and software, to better assess their impact on productivity (MUA, sub. 59, p. 14)
- indicators that capture the impact of landside technological applications and aggregations of terminal equipment per terminal operator and per port. This is expected to help capture performance across all aspects of quayside activity (MUA, sub. 59, p. 14)
- data on empty containers to enable monitoring (MUA, sub. 59, p. 14).

It appears that gaps in data principally affect long-term decision making, rather than day-to-day activity. These desired information points could likely be found in a variety of private and public sector data. Participants' access to these points, however, is currently limited — much of the data remains siloed.

Siloing

Stakeholders at various levels of the Australian maritime supply chain have identified that the system is subject to data 'siloing' (AMC, sub. 15, p. 7; NSW Government, sub. 58, p. 9; GrainGrowers, sub. 22, p. 4). In the perceived absence of a technologically efficient and adequately protected means of sharing data (for example, an aggregated central database), participants silo their data and use only the data that is available to them by private collection or generation.

Siloing can hinder long-term improvements to the efficiency and productivity of the maritime logistics system. Without access to timely and operable data, supply chain participants are less likely to develop mutually beneficial strategies and may instead pursue conflicting, allocatively inefficient objectives (Simatupang and Sridharan 2001). The true benefits of data sharing are often unknown until previously-siloed data sources are made available and have been analysed (PC 2017b).

Why is data siloed in Australia's maritime logistics system?

Several factors reduce supply chain participants' willingness or ability to share data (figure 11.7). Each of these barriers results in sluggish or incomplete information flows and it is likely that a combination of them has hampered information availability in Australia's maritime supply chain.

Does Government have a role in addressing siloing in maritime data sharing?

There is no panacea for siloing that will make all data available for analysis. Addressing commercial sensitivities, for example, often reduces the usefulness of the data, such as by anonymising users' data to provide benchmarking analytics. Any response to siloing, then, must aim address the above factors while considering costs and the maintenance of data's usefulness.

There are several avenues through which government could act to reduce data siloing. The public sector has the potential to aid maritime data sharing through opening access to data held by government agencies. Benefit could also be provided through the creation and maintenance of systems through which stakeholders interact with government and access data insights. Improving national digital infrastructure could also indirectly assist in improving stakeholder digitalisation and data generation practices. However, each of these initiatives has costs and would therefore have to provide adequate public benefit to justify their undertaking.

Figure 11.7 – Factors that impede data sharing

Privacy and security 	Actors may lack faith in the security of the system used by the broader supply chain, viewing the technology as vulnerable to third-party hacks.	Under-digitalisation 	Smaller supply chain participants may store their information in paper records or outdated formats that do not harmonise with existing data sharing platforms, or lack the labour resources to manually input data in a timely fashion.
Commercial sensitivities 	Businesses may view their data as commercially sensitive and choose to withhold their data to protect their perceived competitive advantage.	Poor systems 	Existing data sharing platforms may be difficult or frustrating to use, increasing the time spent on routinely updating datasets and thus reducing the incentives for sharing information. A lack of common data standards can also render data sharing platforms unusable for businesses to conduct analysis.

The Commission has previously considered the role of government in working with the private sector to create and share datasets of national interest (PC 2017b). The 2017 inquiry into *Data Availability and Use* outlined that:

NIDs [national interest datasets] must generate spillover benefits to the community beyond those derived by just the data holders and data contributors. And they must be greater than is currently being generated. That is, additionality would be delivered from the investment by the Commonwealth. (PC 2017b, p. 295)

In line with the inquiry's recommendations, the Australian Government committed to release non-sensitive data by default, and to collaborate with the private and research sectors to enhance the benefit provided by public data (PM&C 2021a). This commitment has been similarly adopted by state governments (Department of the Premier and Cabinet 2020; NSW Government 2021; Victorian State Government 2018). The *National Freight and Supply Chain Strategy* (DITRDC 2021b) also outlined that better freight location and performance data would ensure that departments are able to accurately assess the impacts and progress of freight-related reform.

State-level initiatives to improve the collection and publishing of maritime freight data continue to emerge. TfNSW's proposed Freight Community System, for example, aims to address visibility issues in container movements by collating data from state air, land and sea supply chain networks on a single open-source platform. The New South Wales Government has also revised the *Ports and Maritime Administration Act 1995* (NSW) to enable the New South Wales Minister for Transport to compel container terminal and empty container park operators to provide data on empty container management, though this power has yet to be exercised (TfNSW 2021b). However, in light of the fragmented and cross-state nature of the maritime logistics system, access to an aggregated, nation-level view may benefit planning and trend identification in the system.

The Australian Government is addressing this through ongoing implementation of the National Freight Data Hub.

The National Freight Data Hub

Contained within the National Freight and Supply Chain Strategy, the National Freight Data Hub ('the Hub') is a federal data sharing network with three primary purposes:

1. providing greater access to existing government data
2. creating a safe data sharing platform supported by national data standards to allow businesses to access and share freight information for mutual benefit
3. connecting freight data users with each other to encourage further innovation and industry connections.

The Hub's main achievement to date has been its website prototype created in May 2021, which now hosts 128 datasets (Australian Government 2022c). Public and private datasets have been aggregated and used for visualisations for performance-based information, such as truck movements by local government areas and volumes of imports and exports by commodity and location.

The Australian Government has committed a further \$16.5 million to the Hub until July 2025 (DITRDC 2021b, p. 21). Plans for the future include the establishment of national data standards for measurement and communication, and the inclusion and expansion of rail datasets (DITRDC 2021b). If implemented successfully, the Hub will reduce obstacles to information sharing by:

- improving the quality of systems underlying information sharing. The visualisations hosted on the prototype website are designed to be user friendly and freely accessible, particularly benefitting smaller operators unable to afford commercial data provider costs. The planned endorsement of data standards will also enable the aggregation and comparison of Australian freight across its multiple sectors and jurisdictions, helping smooth over discrepancies in maritime data collection procedures
- addressing privacy and security concerns through aggregation and de identification of freight data. While this will reduce the data's granularity and specificity, this will likely encourage private sector uptake of the initiative and increase the value of the Hub as a result.

The Hub may also provide the additional benefit of facilitating further private sector innovation. In other settings the provision of open interfaces to government information can enable private enterprises to develop their own tools and platforms to aid in the dissemination and analysis of the information contained therein. For example, the success of Xero, the software as a service company, was partly due to its ability to interface with the tax office and implement automatic lodgements. The Hub is currently developing APIs to assist the private sector in drawing value from the datasets provided.

Stakeholders have expressed optimism around the Hub and believe that it should continue to be funded and expanded (ALC, sub. 57, p. 6; SAFC, sub. 53, p. 6; NSW Ports, sub. 66, p. 17). However, given its still-early development, several aspects of the Hub merit consideration.

The success of the Hub will be partly determined by the extent of digitised data provided by supply chain participants. SMEs have digitalised to varying levels, with some continuing to depend on paper documentation and forgoing the use of digital technologies (BITRE and iMove 2020). This will complicate future data sharing initiatives, such as the Hub's intention to publish truck telematics data.

Furthermore, the quality of the datasets hosted on the Hub are affected by the collection methods used. For example, the Hub's map of the number of trucks on roads (from state and territory government data) only provides graphics for 2018 and lacks Victorian and Australian Capital Territory vehicle counts. The public benefit of government provision of information sharing systems is contingent on the quality and collection methods of government data. Further discussion on maritime data collection methodology can be found in chapter 3.

11.5 Coordination technologies used to exchange documents and clear cargo

The flow of cargo from sellers to buyers relies on the exchange of documents (chapter 2). These are used to certify that the cargo complies with regulations or that cargo has been received by a party within the chain. The information conveyed through these documents may include the cargo's origin and destination, its value, the type of cargo and/or its owner. Broader trends toward digitisation and digitalisation² have meant that these documents are now typically provided in Electronic Data Interchange (EDI) formats. In response to this, ICT systems have become available to facilitate the exchange of electronic documents in a common format.

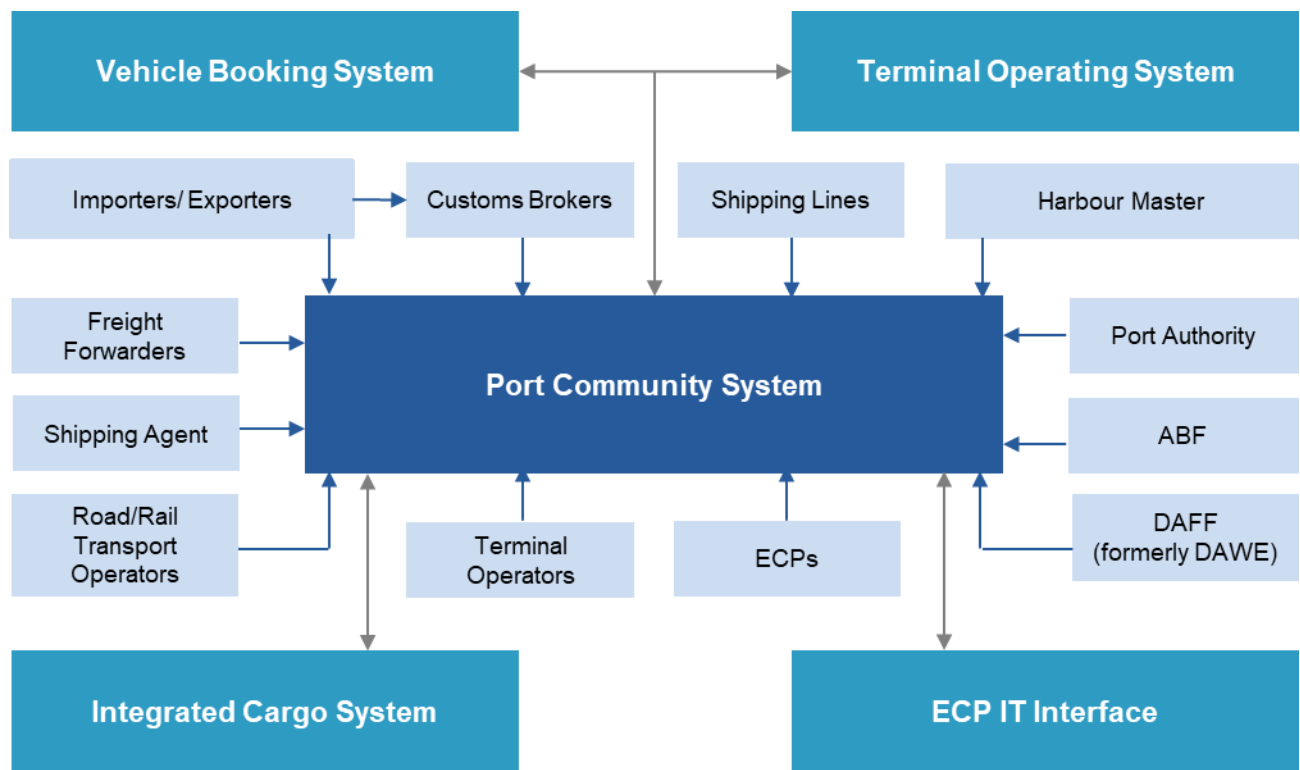
Port community systems

A port community system (PCS) is a technology that enables the sharing of document information (figure 11.8). A PCS allows public and private stakeholders to upload documents to a single online platform, in turn giving other supply chain participants visibility over the status and/or content of these documents, as long as they have permission to do so. A PCS can also host other ICT systems, such as a single window system (which allows a trader to submit their documents for government agency approval to a web portal) and a vehicle booking system (which allows terminal operators to allocate slots for landside operators to book for un/loading cargo).

PCS are typically implemented by port authorities (Tijan et al. 2021). The first PCS was developed in the 1980s by the Port of Felixstowe, a privately-owned port in the United Kingdom (Long 2009). Today, PCS are used to coordinate document flows at public and private ports worldwide and are sometimes developed by state-run ports — examples include New Zealand's PortConnect (box 11.7), and the Ports of Amsterdam and Rotterdam's Portbase. These systems often include APIs that improve ease of use, for example, by providing container event notifications. All stakeholders within the port community benefit in some capacity from the implementation of a PCS (Simoni et al. 2022).

Some inquiry participants have claimed that a common national PCS would improve document flows in Australia's maritime sector. NSW Ports commented that having one system between the states and territories would enhance the benefits received from using a PCS (sub. 66, p. 14); IFCBAA suggested that a national system may improve the extent and granularity of live container tracking (sub. 34, p. 11); and the Australian Maritime College suggested that Australia lacks a PCS and remains far behind European ports in terms of digitalisation (sub. 15, p. 7). Patrick Terminals, however, suggested that the creation of a parallel government-run PCS may cause unnecessary administrative complexity and costs (sub. 20, p. 48).

² Digitisation refers to the conversion of physically recorded information to electronically readable and transmittable formats. This is contained within digitalisation, which refers to the adoption of digital technologies which change how a business operates.

Figure 11.8 – A generic Australian PCS network^a

a. ABF: Australian Border Force; DAFF: Department of Agriculture, Fisheries and Forests (formerly DAWE: Department of Agriculture, Water and the Environment); ECP: empty container park.

Source: Adapted from NICTA (2015).

While some parties suggested that government should coordinate a national PCS, a number of commercial document and information sharing options are offered around the world. In Australia, the largest of these is 1-Stop's Gateway (box 11.4).

Box 11.4 – Maritime data exchange platforms

1-Stop is an ICT company established by DP World and Patrick Terminals in 2002. Its products largely focus on facilitating data exchange in the maritime logistics chain. These include:

- 1-Stop Gateway — a PCS for supply chain participants to exchange documents (such as Electronic Import Delivery Orders and Pre Receipt Advice), track live container locations and view vessel schedules
- the Vehicle Booking System (VBS)
- 1-Stop Modal — a terminal operating system that provides container and stockyard management tools
- invoice and payment systems.

1-Stop Gateway also accommodates smaller exporters who lack inhouse systems which can generate EDIFACT (an international EDI standard) messaging, by allowing them to enter their export information directly into the 1-Stop system.

Box 11.4 – Maritime data exchange platforms

1-Stop's role in the Australia's maritime logistics chain

1-Stop Gateway is the most widely used PCS in Australia (FPH, sub. 55, p. 17). It is currently in use at container terminals operated by Patrick Terminals and DP World, and roll on, roll off terminals operated by Linx Cargo Care Group.

Containerchain, a Singapore based logistics solutions provider, entered the Australian market with an initial focus on empty container parks. Containerchain now offers a suite of document exchange, invoicing and container visibility services, as well as supply chain management tools through its parent company Wisetech Global. However, 1-Stop remains dominant in the domestic market for data exchange systems.

Some inquiry participants have indicated that nationwide uptake of 1-Stop may be hindered by its joint venture origins, raising concerns over how competing terminal operators' data is protected and used (FPH, sub. 55, p. 17). Such concerns could be resolved by underlaying a PCS with technologies that safeguard data entry and access. One means of doing so, suggested by participants, is blockchain (FPH, sub. 55, p. 17; Ports Australia, sub. 45, p. 6) (box 11.5).

It is unlikely that the efficiency of digital document flows will be improved by the creation of an entirely new system. Given the high proportion of Australian terminal operators using 1-Stop, implementing a government-run PCS may only add further administrative cost for users in the maritime ICT landscape.

Box 11.5 – Blockchain

Blockchain is a distributed ledger technology that facilitates data communication between participants through a decentralised electronic database. When data points are added to the database, it collects them into a 'block'. When full, this block is added to a historical chain of older blocks and given a timestamp. The chain is stored on a peer-to-peer network of computers and each addition to the chain is updated on every computer on the network simultaneously. All information in the blockchain can be viewed by having a personal computer (a 'node') connected to the database, or through a blockchain explorer that allows those outside the chain to view the live addition of data. Blockchain also allows the automation of transactions through smart contract programs, which are executed when predetermined conditions are met.

For the maritime supply chain, this means that an electronic bill of lading attached to a container, for example, can be viewed and/or signed by customs, freight forwarders and any other supply chain participant who has been permitted to access the chain.

Blockchain is utilised in Australia and abroad

Internationally, IBM and Maersk have collaboratively designed the TradeLens platform, which uses a permission-based blockchain to share shipping documents. TradeLens (2022) has been used to process more than 60 million containers from its commercial launch in 2018. No Australian supply chain participant has signed on to the TradeLens platform, other than DP World (Sydney) and Patrick Terminals (Brisbane, Sydney, Melbourne and Freemantle).

Box 11.5 – Blockchain

There has been limited uptake of blockchain in Australia. The Port of Melbourne is currently trialling the Naviporta platform in partnership with the Port of Rotterdam. This platform can automate custom clearance processes between the United Kingdom and exporting countries (Port of Melbourne, sub. 65, p. 23). In 2018, the Port of Brisbane, the Australian Chamber of Commerce and Industry and PwC Australia developed a proof of concept system for their blockchain-based Trade Community System, which aims to supplement existing information systems with a secure overarching platform (Blundell 2018). It is unclear if or how the project has progressed.



Draft finding 11.2

There is no case for a government-run port community system

Australia's maritime sector relies on a range of private ICT systems that facilitate document sharing and allow cargo to flow efficiently through the maritime logistics chain. These systems continue to be developed through the adoption of new technologies that increase their safety and usability. Implementing a government-run port community system would risk simply adding further administrative costs for users in the maritime ICT landscape without corresponding benefits.

The Australian Government should continue to work towards ensuring that its customs and biosecurity systems can seamlessly interface with private port community systems.

Vessel and cargo clearance requirements

A range of regulatory requirements must be met before goods can enter or leave Australia, to ensure vessels and cargo are compliant with Australia's biosecurity laws and customs regime. These requirements have been subject to review over the years, in part to reduce the costs imposed by administrative complexity and outdated IT systems. For example, the Beale Review (Beale et al. 2008) recommended an additional \$225 million budgetary commitment for IT and business biosecurity systems 'recognising past underinvestment' (p. 210) and recommended a new Biosecurity Act in light of legislation being 'complex and difficult to follow' (p. 26).

While the *Biosecurity Act 2015* (Cth) has seen some of these recommendations enacted, inquiry participants continue to express frustration with biosecurity and customs procedures, especially with extensive delays in inspection appointments and approvals (SAWIA, sub. 17; AFGC, sub. 21; IFCBAA, sub. 34; Metcash, sub. 38; BCA, sub. 56). The BCA also indicated that some cross-border regulatory procedures are not fully digitised – a view corroborated by the Department of Agriculture, Fisheries and Forests (DAFF) who describe the biosecurity inspection booking process as 'manual, paper-based and labour intensive' (DAWE 2022a, p. 34). Where the system is digitised, it is not always effective. IFCBAA suggested that the current Integrated Cargo System is 'a significant point of vulnerability' for the maritime logistics system, being subject to 'regular instances' of outages, crashes, and delays (sub. 34, p. 12).

A broader issue within the current clearance system is the administrative complexity and duplication of information required by government departments (Accord Australasia, sub. 47; BCA, sub. 56). This is examined in greater detail below.

The current system of vessel and cargo clearance requirements

Information provision and clearances required for vessels

For each port to be visited by a vessel, information must be provided to the variety of parties that will provide services to the incoming vessel. This includes vessel and crew information and intended destination as well as manifests, loading plans and a range of work orders (figure 11.9).

Additionally, as vessels carrying cargo approach Australian territorial waters they must obtain clearances from the DAFF and Australian Border Force (ABF) relating to biosecurity risks posed by the vessel and security risks posed by the vessel and crew, respectively.

Clearances required for cargo

Separate to the clearance processes for vessels and crew, a range of clearances and approvals must be obtained for cargo being transported to and from Australia.

The regulations that apply to incoming international goods are administered by more than 29 Australian Government agencies (Simplified Trade System Implementation Taskforce 2021a). The process of navigating the approvals process and providing the information required by the relevant bodies can be expensive and time-consuming.

NSW Ports provided a diagram depicting current information flows for cargo clearances in Australia and the duplication in data entry under the current system (NSW Ports, sub. 66, p. 14) (reproduced as figure 11.10).

The administrative complexity highlighted by the above figures is compounded by technological issues. Inquiry participants have suggested that the ABF's Integrated Cargo System (ICS) is unreliable and outdated (IFCBAA, sub. 34). DAFF, meanwhile, commenced the Biosecurity Integrated Information Systems and Analytics program in 2015 to replace their legacy cargo and traveller processing systems (Inspector-General of Biosecurity 2021). DAFF's Biosecurity Integrated Information System (BIIS) has been incrementally releasing features for the Import Management System (IMS) to replace some of the department's older border applications, with the first release in August 2019 focused on features related to the self-assessed clearance (SAC) referrals for Conference of Asia Pacific Express Carriers and work is currently underway to extend biosecurity risk management for all SAC reporters (DAWE 2022c).

As both DAFF and the ABF expect the biosecurity and customs task to grow with cargo volumes (DAWE 2022a; DoHA 2021), it is imperative that Australia's clearance systems are administratively efficient and technologically sound.

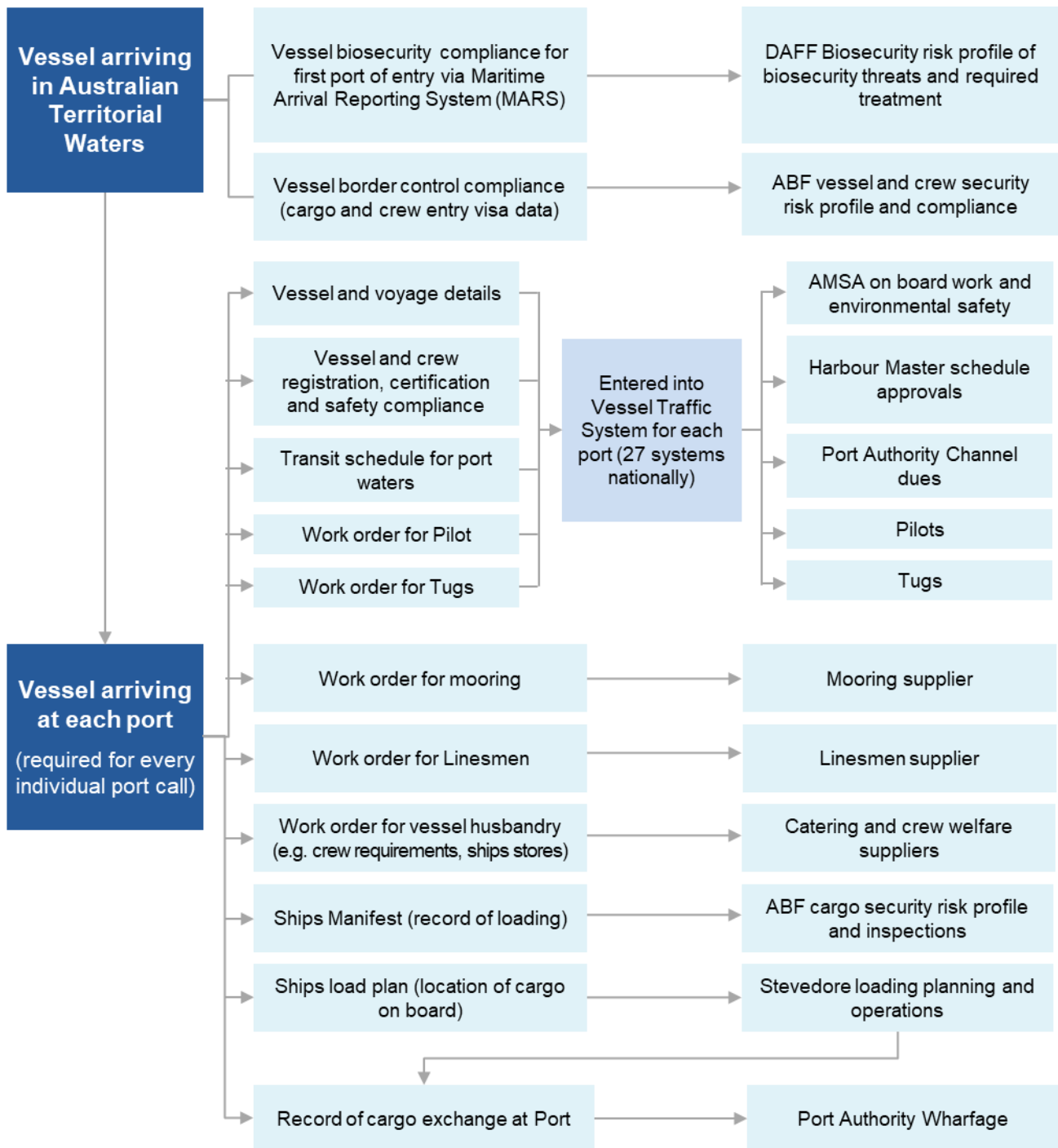
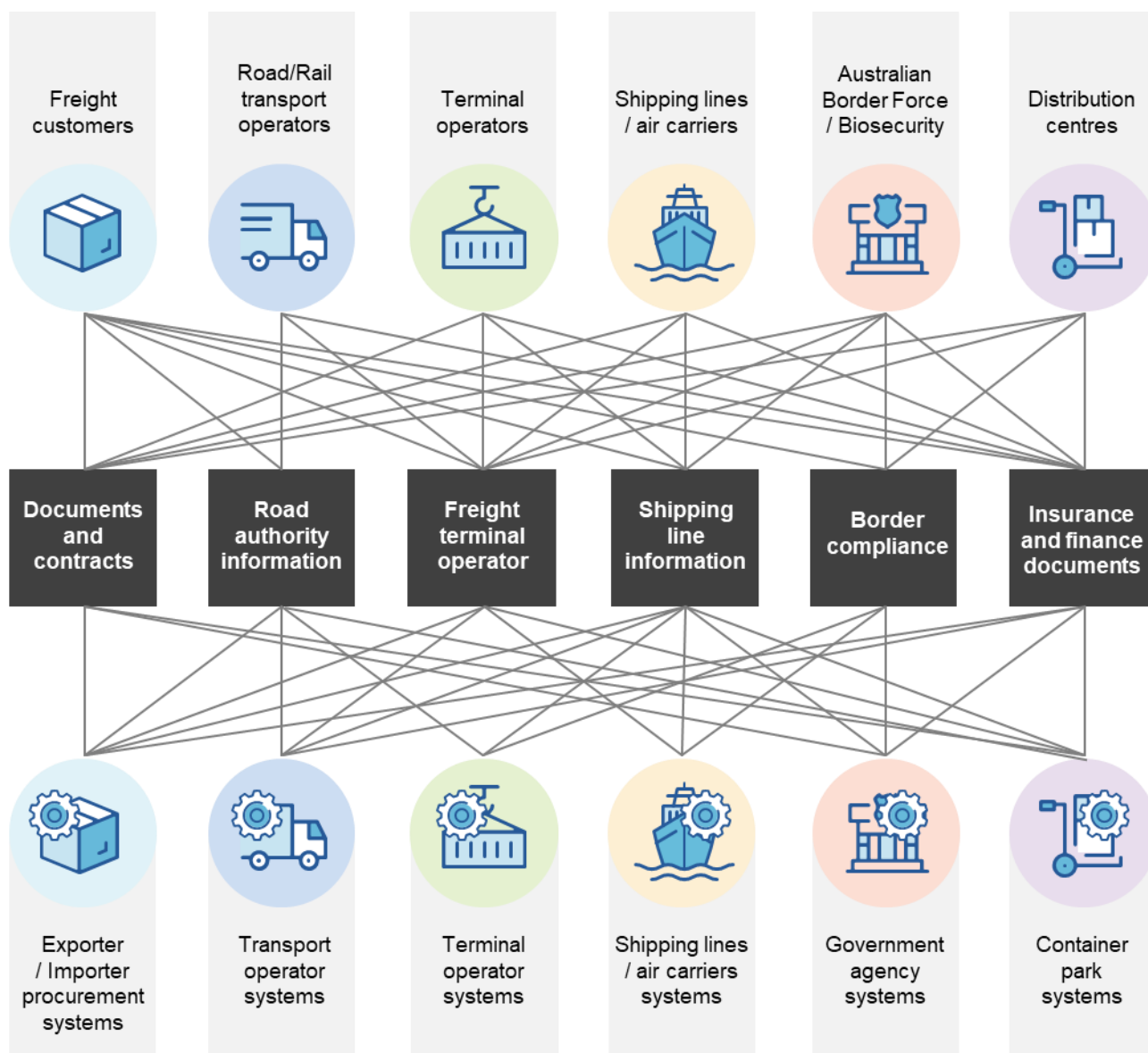
Figure 11.9 – Information to be provided and clearances to be obtained by vessels

Figure 11.10 – Current cargo clearance information flows

Upcoming reform — the Simplified Trade System

The need to address issues in vessel and cargo clearance systems has been recognised, both internationally and domestically. Article 10(4) of the World Trade Organisation's Trade Facilitation Agreement encourages the establishment and maintenance of 'single window' trade systems that let traders interact with authorities through one entry point. In line with this, a taskforce was set up within AusTrade in June 2021 to develop the Simplified Trade System (box 11.6).

It is still too early to tell what the STS might achieve, but the initiative is underway. A beta test of a new biosecurity web portal was carried out in early 2022, and a national rollout of the system is intended to take place from March onwards (DAWE 2022a). Regulatory hurdles are also being addressed through ongoing proof of concept trials with importers and the Port of Melbourne.

Box 11.6 – Simplified Trade System (STS)

The Simplified Trade System will be a series of reforms that aim to streamline cargo clearance processes. The centrepiece will be a ‘tell-us-once’ digital platform through which stakeholders can upload and access all relevant documentation required by Australian government authorities. This initiative is also likely to review Australia’s international trade regulations.

The STS will aim to improve the user experience for businesses, simplify regulatory processes, better align processes across government agencies and enhance data collection and sharing.

The government intends to co-design the STS with business and recently released a consultation paper (*Simplified Trade System Implementation Taskforce 2021b*).

Industry’s hopes for the STS

Responses to the Taskforce’s Consultation Paper proposed changes to the existing system, the ICS. Unifying the responses was a call for a national approach that coordinates ongoing state government initiatives and links the activities of DAFF and the ABF, who are currently perceived to operate independently. One proposed way of achieving this is via expansion of the ABF’s Australian Trusted Trader system to DAFF (IFCBAA, sub. 34, p. 12; ACCI 2022, p. 3; Sydney Fish Market Pty Ltd. 2022, p. 1). Trusted Trader offers businesses priority processing and treatment of their goods at the border and reduces the number of declarations required for importation under the assumption that the business is ‘low risk’ (ABF 2022b).

Similarly, support was expressed for the concept of a tell-us-once web portal that removes the need for paper documentation. Among suggestions for what might be included in the portal were a dynamic tool that notifies users of area-specific delays (KPMG 2022) and an opt-in self-service portal for customs (BCA 2022). Other issues raised were that the current digital certificates system creates unnecessary costs for ICS users (FTA and APSA 2022; IFCBAA 2022). A digital certificate is a file with a unique identifier that provides proof of the sender’s identity and confirms that a signed import document has not been tampered with. Receiving a digital certificate requires an identification check. Users of the ICS must purchase a digital certificate from DigiCert, the only provider accredited by the ABF, and renew this on a two-yearly basis (ABF 2022a).

Crucially, many responses requested that the Taskforce be transparent with industry in their progress and agenda. Quarterly STS status reports were suggested (FTA and APSA 2022), as well as workshops with industry groups (Ports Australia 2022) and pilot programmes of new web platforms (BCA 2022) to prevent the ‘big bang’ approach used for the ICS in 2005 that saw widespread outages at launch (The Age 2005). Some requested that the ABF review their data holdings to determine what more could be made publicly available through the STS (ACCI 2022; CAPEC 2021).

Some respondents emphasised the importance of adopting international standards for messaging and data transfer, be it adopting the United Nations’ Model Law on Electronic Transferable Records (ACCI 2022; ANZ 2022), using ISO/IEC standard syntax for exchange (GS1 Australia 2022) or using internationally recognised fish names (Sydney Fish Market Pty Ltd. 2022). To some, international standardisation entails closer collaboration with customs offices or systems in trading partners, particularly New Zealand.

The level of resourcing for DAFF and the ABF will impact the clearance system's efficiency. Physical inspections of containers and break-bulk cargo are still carried out, implying that an inadequate number of inspection officers may undermine an effective single window system. Adopting new innovations under the STS' suite of reforms may ease this burden — for example, by using AI tools for document scanning or digital technologies for remote inspection (Inspector-General of Biosecurity 2021, p. 59).



Draft finding 11.3

Government should continue to overhaul cargo clearance systems

The Australian Government's cargo and vessel clearance systems are currently convoluted and challenging for stakeholders to use, with repetition in data entry and outdated ICT systems. A government taskforce is working to address these issues. Successful reform will require the elimination of duplicative application processes, adequate resourcing for the departments performing clearances and a stable 'single window' ICT platform that can integrate with privately operated port community systems.

11.6 International comparisons

The following examination of maritime freight operations within international ports aims to shed light on ways in which Australian operations differ from those in other countries and to identify if adoption of approaches used elsewhere might improve the efficiency and resilience of Australia's maritime logistics system.

International ports use many of the maritime technologies outlined in this chapter. Globally, an estimated 53 container terminals have implemented automation, with 32 per cent of these situated in Asia. In these terminals, yard operations were the most common operation to be automated, followed by horizontal transfer equipment. The majority of the terminals used conventional quay cranes, with only a small number identified as remotely operated (ITF 2021, pp. 17–18). The use of a PCS and other coordination technologies, meanwhile, have become standard practice worldwide (Carlan, Sys and Vanelislander 2016).

Inquiry participants offered some brief comparisons of Australia's technology uptake relative to global practice. Deakin University's submission observed that "is at the forefront of technical innovation in the logistics industry", particularly excelling at introducing automation (sub. 39, p. 4). The Australian Maritime College, meanwhile, observed that Australia's major container ports have adopted automation, but lag behind European ports in digitalisation (sub. 15, p. 7). While the AMC suggest that Australian terminals have yet to use a PCS, however, it appears that services offered by companies such as 1-Stop and Containerchain fulfil the role of a PCS.

As discussed in chapter 3, like-for-like comparisons are the most valuable for international benchmarking. Australian container ports may be unable to achieve the productivity levels of international ports with much larger container traffic volumes, such as transshipment ports like Singapore or Hong Kong. Australia's container ports are primarily destination ports, not source ports (like Shanghai) or transshipment ports (like Singapore). The most useful comparisons for the purposes of this chapter, therefore, are the technologies used at ports with similar characteristics to those in Australia. Similarity is determined primarily in terms of whether the port is an origin–destination port and its volume of cargo throughput (comparable ports are discussed in box 3.5). As such, boxes 11.7 and 11.8 contain observations about the technologies and information systems of ports in New Zealand and Japan, respectively.

Outside of containerised freight, Australia is a major exporter of bulk commodities. As outlined in section 11.3, Australia's high-performing bulk mineral terminals are supported by advanced technology and are generally considered to be world-leading. The comparisons below are therefore limited to container terminals, in order to find international instances of technology use that may significantly benefit Australia's containerised trade.

Box 11.7 – New Zealand container ports

About the ports

New Zealand's container trade is primarily handled by the Port of Tauranga and the Port of Auckland, with the pair accounting for 63 per cent of all containers handled in New Zealand in 2020 (Deloitte 2021, p. 46). Tauranga's 2020 throughput of 1.25 million TEUs invites comparisons to the Port of Brisbane (approximately 1.3 million TEU), while Auckland's 2020 throughput of 881 000 TEU is similar to that of Fremantle (approximately 800 000 TEU) (BITRE 2021c; Deloitte 2021). The pair of New Zealand ports are ranked within the top 200 container ports of the Container Port Performance Index (The World Bank 2021).

Operational performance

Both ports are publicly owned. The Port of Tauranga's majority shareholder, Quayside Holdings, is the commercial investment arm of the Bay of Plenty Regional Council, while Ports of Auckland Limited is owned by Auckland Council. At the Port of Auckland, stevedoring is provided by the Port. At the Port of Tauranga, stevedoring is performed solely by third party companies.

Auckland and Tauranga partnered in 2012 to create PortConnect, a port community system (section 11.5) that provides a suite of cargo management services. These include container tracing and status notifications, online Export Pre-Advice submission, shipping line clearance messaging, a trade single window with New Zealand Customs and an Application Programming Interface (API) that receives ongoing container information from both ports (PortConnect Ltd. 2022). PortConnect collects and shares a variety of vessel scheduling and cargo information. This information is available to all supply chain participants, though some data points are paywalled by the subscription version of the 'Track and Trace' function. The system has since been adopted by the Port of Lyttelton (the country's third largest container port), Timaru Container Terminal and Northport. The Port of Auckland uses 1-Stop's VBS for vehicle bookings.

With respect to automation, the Port of Auckland has commenced its Fergusson Container Terminal project, which was first announced in 2016 but has been beset by delays due to software faults. The project aims to install 27 automated straddles by 30 June 2022 to work alongside manually operated stacking cranes. The Port of Tauranga, meanwhile, has yet to implement any form of automation, though it intends to install automated stacking cranes in the near future (Port of Tauranga Ltd 2021).

New Zealand's two largest container ports use a common PCS that allows for a high degree of coordination between supply chain participants at Auckland or Tauranga. Adoption of PCS technology in Australian container terminals precedes that of New Zealand. However, the expansion of the system to other ports suggests that PortConnect has the potential to become a national PCS for the New Zealand maritime sector, particularly given that container terminals in New Zealand's ports are government-operated and therefore lack the commercial sensitivities that has dissuaded stakeholders from using 1-Stop in Australia.

The Port of Auckland expects automation to help expand capacity, but given implementation is still underway, it is too early to tell if this will be the outcome. Its intended automation model resembles Patrick Terminals' Brisbane and Sydney terminals. Tauranga's planned use of automated stacking cranes bears similarity to those used by DP World in Brisbane. While information sharing between the two ports is deeply coordinated, their strategies for automation (that is, which aspects of the quayside they hope to automate) differ. It appears that Australia's major ports are more heavily automated than those in New Zealand.

Box 11.8 – Yokohama container port

About the port

Situated on Japan's east coast, the Port of Yokohama was designated as a 'super hub port' in 2004 by the Japanese government and saw container throughput of 2.66 million TEU in 2020, roughly equivalent to that of Melbourne (approximately 3 million TEU) or Sydney (approximately 2.6 million TEU) (City of Yokohama 2021). Yokohama is regarded as a global leader in container terminal efficiency: it was ranked first by both methods used in the 2020 Container Port Performance Index, while APM Terminals' Yokohama terminal completed a then-record 163 container moves per berth hour in 2013 (JOC Group 2014).

Operational performance

The Port of Yokohama is publicly owned, falling under the responsibilities of the Port and Harbour Bureau of the City of Yokohama. The government-owned Yokohama–Kawasaki International Port Corporation and Yokohama Port Corporation are responsible for leasing, maintaining and managing the container terminals and port facilities, respectively. Stevedoring is performed by private container terminal operators contracted by shipping lines and freight is moved on road by private trucking companies.

The Cyber Port system is a PCS that has been active at the Port of Yokohama from April 2021. Like other PCSs, Cyber Port allows logistics chain participants to digitise their documents (for example, manifests) and share them on a common platform via EDI. This data can also be aggregated and anonymised to generate data visualisations. In 2023, Cyber Port will be fully integrated with the Nippon Automated Cargo and Port Consolidated System, the national single window system for regulatory and customs clearances. The Commission understands that very few users of the Port also use Cyber Port (APM Terminals, pers. comm., 23 June 2022).

Included in the Cyber Port system is CONPAS, a vehicle booking system that lets truck operators reserve a time to enter the port for container loading and unloading. Transport operators are able to enter the port using a government-issued Port Security Card. Container loading slips can be uploaded onto CONPAS before a truck's arrival through Cyber Port (Cyber Port 2021). A small proportion (in the range of 10–20 per cent) of the trucking companies operating at the port currently use CONPAS. (APM Terminals, pers. comm., 23 June 2022).

The coordination technology used at Yokohama, CONPAS, does not significantly contribute to the Port's efficient levels of container movement. CONPAS trials at Yokohama in 2017 resulted in an approximately 10 per cent reduction in truck waiting time, consistent with the improved truck turnaround times seen in Australia with the introduction of 1-Stop's VBS (DP World, sub. 49, p. 87). However, only a small proportion (in the range of 10–20 per cent) of incoming trucks used CONPAS to make a reservation during the trial, with this proportion remaining consistent post-trial as many operators choose to use fax. (APM Terminals pers. comm., 23 June 2022) Despite the Ministry of Land, Infrastructure, Transport and Tourism's role in

developing the Cyber Port system for Japan's publicly owned ports, the system has yet to see significant uptake at Yokohama and has not been rolled out at other ports. The Port of Nagoya, for example, rely on their own Nagoya United Terminal System for PCS functionality (Nagoya Harbor Transportation Association 2018). The existence of multiple government-created PCSs in Japan contrasts with the number of Australian terminals relying on the privately developed 1-Stop. There is little to suggest that the existence of these parallel PCS have significantly altered the flow of documents in Japan's maritime sector.

The level of automation at Australia's main ports exceeds that of Yokohama. Yokohama's container terminals are almost entirely manually operated. However, a Yokohama-based container terminal operator ordered two automated rubber tyre gantry cranes in 2021 — a model of automation yet to be seen in Australia (Avery 2021).

Conclusions from international comparisons

Our examination of New Zealand and Yokohama's ports, which performed more favourably on the World Bank's 2020 *Container Port Performance Index* than the five largest Australian container ports, reveals that the technologies used in Australia's major container terminal operations are broadly similar to those used in ports that perform well overseas. The ICT systems used in Australian terminals, for example, perform the same functions as those used in Yokohama and New Zealand (that is, landside scheduling, document transfer, real-time alerts on yard congestion). Australia's level of automation exceeds that of the two examples studied, although New Zealand's future automation pattern is likely to resemble that in Australia's major ports.

Whether Australia's ports are as efficient as international counterparts remains up for debate. However, the characteristics of our systems in terms of the utilisation of automation and information sharing systems are fundamentally the same.

12. Australia's national shipping concerns

Key points

- ✱ **Coastal trading regulation is not delivering competitive shipping services for Australian consumers.**
 - Cargo owners find the current regime for cabotage burdensome and inflexible, reducing the attractiveness of shipping as an option.
 - Numerous reports and inquiries over the past ten years have noted that the current system is uncompetitive and requires reform, but little action has been taken.
- ✱ **Coastal trading regulation should be amended to allow increased competition between Australian and international vessels.**
- ✱ **Concerns raised about domestic shipping capacity and training may be better resolved by means other than a strategic fleet.**
 - A privately owned, Australian registered strategic fleet would have limited ability to mitigate the types of issues that have recently affected Australia's international freight task.
 - Owners would need subsidies in order to compete globally on commercial terms and as compensation for the costs and risks associated with having to make their vessels available if requisitioned in times of need.
 - Capacity could be acquired as needed from the international market without the costs involved in supporting a national strategic fleet.
 - The shipping charter market provides access to a wide variety of vessels that could be used to address specialist case-by-case needs. And the Australian Government could access international resources — including the charter market — in times of natural disaster and emergencies.
- ✱ **Australian-flagged vessels are not a prerequisite to meeting maritime skill requirements.**
 - Cadetships and skilled migration appear to be working well in meeting needs for blue-water experience.
- ✱ **Calls for a national fleet raise complex matters which might be further evaluated and examined by the Taskforce proposed by the Government in its policy position prior to the election.**

This chapter looks at issues surrounding coastal trading and its regulation (section 12.1), and at proposals for a national 'strategic' fleet that seek to address concerns about Australia's reliance on overseas shipping operators and international trading vessels (section 12.2).

12.1 Coastal trading faces ongoing challenges

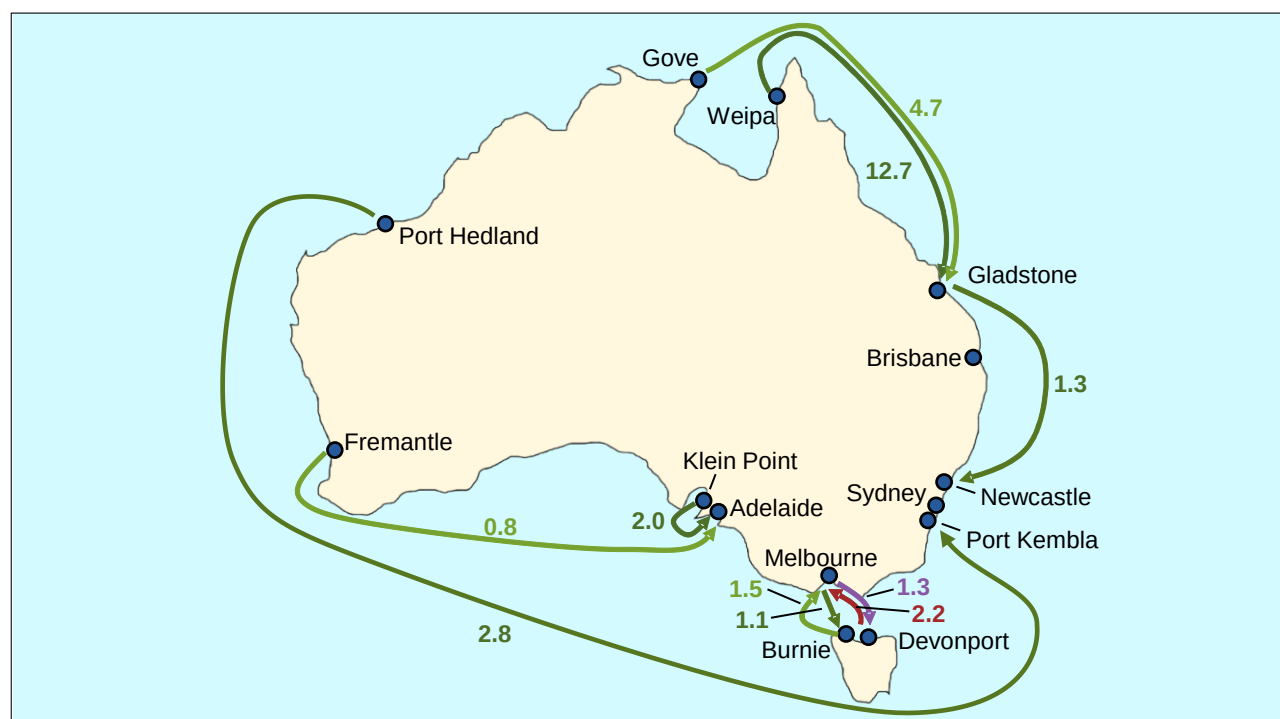
Coastal trading involves the movement of cargo between Australian ports by ship, without travelling via an intermediate international port. As this cargo does not travel beyond Australia's international border, it remains part of the domestic freight and logistics system.

The total volume of cargo moving between Australian ports has not changed significantly in over 40 years, despite increases in the domestic freight task. As a result, coastal trading's share of the domestic freight task has fallen significantly, as most demand growth has been picked up by road and rail (Ports Australia 2021, p. 2). Coastal trading via shipping constituted an estimated 14 per cent of Australia's total domestic freight task in 2020-21, in comparison with road's 28 per cent and rail's 56 per cent (Commission estimates using BITRE 2021a, p. 78).¹

Coastal trading accounts for an even smaller share of Australia's total maritime logistics trade — less than 3.5 per cent (Commission estimates using BITRE 2021a). Cargo volumes were steady at around 50 million tonnes a year over the decade to 2018-19. In contrast, international sea freight tonnages grew by nearly 65 per cent over this period.

Coastal trading mostly transports bulk cargo, with intrastate movements in Queensland (mostly alumina ores from Weipa to Gladstone) making up over 25 per cent of tonnage in 2018-19. The top ten trade routes constituted over 55 per cent of total coastal cargo tonnages moved in 2018-19 (figure 12.1).

Figure 12.1 – Coastal trading tonnages are dominated by bulk cargo in Queensland
Top 10 tonnage domestic shipping corridors by tonnages 2018-19



Source: Adapted from BITRE (2021b).

¹ Rail dominates due to the large iron-ore and coal tonnages moved from mine sites to ports, as well as non-bulk cargo moving on the east–west rail corridor. Road dominates the non-bulk freight task including most consumer goods.

Key non-bulk routes include the ferry services connecting Tasmania to mainland Australia (box 12.1). Non-bulk cargo including containerised trade between the east coast and Perth constitutes a small proportion of the total movements (chapter 2), with a significant proportion carried under temporary licences on international vessel (discussed below). Other general cargo coastal trading services connect remote and island communities across the far north of Australia.

Box 12.1 – Connecting to Tasmania

As an island, Tasmania relies on shipping services to connect to both domestic and international trade.

Bass Strait services are provided by three operators that offer daily services each way between Tasmania and the Port of Melbourne. Toll/ANL and Searoad provide freight only services. The Tasmanian government owned TT Line service carries freight along with passengers and private vehicles. Cargo is handled using a combination of containers and trailers. Each operator has their own dedicated terminals in the ports, with dedicated workforces. All six vessels operating these services are Australian registered and flagged and represent the only significant container-capable vessels operating under a coastal trading General Licence (Ports Australia 2021, p. 2). These ferry services collectively make up around 10 per cent of the Port of Melbourne's total containerised trade (Commission estimates using Port of Melbourne 2018).

One regular international container service is scheduled to call weekly at Bell Bay (connecting to Sydney and Noumea using a vessel of 1500 20-foot equivalent unit capacity) and handles around 20 000 20-foot equivalent units annually (Tasmanian Ports Corporation Pty Ltd 2021b, p. 17). Cargo is loaded and unloaded by two mobile harbour cranes operated by Qube. Other shipping services visit the state for bulk and break-bulk cargo, although infrastructure limits vessel sizes.

The Australian Government supports users of Bass Strait ferry services through two rebate schemes designed to address the notional cost differential between domestic sea and equivalent road or rail services available for mainland interstate transport. The Bass Strait Passenger Vehicle Equalisation Scheme applies to personal passenger vehicles; the Tasmanian Freight Equalisation Scheme is available for non-bulk cargo. In 2020–2021, a total of \$36.9 million was spent under the Bass Strait Passenger Vehicle Equalisation Scheme and \$168.8 million under the Tasmanian Freight Equalisation Scheme (DITRDC 2022c).

In 2013 the Australian Government requested that the Commission inquire into Tasmania's shipping costs and the competitiveness of Tasmania's freight industry. The report noted that services to Tasmania faced specific market challenges around low volumes and high service costs and that the government should consider reforms that 'have national and Tasmanian benefits (such as coastal shipping reform) and those that directly enhance the competitiveness and productivity of the Tasmanian economy' (PC 2014b, p. 2). The Australian Government responded to the report in 2015 including an extension of the TFES to cargo destined for transshipments through Australian mainland ports.

Regulation is a key feature of coastal trading services

The transportation of domestic cargo between interstate ports is regulated by the Australian Government under the *Coastal Trading (Revitalising Australian Shipping) Act 2012* (Cth) (Coastal Trading Act).² All

² Cargo shipped on intrastate voyages (between ports within the same state) does not require licensing under the Coastal Trading Act. No issues have been raised with respect to intrastate shipping. This section therefore focuses on interstate shipping.

vessels providing interstate cargo services are required to hold a trading licence, with the regime placing stricter requirements on foreign-flagged vessels (known as cabotage restrictions).³

The Act provides three licence categories:

- *General licences* are available for a maximum of five years for vessels registered on the Australian General Shipping Register (box 12.2). Under a general licence, there are no restrictions on a vessel engaging in coastal trading.
- *Temporary licences* are granted to foreign flagged vessels carrying domestic cargo or to vessels registered on the Australian International Shipping Register (box 12.2). Licences must be approved by a delegate for the Minister for Infrastructure and Transport from the Department of Infrastructure, Regional Development and Cities. The licence allows the vessel to be used in coastal trading over a twelve-month period under stringent conditions. Licence holders must undertake at least five voyages during the licence period and must specify the details of each voyage when applying for the licence. Approval of the licence can be challenged by general licence holders providing competing services, and the Minister must consider that challenge when deciding whether to grant the temporary licence.
- *Emergency licences* can be granted by the Minister for Infrastructure and Transport's delegate in response to national emergencies that require a significant and coordinated response.

The Minister can also apply an exemption from requirements of the Act for certain types of vessels for a defined period in response to specific shipping needs. For example, in January 2022, exemptions were provided to container and roll-on, roll-off vessels when floods damaged east–west rail links (Minister for Infrastructure and Transport (Cth) 2022).

The *Fair Work Act 2009* (Cth) (Fair Work Act) also applies to all vessels engaged in coastal trading where they are: operating under a general or emergency licence; have a majority of Australian employees; or are operated or chartered by an Australian employer. Vessels on a temporary licence undertaking more than two coastal trading voyages in a twelve month period are also subject to the Fair Work Act for each voyage from the day the loading of domestic cargo begins until unloading is complete (Fair Work Ombudsman 2021).

How does cabotage regulation impact the maritime logistics system?

In 2018–19, over 75 per cent of interstate coastal freight (by weight) was carried under temporary licences (Commission estimates using BITRE 2021b, fig. 3.1). Most of the remaining coastal freight, carried under general licence, appears to be Tasmanian cargo.

Previous investigations into cabotage argued that restrictions imposed through licensing placed a significant impost on Australian businesses that rely on coastal shipping, and deterred businesses from using coastal shipping, reducing competitiveness and increasing costs and uncertainty (Harper et al. 2015, pp. 38–40; PC 2014b, pp. 149–156, 2016b, pp. 390–391). Two bills to reform coastal trading regulations have been put before parliament but neither has passed (box 12.3). Modelling of the changes proposed in the 2015 bill indicated potential economic benefits worth \$667 million over twenty years (Parliament of Australia 2015, p. 75).

³ International conventions allow for national regulations to be placed on domestic freight movements by foreign vessels, provided they do not contravene the agreed standards for ship operations.

Box 12.2 – Australia's shipping registers

The *Shipping Registration Act 1981* (Cth) and *Shipping Registration Regulations 2019* require that all Australian owned vessels that travel internationally are registered and Australian flagged. This requirement also applies to any Australian owned vessel over 24 meters in length and capable of travelling overseas. Registration confers Australian consular protection overseas, as well as requiring the vessel to observe relevant Australian laws and international conventions in foreign operations. Unregistered vessels are not permitted to travel internationally and ships' owners and masters who do embark on voyages with unregistered vessels may be subject to criminal prosecution and fines.

Registers are maintained by the Australian Maritime Safety Authority (AMSA). Conditions that apply under each register vary.

Australian General Ships Register (AGSR)

- Vessels must be majority owned by an Australian national(s) (that is, greater than 50 per cent of vessel shares must be held by Australian citizens).
- All seafarers employed on a trading ship must be either Australian citizens, permanent residents or hold a visa with appropriate work rights.
- Australian workplace relations law, including the *Fair Work Act 2009* (Cth), applies to the vessel at all times.

Australian International Ships Register (AISR)

- The vessel must be at least 24 meters in length.
- Vessel must be wholly Australian owned.
- Vessels must be primarily engaged in international trading.
- The positions of ship's master (or first mate) and chief engineer (or first engineer) must be held by Australian seafarers; other positions can be held by Australian or international seafarers.
- The owner of the vessel must have a collective agreement covering all ship's crew prior to registration.
- The *Fair Work Act 2009* (Cth) does not apply to AISR vessels in relation to the making of the collective agreement and when engaged in international trading.
- AMSA has discretion over accepting vessels on the AISR instead of the AGSR.
- Vessels may apply for tax incentives through the Department of Infrastructure, Transport, Regional Development, Communications and the Arts.

Registrations cover a wide variety of watercraft, including those engaged in aquaculture, off-shore oil and gas extraction, ocean research, tourism, tugs, dredges and recreational craft in addition to commercial trading vessels. As of June 2022, the AGSR listed over 11 500 vessels of which around 65 per cent were identified as yachts or pleasure craft (Commission estimates using AMSA 2022). There was no indication of any vessels being registered on the AISR.

In accordance with international conventions, Australian defence force vessels are not required to be placed on the public registers but are also Australian flagged to confirm their national identity.

Sources: AMSA (2022) and DITRDC (2022c).

Submissions to this inquiry suggest that the regulatory regime remains an issue. Most maintained that the inflexibility and costs imposed mean coastal shipping is uncompetitive with road, rail and international

shipping.⁴ Others expressed support for simplification of regulation to ease administrative burden and improve supply chain resilience through increased transport options.⁵ And some suggested that the uncompetitive position of domestic shipping has driven increased substitution of international products for Australian domestic production to the detriment of the Australian economy.⁶

Some submissions, however, advocated caution in changing regulation of coastal shipping. These raised concerns around competitive neutrality, specifically between Australian road and rail businesses needing to comply with Australian workplace and tax regimes which do not apply to international shipping companies⁷ (ARA, sub. 61, pp. 16–17; FoRG, sub. 69, pp. 4, 9–10).

Box 12.3 – Recent bills to change the regulation of coastal shipping

Shipping Legislation Amendment Bill 2015

The bill proposed:

- introducing a single permit system allowing unrestricted trade for both Australian and foreign licensed vessels over a twelve-month period
- allowing vessels trading overseas for more than 90 days per year to register on the AISR and removing the requirement for a collective crew agreement prior to registration
- applying seafarer pay and conditions set out in Australian law to ships that are engaged in coastal trading under permit for more than 183 days per year.
- removing the contestability provision from temporary licensing requirements (foreign and Australian registered vessels would be subject to the same access and operation conditions)

Coastal Trading (Revitalising Australian Shipping) Amendment Bill 2017

The bill proposed:

- streamlining the temporary permit system
- removing the requirement to nominate a minimum of five voyages for a temporary licence
- retaining, but streamlining, the consultation on contestability provisions
- reducing administrative burden connected to variation to temporary licences
- the application of Fair Work Act to coastal shipping would remain unchanged.

Sources: Parliament of Australia (2015, 2017).

Others argued for broadening the regulatory regime to strengthen crewing and workplace relations compliance on vessels and to reduce the reliance on global suppliers for shipping services (ITF, sub. 54, pp. 5–6; MUA, sub. 59, p. 136). The Maritime Union of Australia has also pointed to additional reforms aimed at preserving national maritime capability and to provide for the primacy of the ship provider rather than

⁴ SAL, sub. 11, pp. 68, 73; Wilmar Sugar Australia, sub. 28, p. 5–6; AAC, sub. 37, p. 2; CIF, sub. 48, pp. 4–6; and BCA, sub. 56, p. 7.

⁵ AFGC, sub. 21, p. 10; MCA, sub. 25, pp. 8–9; IFCBBA sub. 34, p. 6; Ports Australia, sub. 45, pp. 11–12; and NSW Government, sub. 58, p. 10.

⁶ AI Group, sub. 60, pp. 35–37 and SAL, sub. 11, pp. 73–76.

⁷ International shipping companies are regulated through international agreements and are excluded from a number of Australian regulatory requirements. This creates a potential competitive disadvantage for domestic transport operators.

cargo interests (MUA 2021a, p. 2). While these proposals have a strong focus on crew welfare, safety and resilience, there is little discussion of how proposed measures would contribute to the global competitiveness of Australia's maritime logistics system or what economic costs and benefits regulatory protections afforded to general licence holders would provide to the broader Australian public.

The Commission has previously noted that the reforms proposed in the lapsed 2015 Shipping Amendment Bill would improve competitiveness and could attract more international vessels to the Australian freight task, increasing competition (PC 2016b, pp. 393–394). The lapsed 2017 Amendment Bill addresses the removal of current constraints on flexibility that would encourage greater competition. Reform to allow greater competition from foreign vessels would provide more cost effective shipping services for Australian users. The Commission has not received any evidence through the current inquiry that would change this view.



Draft finding 12.1 **Coastal shipping regulation impedes competition**

There is a strong case for reform to coastal shipping regulation to allow greater competition from foreign vessels on domestic sea routes. This would result in more cost effective shipping services for Australian users. The temporary licence system should be streamlined and general licence holders' ability to contest approval of temporary licences should be limited. Requirements that Australian labour laws apply for licence holders should be retained.



Draft recommendation 12.1 **Amend coastal shipping laws to increase competition**

The Australian Government should amend coastal shipping laws to:

- streamline the temporary licence system to increase operational flexibility and reduce the administrative burden on licence applicants
- retain, but limit, the ability for Australian vessel operators to contest the granting of licences to foreign vessels
- maintain the current application of the *Fair Work Act 2009* (Cth) in coastal shipping
- review conditions for Australian registration of vessels to encourage increased international competition.

12.2 Concerns about capacity and training may be better resolved by means other than a strategic fleet

Australia's current national fleet

Under its international treaty obligations, Australia requires that all vessels operating in international trade be registered with a legally and internationally recognised national identity. This requires vessels to be recorded on a nation's ship's register and flagged⁸ to that nation. As discussed above, Australia operates two national

⁸ Registered vessels are required to fly a flag as a means of identifying their nation state jurisdiction while travelling internationally.

registers that confer Australian nationality on a vessel (box 12.2). Vessels that are Australian flagged constitute the national fleet.

The number of Australian flagged major trading vessels⁹ has been falling over time. In 2007 there were thirty ships (DIRDC 2019, p. 7). As of May 2022 there were fifteen trading ships: four bulk carriers, five tankers and the six Tasmanian roll-on/roll-off ferries (Commission estimates using AMSA 2022; SAL, sub. 11, pp. 70–71). The decline has occurred despite a rising domestic freight task, which has seen significant growth in road and rail freight volumes.

Proposals for a strategic fleet

Recent pressures on global shipping and transport challenges associated with natural disasters have highlighted the importance of international service suppliers to Australia and the limited number of Australian registered trading vessels. In response, some commentators have called for greater government support for Australian flagged shipping capacity to address the reliance on international shipping and the diminishing scale of Australia's shipping sector.

Both the Australian Labor Party and the Liberal–National Party coalition had policy positions prior to the last election that include development of a 'strategic' national fleet or 'sovereign' shipping capacity to secure ongoing access to essential imports and to provide vessels for use in times of national crisis or conflict (box 12.4). (For simplicity, this chapter uses the term 'strategic fleet' to encompass both concepts). The Maritime Union of Australia (MUA) has also produced a detailed policy proposal.

There have been inquiries into related shipping concerns, including two in the past five years.

- The Senate Rural and Regional Affairs and Transport References Committee undertook an investigation in July 2017 into *Increasing Use of So-Called Flag of Convenience Shipping in Australia*, recommending a comprehensive whole of government review into the potential economic, security and environmental risks presented by flag of convenience vessels and foreign crews (RRATRC 2017, p. vii).¹⁰ The government of the day responded that it considered that 'Australia already has appropriate arrangements regarding national security, fuel security, minimum employment law standards and marine environment'. It further noted that 'international shipping, including foreign flagged ships, plays an essential role in Australia's freight task and that Australia's shipping services must remain open and competitive' (DITRDC nd).
- In December 2020, the Committee reviewed the Australian shipping regulatory regime, and proposed the government commit to a strategic fleet, and that a taskforce be established to advise on the legislative, operational, funding and requisitioning arrangements (RRATRC 2020, p. 55). A response from the former government to this inquiry was not released prior to the election.

⁹ Major trading vessels identified as being greater than 2000 deadweight tonnes in capacity (DIRDC 2019, p. 6) and by ship type (bulk, tanker, general or RO/RO).

¹⁰ A flag of convenience (or open register) is a shipping register operated by a country that has few requirements for local ownership or crewing of vessels engaged in international trade.

Box 12.4 – Policy positions supporting a strategic fleet

Australian Labor Party policy

The Labor party announced its policy proposal for a strategic fleet in 2022. The proposal included:

- creation of a privately owned, Australian flagged and crewed fleet
- vessels to operate on a commercial basis, with the ability for them to be requisitioned by the Australian Defence Force as needed in times of natural disaster or conflict
- closure of existing loopholes in shipping regulatory frameworks
- creation of a taskforce to advise on establishment of the fleet consisting of representatives from the shipping industry, charterers, unions, Australian business and the Department of Defence.

The policy follows on from announcements made in 2019 proposing a strategic fleet of up to a dozen ships including tankers, cargo carriers, container and roll-on roll-off vessels (Albanese 2019).

Liberal–National Party policy

The Liberal–National coalition announced a policy position on developing sovereign maritime capability in May 2022 which included:

- a review of income tax exemptions for Australian ship owners and seafarers to ensure they can compete on an even footing with international operators, and exploration of tax changes that will promote Australia's sovereign merchant capability
- encouragement for ship owners to look to regional neighbours for workers to complement Australian crews
- implementation of changes to the Coastal Trading Act to increase the speed with which ship owners can service Australia
- an increase Australia's sovereign maritime capability that can be called upon in times of national crisis or natural disaster.

Maritime Union of Australia (MUA) policy briefing

The MUA produced a policy briefing paper in 2021 calling for a strategic fleet and proposing:

- a commercial strategic fleet of around thirty-six ships, creating around 740 seafarer and 1100 indirect maritime jobs
- the fleet to be made up of petroleum tankers, dry bulk, container (feeder) vessels and multi-purpose ships (that may be deployed to service Bass Strait and remote regional communities) to fulfil trade demand currently met by a combination of existing internationally and domestically operated vessels
- the ships would operate on a commercial basis, or a cost recovery or government funded basis for non-commercial pursuits
- the fleet would provide the basis for Australian seafarer training
- the fleet could be requisitioned by the Defence forces and emergency management agencies.

Sources: ALP (2022); The Nationals (2022); MUA (2021b).

Why a strategic fleet?

A range of issues have led to calls for a strategic fleet

Arguments for the creation of a strategic fleet centre on the perceived risks of over-reliance on foreign flagged vessels and international crews. This discussion is coupled to the decline in the number of Australian ships and seafarer jobs. Advocates propose that the strategic fleet would address these risks by creating self-sufficiency and self-reliance through local ownership of shipping assets and increases in the supply of skilled mariners (MUA 2021b, p. 1; MIAL, sub. 46, p. 4; OSSA, sub. 42, p. 1). One envisaged benefit is that the fleet would address a potential scarcity in blue-water training capacity (MIAL 2019, p. 3; MUA 2021b, p. 9; MIAL, sub. 46, p. 12), considered in chapter 10.

Building Australia's 'in-house' shipping capacity is also seen as a way of providing protection to national interests, as foreign-flagged trading vessels, such those using flags of convenience, may not be safe¹¹, reliable nor available in times of need. There is also a concern that foreign vessels could not be requisitioned or directed into high-risk areas of operation during times of disruption, as control of the vessels can only be exercised by their nation of registration and ownership (MIAL, sub. 46, p. 9).

Furthermore, the strategic fleet is seen as a means for Australia to command greater response capacity in the event of natural disasters and conflicts, augmenting the capabilities of emergency agencies and the Australian Defence Force (MUA 2021b, p. 10; MIAL, sub. 46, pp. 12–13; OSSA, sub. 42, pp. 1-2).

Maintaining this 'defensive' capacity is also seen as a means to check international control over shipping and Australian supply chains, protecting economic 'sovereignty' and access to global trade. This is primarily reflected in the desire to avoid disruptions to refined petroleum supplies (including access to Australia's international strategic fuel reserves) (ALP 2022; MUA 2021b, p. 8; MIAL, sub. 46, p. 10). However, it is also seen as a risk mitigation strategy for broader supply side failures in global shipping markets. The decline in shipping service performance to Australia and issues of skilled labour availability during the COVID-19 pandemic is cited as harbingers of potential issues that must be addressed (MIAL, sub. 46, pp. 8-9; MUA, sub. 59, p. 18).

Evidence of the need for a strategic fleet requires further evaluation

Would a strategic fleet provide capacity required in times of significant disruption?

Disruptions can occur to different types of shipping services and supply chains at different times. Operating with only a limited number and types of vessels, the proposed strategic fleet would be unlikely to cover any significant disruption with the capacity required. Furthermore, the vessels and employees of the strategic fleet would likely face the same disruptions as other commercial shipping operations. For example, an Australian strategic fleet would have faced the same congestion issues at international ports stemming from the COVID-19 pandemic as other commercial shipping.

Experience as much of the world has transitioned to living with COVID has also shown that, despite experiencing significant operational and economic stresses, the international shipping sector is responsive to changes in Australian demand. Since the COVID pandemic began in 2020, international containerised trade has grown to record levels, and container shipping lines have introduced new services to Australia despite ongoing high global demand for capacity in other trades (DP World Australia, sub. 49, p. 30; SAL, sub. 11, p. 21). Exports of iron ore and natural gas have also continued to rise. Furthermore, international ship owners

¹¹ The Commission has previously noted issues of substandard international vessels are suitably dealt with through the inspection and vessel detention powers available to the Australian Maritime Safety Authority (PC 2016b, p. 392).

have ordered record numbers of new vessels to boost global capacity, although with a two-to-three-year lead time on construction, global shipping congestion and capacity issues will take some time to resolve (chapter 1).

More generally, the experience of the COVID-19 pandemic has illustrated how resilience in supply chains can be supported by tapping into available resources. A recent example is the approach taken to address flooding of the east–west rail line in 2022. The Australian Government granted exemptions to international vessels that allowed carriage of domestic cargo (not normally permitted under the coastal trading regime) (outlined in section 12.1), accessing shipping capacity already operating in Australian waters. This was achieved through existing regulatory frameworks without the need to hold a reserve capacity of Australian owned vessels.

Concerns about shortages of seafarers with the requisite skills

The Commission has not been presented with conclusive evidence that the current supply of seafarers is materially restricting Australia's shipping operations. Many of the issues around access to seafarer skills that have been experienced since the onset of the COVID-19 pandemic have been related to border control and immigration measures that restricted employee mobility. Strategic fleet employees would not have been immune from these challenges. As noted by the International Transport Workers Federation, one of the major issues was the need to identify seafarers as 'key workers' (ITF, sub. 54, p. 7). Resolving these types of issues requires better government co-ordination on immigration and health controls in response to crises.

Additionally, a national fleet would not add significantly to the seafarer workforce in Australia. An estimated 66 000 domestically certified seafarers work across all maritime activities (which include tourism, fishing, aquaculture, oils and gas, scientific research, search and rescue and relevant parts of the defence force) (AIS 2021b). There appears to be no reason why future demands for seafarers cannot be met by the current combination of both local and international labour pools — given the attractiveness of Australia as a place of work and residence for skilled international mariners.

The reduction in Australian-based seafarer jobs with the decline in the number of Australian-flagged major trading vessels does not, on the evidence presented to the commission in this inquiry, provide a strong rationale for creating a strategic fleet. As the Commission noted previously with respect to cabotage protection afforded to Australian flagged vessels:

In itself, protecting an industry to preserve jobs is not justified. The cabotage restrictions protect some jobs at the expense of growth in other industries. Protecting an industry from competition not only harms consumers (in this case farmers), but also reduces the incentives of the protected industry to improve its efficiency and competitiveness. Over time, the protected industry falls further behind foreign competitors, requiring ever more protection and increasing the cost to consumers and the community in general. (PC 2016b, p. 392)

Australian-flagged trading vessels do not appear to be a prerequisite to meeting needs for maritime jobs or training requirements. Rather, there is a range of non-trading Australian flagged vessels that could provide such opportunities. There is also no prohibition on Australian seafarers working or training on foreign-flagged trading vessels, and indeed there are examples of foreign-flagged vessels being worked by Australian crews (MUA 2021b, p. 7).

Concerns have been raised that current income taxation arrangements for Australian seafarers may compare unfavourably to other nations (MIAL, sub. 46, pp. 13, 23-27; OSSA, sub. 42 p. 3), however this is best seen as a matter of taxation policy and should be addressed either through mechanisms dealing with taxation policy or through the proposed Taskforce outlined in the Australian Government's pre-election policy.

Similarly, existing cadetships and skilled migration (notwithstanding the COVID-19 pandemic disruptions) appear to be working well in meeting needs for blue-water experience. On this basis government resources may be better targeted towards directly funding these programs than towards a strategic fleet, as discussed in chapter 10.

In responding to the need for shipping capacity in times of conflict, history suggests that even in times of war international shipping resources can still be obtained (SAL, sub. 11, p. 83). However, the risks involved with national security and defence (including access to strategic fuel supplies) require a separate needs assessment independent of maritime industry economic issues. Concerns relating to defence capability and national security are clearly matters for Government and should be addressed directly through those policy settings rather than maritime industry policy.

Commercial operation would place a major impost on a strategic fleet

Strategic fleet vessels would face several commercial disadvantages relative to internationally flagged vessels. Conditions of registration and Australian workplace laws mean Australian-flagged vessels face relatively high costs and would not be able to profitably compete in international trade without significant government subsidies.

Operating costs for Australian flagged-vessels are considerably higher than their international counterparts'. Crew costs are estimated to make up around 40 per cent of vessel operating cost (Stopford 2009, p. 227). Australian crew costs are estimated at between 4.5 to 7 times higher than those of comparable international crews (DIRDC 2019, SAL sub. 11, p. 86). These costs differentials are understood to be a function of both higher remuneration and higher crewing levels per vessel.

Other factors also impact the potential costs of, and risks to, investment in an Australian-flagged vessel rather than one registered elsewhere. Potential investors would weigh up the financial incentives available under different flag regimes such as favourable taxation treatment or other forms of subsidy; any constraints on capital structures, for example, limits on multinational ownership; and autonomy over operational decisions, including the mix of nationalities and roles in crewing the ship in international service. Strategic fleet vessels would be subject to restrictions in each of these areas as a condition of being Australian flagged. Owners of strategic vessels would also have to factor in the risk of having to break contracts if requisitioned by the Australian Defence Force to help in times of natural disaster or conflict, and what levels of commercial compensation might be required in these circumstances.

Vessels in the strategic fleet would also have to compete with internationally flagged vessels that do not face similar limitations, imposts or risks. Currently nearly half (44 per cent) of the global tonnage of tanker, bulk cargo and container vessels engaged in international trade are listed on three major registries, Panama, Liberia and the Marshall Islands (Commission estimates using UNCTAD 2022). These vessels tend to be larger and make up most of the long distance, intercontinental trading fleet, and include a number of ships serving Australia's international trade. Ship owner preference for these registers reflects that they maintain globally attractive, flexible regulatory regimes that provide lower costs and competitive advantages over other flag nations.

The decline in Australian-flagged vessels would appear to demonstrate that Australian investors are unwilling to fund the acquisition of new vessels and international shipping businesses. Investors would need more favourable regulatory terms and higher levels of subsidy than those currently available to invest in the strategic fleet.

Without ongoing government support, commercial operation of the strategic fleet would not appear to be sustainable.

There are more cost effective ways to address national shipping concerns

On the evidence presented to this inquiry there are several ways in which the Australian Government could secure shipping capacity at a lower ongoing cost than a strategic fleet. Amongst the simplest options is reform of coastal trading regulations (discussed in section 12.1) which would enable easier access to international shipping resources in Australian waters.

Some inquiry participants have also noted that reforms to the AISR would make Australia a more attractive place to invest and help address the decline in the number of Australian flagged vessels and seafarers (MIAL, sub. 46, p. 17; OSSA, sub. 42, p. 5). Maritime Industry Australia Limited has previously suggested reforms to the AISR including: broadening the number of vessel types eligible to register; requiring a minimum Australian crew component rather than defined roles; change to the collective bargaining requirements; improving processes for seafarer certifications; and streamlining the process for re-flagging vessels (2019, pp. 14–16).

The Australian Government could also consider incorporating options to directly access international shipping capacity as part of its resilience and emergency response planning. The shipping charter market provides access to a wide variety of vessels that could be used to address specialist needs on a case-by-case, without the need for ongoing commitments to support a commercial service which may not be fit for purpose or could be unavailable due to commercial commitments overseas.

Alternatively, the Australian Government could use financial instruments to underpin capacity that could be drawn down in times of crisis. For example, the government could write options contracts with large cargo owners or with shipping lines to 'buy out' their capacity in times of great need.

These are complex matters which might be further evaluated and examined by the Taskforce proposed by the Government in its policy position prior to the election.

Streamlining port interfaces, reform to reduce barriers to entry into the Australian market for all ship owners and operators and building relationships with Australia's key trading partners that support access to maritime resources in times of crisis would also be matters for consideration.



Draft finding 12.2

A strategic fleet requires further evaluation as on present evidence it is not the best remedy for concerns about domestic shipping capacity and training

A privately owned, Australian-registered strategic fleet would have limited ability to mitigate the types of issues that have recently affected Australia's international freight task. As commercial operations, vessels would not be immune to global market pressures. Moreover, owners would need subsidies in order to compete globally on commercial terms and as compensation for the costs and risks associated with having to make their vessels available if requisitioned in times of need.

Capacity could be acquired as needed from the international market without the costs involved in supporting a strategic fleet. The shipping charter market provides access to a wide variety of vessels that could be used to address specialist case-by-case needs. And the Australian Government could access international resources — including the charter market — in times of natural disaster and emergencies.

Furthermore, Australian-flagged vessels are not a prerequisite to meeting maritime skill requirements. Cadetships and skilled migration appear to be working well in meeting needs for blue-water experience.

Appendices

A. Public consultation

The Commission has actively encouraged public participation in this inquiry. This appendix outlines the consultation process and lists the organisations and individuals who have participated to date.

- Following the receipt of the terms of reference on 10 December 2021, an advertisement was placed in The Australian, and a call for submissions was released on 20 December 2021.
- The Commission received 78 submissions prior to the release of the draft report (table A.1) and 6 brief comments. These submissions and brief comments are available online at <https://www.pc.gov.au/inquiries/current/maritime-logistics>
- Consultations were held with representatives from maritime and freight peak bodies, individual organisations within the maritime logistics system along with business peak bodies, State, Territory and Australian government agencies (tables A.2).
- The Commission welcomes further submissions on the content of the draft report, including responses to the information requests, findings and draft recommendations.
- Public hearings will be held in early November. Further details on registering for hearings and making submissions can be found on the inquiry website.

The Commission would like to thank everyone who has participated in the inquiry to date.

Table A.1 – Submissions^{a,b}

Participants	Submission number(s)
Accolade Wines*	29*
Accord Australasia	47
Ai Group	60
Australasian Railway Association (ARA)	61
Australian Aluminium Council (AAC)	37
Australian Chamber of Commerce and Industry (ACCI)	73
Australian Competition and Consumer Council (ACCC)	26
Australian Food and Grocery Council (AFGS)	21
Australian Logistics Council (ALC)*	57*
Australian Maritime College (AMC)	15
Australian Maritime Officers Union (AMOU)	18
Australian Meat Industry Council (AMIC)	41
Australian Steel Association	16
Ballantyne, Dr Stuart	3
Brame, Colin	2
Business Council of Australia (BCA)	56
Cement Industry Federation (CIF)	48
CEVA Vehicle Logistics	10
Chamber of Commerce and Industry WA (CCIWA)	43
Columbus Group – Donald Yates	1, 76
Container Transport Alliance Australia (CTAA)	50
Deakin University	39
Department of Transport VIC	70
DP World Australia*	49*, 79
Federal Chamber of Automotive Industries	23
Flinders Port Holdings (FPH)	55
Freight and Trade Alliance and Australian Peak Shippers Association (FTA and APSA)	31, 71, 74, 75 and 77
Freight on Rail Group (FoRG)	69
Grain Trade Australia	4
GrainGrowers	22
Housing Industry Association (HIA)	40
Hutchison Ports Australia*	63*
Infrastructure Commission of the Northern Territory Government	27
International Forwarders and Customs Brokers Association of Australia (IFCBAA)	34
International Transport Workers Federation (ITF)	54

Participants	Submission number(s)
Maritime Industry Australia Limited (MIAL)	46
Maritime Union of Australia (MUA)	59, 72
Maritime Union of New Zealand (MUNZ)	30
MetCash Trading	38
Mineral Councils of Australia (MCA)	25
National Competition Council (NCC)	33
National Farmers Federation (NFF)	14
National Road Transport Association (NATROAD)	8
NSW Government	58
NSW Ports	66
Offshore and Specialist Ships Australia Ltd	42
Patrick Terminals*	20*
Port of Brisbane*	6*
Port of Melbourne	65
Port of Newcastle	62
Ports Australia	45
Ports WA	12
Qube Holdings Limited	64
Road Freight NSW and Australian Trucking Association	52
Shipping Australia (SAL)	11
South Australian Freight Council (SAFC)	53
South Australian Wine Industry Association Incorporated (SAWIA)	17
Svitzer Australia Pty Ltd	5
Tasmanian Forest Products Association	9
Taylor, Dr Greig and McDonald, Dr Matthew	35
Thapa, Udaya*	44*
Tractor and Machinery Association of Australia	36
Victorian Farmers Federation (VFF)	32
Victorian International Container Terminal (VICT)	7, 78
Victorian Transport Association (VTA)	24
Viterra	51
Viva Energy*	68*
Wilmar Sugar Australia	28
Wine Australia for Australian Wine	13
World Shipping Council (WSC)	19

a. Submissions marked with an asterisk have omitted 'In confidence' content – part or all of the submission is not online.

Table A.2 – Public consultations^{a,b}**Participants****1-Stop Connections**

Australian Border Force (ABF)

Australian Competition and Consumer Council (ACCC)

Australian Industry Group (Ai Group)

Australian Industry Standards (AIS)

Australian Maritime Officers Union (AMOU)

APM Terminals Yokohama

Australasian Railway Association (ARA)

Australian Logistics Council (ALC)

Business Council of Australia (BCA)

Competition and Markets Authority, UK

Coles Group

Container Transport Alliance Australia (CTAA)

Department of Agriculture, Water, and the Environment (DAWE)

Department of Infrastructure, Transport, Regional Development and Communications (DITRDC)

DP World Australia

Export Council of Australia (ECA)

Essential Services Commission (ESC)

Essential Services Commission of South Australia (ESCOSA)

Flinders Port Holdings (FPH)

Freight VIC (VIC Department of Transport)

Fremantle Ports

Freight and Trade Alliance (FTA)

Fair Work Commission (FWC)

GHD Advisory

GrainGrowers

Infrastructure and Project Financing Agency

International Cargo Handling Co-ordination Association (ICHCA)

IHS Markit

International Forwarder and Customs Brokers Association of Australia (IFCBAA)

Infrastructure Australia

Independent Pricing and Regulatory Tribunal (IPART)

Participants

Municipal Association of Victoria (MAV)

Maritime Industry Australia Limited (MIAL)

Maritime Union of Australia (MUA)

National Farmers Federation (NFF)

National Transport Commission (NTC)

NSW Ports

NT Department of Infrastructure, Planning, and Logistics

Patrick Terminals

Pilbara Ports Authority

Port of Brisbane

Port of Melbourne

Port of Newcastle

Ports Australia

Ports Victoria

Qube Holdings Limited

Salta Properties

Shipping Australia Limited (SAL)

Simplified Trade System Implementation Taskforce (STS Taskforce)

Svitzer Australia Pty Ltd

TasPorts

The Office of the Australian Small Business and Family Enterprise Ombudsman (ASBFEO)

Transport for NSW (TfNSW)

Transfleet Transport

Federal Maritime Commission, US

Victorian Skills Authority (VSA)

Victorian International Container Terminal (VICT)

Victorian Transport Association (VTA)

WA Department of Transport

Wyndham City Council

B. Restrictive content in container terminal enterprise agreements

B.1 Introduction

Chapter 9 sets out the Commission's view that enterprise agreements (EAs) in container terminals contain content that leads to overly inflexible and prescriptive work arrangements. These arrangements impede efficient resource allocation and are harmful to productivity.

This appendix documents relevant clauses, supplementing the discussion in chapter 9. The conclusions the Commission has drawn (where relevant) and possible remedies are discussed in the chapter itself.

B.2 Recruitment, promotion and training are based on tenure, not merit

Container terminal EAs create a strong hierarchy of jobs. This hierarchy has two dimensions:

- employee grades or classifications — the role an employee will perform day-to-day, based on a set of tasks and competencies
- employment types, which vary from agreement to agreement but broadly follow the categories of permanent full-time, permanent guaranteed wage and casual set out in the Stevedoring Industry Award 2020 (Stevedoring Award) (cls. 8–11).¹

Time served appears to be the central factor in employees' advancement through these hierarchies, whether promotion to more senior, higher-paying roles or movement to preferred employment types (that is, from casual into permanent guaranteed wage into permanent full-time).

In addition, EAs usually place limits on outside recruitment and / or preference internal candidates.

As discussed in chapter 9, clauses in EAs that limit recruitment, promotion and training decisions combine to make it less likely that the most appropriate person for a job is working in it. Enabling employers to pick the most appropriate person for a job would contribute to enterprise productivity.

Examples of container terminal EA clauses that create the hierarchies and explanations of their operation are provided below.

¹ Permanent full-time employees have fixed rosters (although there is flexibility built into these). Guaranteed wage employees are permanent employees who usually have a much more flexible roster than permanent full-time employees. They may be entitled to a minimum or average number of weekly shifts, or an equivalent payment. (These positions are mostly called permanent guaranteed employees or variable salary employees in EAs). Casual employees are generally called supplementary employees (Stevedoring Award, cls. 9–10; MUA, sub. 59, pp. 98–99).

Promotion is largely based on time served

Most container terminal EAs set out how the roles in the terminal align to the grades in the Stevedoring Award and the business's own operational classifications. Box B.1 sets out an example drawn from the Hutchison Ports Australia and Maritime Union of Australia (MUA) Enterprise Agreement 2021 (Hutchison EA).

A hierarchy of roles is not unusual — hierarchies are found in EAs in many industries. What is unusual is the criteria used to determine when employees progress through the hierarchy in container terminal EAs.

Box B.1 – Alignment between grades and roles at Hutchison

Hutchison level	Stevedoring Award grade	Roles
1A	2	• New starter induction • General duties (lashing, pin/twistlock duties, spotting, wharf duties, basic clerical tasks and any other task as stipulated by the [Stevedoring] Award)
1	3	• Bus/first aid • Shuttle/straddle operator • Heavy fork operator
2	4	• Reefer monitor • Maintenance storeperson • [Automated stacking crane] operator • [Automated stacking crane] support • Reachstacker operator
3	5	• Crane operator • Allocator • Tower clerk • Lashing team leader
4	6	• Team leadership • Team leader yard • Team leader rail • Maintenance tradesperson • Senior clerk
5	7	• Shift coordinator

Source: Hutchinson EA, cl. 16.12.

The Commission understands that it is common industry practice for new employees to start as lashers (one of the most junior roles in the terminal), which at face value seems to apply irrespective of their skills and experience. For example, as noted in chapter 9, the EA for Hutchison's operations in Sydney states that

'[e]mployees starting employment after the commencement of this Agreement will be appointed to Level 1A following on from the Induction period' (cl. 16.13).

There are also restrictions in place which substantially limit how promotion decisions are made. Container terminal EAs usually include a points system which is used to determine promotion and they tend to reward time-served. An example from the Patrick Terminals Enterprise Agreement 2022 (Patrick EA) is presented in (box B.2). Similarly, DP World has a clause in its Brisbane EA stipulating the progress of employees through employment grades at prescribed times:²

All new [fixed salary employees] appointed to Shuttle post approval of this Agreement will be appointed to Grade 3 (Shuttle Carrier 2) for a period of 2 years. ... During this period an Employee will be upgraded to Grade 4 on shifts where they are operating the Shuttle, in accordance with Part A clause 12.4. After 2 years, subject to the Employee not having received a warning letter in the previous 12 months, the Employee will be permanently upgraded to Grade 4. Any Employee issued a warning letter in the previous 12 months will have their upgrade withheld for a period of 6 months (i.e., beyond two years). (DP World Brisbane Enterprise Agreement 2020 (DP World Brisbane EA), part B, cl. 2.1).³

Box B.2 – Promotion for Patrick Terminal's permanent, full-time employees

9.6 Promotion in Grades for [General Permanent] Employees

9.6.1 Where the vacancy to be filled involves promotion in grades the following selection criteria will apply:

- (i) The candidate must have the required skills;
- (ii) The candidate must not have received a final warning within the previous 12 months;
- (iii) Candidates will be allocated points on the following basis:
 - (A) 1 point for each month that the candidate has held the required ticket to a maximum of 60 points;
 - (B) 1 point each shift that the employee has been allocated to the position in the last 6 months, capped at 25 points. Periods of unavailability greater than 1 week will be prorated. For example, if an employee's average allocation exclusive of unavailability was two shifts per week and the employee's unavailability lasted for 4 weeks, 8 additional shifts (points) will be added, subject to the cap;
 - (C) 5 points deducted if the candidate been issued with a formal counselling notice within the previous 12 months;
 - (D) 10 points deducted if the candidate has received a written warning within the previous 12 months;
- (iv) Where two candidates have the same score the candidate with the longest length of service will be appointed to the job.

² DP World has separate EAs at its four container terminals.

³ At DP World, fixed salary employee means permanent, full-time employee. A shuttle or shuttle carrier is a similar piece of equipment to a straddle carrier, but its functions are more limited.

Box B.2 – Promotion for Patrick Terminal's permanent, full-time employees

- (v) To be appointed a candidate must be fit for the inherent requirements of the job. Where a candidate has an injury that means they are not fit for the inherent requirements of the job, but can satisfy the Company that they are expected to be fit to do so within 4 months, and would otherwise be selected for the role, the Company will hold the role for the candidate for 4 months. If after 4 months the candidate is fit for the inherent requirements they shall be appointed to the position, subject to the candidate's continued eligibility.

The agreement also includes port-specific variations to this clause. For example, in Fremantle, increased weighting is given to time served by removing the cap on points in 9.6.1 (iii) (A) and adding a condition that there will be '1 point for each month from the candidate's commencement of employment', also with no cap on points (part B: sch. 2 — Fremantle, Trial Fremantle Part B Arrangements, cl. 12.12; part B: sch. 2 — Fremantle, Default Fremantle Part B Arrangements, cl. 3.10).

In Melbourne, '[t]ime served performing relevant role (on upgrade basis) is a key factor in promotion' (Patrick, pers. comm., 4 July 2022). Clause 9.6.1 (iii) (B) permits workers to accrue half a point for each shift an employee has been allocated to and has a higher cap of 50 points, giving this criterion greater weight within the overall allocation of points (part B: sch. 3 — East Swanson dock, cl. 10).

Source: Patrick EA.

Agreement content limits external recruitment

In addition to requiring that new employees start employment at a lower grade than might be implied by their skill set, agreements also constrain external recruitment. For example, the Hutchison EA includes a clause which stipulates that internal candidates, where available, trained and suitable, will be preferred to external candidates (cl. 10.1). The MUA's (sub. 59, p. 110) view on this clause is that:

These words were included in the greenfield agreement between Hutchison and the MUA in 2013. No industrial action has been taken in pursuit of these claims. The employer has not sought to change them since that time.

However, this clause is not unique to Hutchison; the EAs at Patrick (cl. 9.4.1), VICT (sch. 7) and FACT (cl. 26.7.4) have similar clauses. Of course, it is not unusual for an employer to prefer to appoint from the current workforce rather than choose an external recruit. However, the agreements appear to codify this practice rather than leaving it to the employer's discretion. This adds to overall effect of container terminal EAs being highly prescriptive in how people are employed and how their labour is used.

As discussed in chapter 9 (box 9.2), there has been a great deal of public commentary about the 'family and friends' clause in the Hutchison EA (cl. 10.4), but this does not appear to be out of step with practices often found in workplaces across the economy.

Movement through employment types is also largely based on time served

The hierarchy of employment types in container terminal EAs means new hires begin as casuals before moving to permanent guaranteed wage employment and then permanent full-time employment.

For example, the DP World Melbourne Enterprise Agreement 2020 (DP World Melbourne EA) (cl. 3.7) sets out '[t]he career path is Supplementary to [variable salary employee] to [fixed salary employee] subject to meeting earnings and performance triggers'. In addition, the Flinders Adelaide Container Terminal Stevedoring Enterprise Agreement 2021–2025 (FACT EA) (cls. 26.6.1.3, 26.6.1.6) requires that workers serve a minimum of two years in each type of employment before promotion is possible (unless there are operational reasons for this to be shorter) and the final decision will be based on tenure.

Some agreements make clear that permanent employment is the preferred type of employment. For example:

- The Company recognises that [fixed salary employee] is the primary employment category. (DP World Melbourne EA, cl. 3.6)
- The Company aims to operate a competitive and sustainable business that can maximise permanent employees on a roster. (DP World Melbourne EA, cl. 3.8)
- The basis for any roster is to provide secure permanent rostered jobs and maintain as much regularity and predictability of working shifts as possible as well as the flexibility to ensure rostered shifts are generally worked within an Employee's existing skillset. (Victoria International Container Terminal Operations Agreement 2021 (VICT EA), cl. 7.4.1)
- The requirement for roster change may not only be based on changed working arrangements, but also be based on maintaining and increasing, where appropriate, permanent rostered jobs and ensuring shifts are generally worked within an Employee's existing skillset so that the integrity of the roster is maintained. (VICT EA, cl. 7.4.3)

Container terminal EAs can also explicitly favour certain types of employment arrangements in promotion decisions. For example, in the Hutchison EA (cl. 10.6), applicants who are already permanent full-time employees (called permanent rostered employees in the EA) will be appointed to higher positions first, followed by permanent guaranteed wage employees (also called permanent part-time employees), and finally, casual employees. The FACT EA (cl. 26.7.2) has a similar clause.

Access to training is also contingent on time served

As with the processes for promotions, many container terminal EAs set out training paths that lock in rigid career ladders.

The Stevedoring Award (sch. A) defines each grade in the hierarchy of occupations outlined above (box B.1) as attainment of the previous grade plus training. For example, '[a] Grade 4 employee is an employee who has attained the level of stevedoring employee Grade 3', has 'completed additional training and has demonstrated competence ... at this grade' and has 'been trained and selected for appointment to the classification of stevedoring employee Grade 4 in accordance with the operational requirements of the employer's enterprise'.

As with promotions, EAs typically set out points systems to determine which employees receive training. While these systems vary across EAs, they generally reward tenure and penalise some or all of disciplinary action, absenteeism (which would not be uncommon) and past skill acquisition. An example of such a system, from the FACT EA, is provided in box B.3. The Commission's point is that while tenure will often be a factor among many in deciding who receives training in a workplace and the type of training they might receive, the extent to which this one condition is emphasised in container terminal operations harms the relevant workers and lowers the efficiency of terminal operations.

Box B.3 – Example of a points system for access to training**Selection criteria for internal vacancies and training applied at FACT**

- 26.9.1 The selection criteria identified below will be used for promotional opportunities, training opportunities and secondments.
- 26.9.2 Priority for consideration will apply to existing [fixed salary employee], [variable salary employees], then supplementary employees, and the final selection will be made by management.
- 26.9.3 The criteria assesses candidates' applications using a total of 100 points. The table below determines application for various roles/opportunities. To avoid confusion, the panel discussions below are to differentiate between equal candidates. Where the panel discussion is not necessary/used, the relevant points will be awarded regardless.

	General Role/Task	Clerical	Relief/ Supervisor	Team Leader	Crane or Reach Stacker	Maintenance Department
Inherent Requirements	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Performance Panel/Feedback	25	25	25	25	25	25
Interview	N/A	N/A	N/A	N/A	N/A	N/A
Sub Panel Discussion with applicant	N/A	5	N/A	5	N/A	N/A
Trade/skills Sub Panel discussion with Application	N/A	N/A	N/A	N/A	N/A	10
Trainer Feedback	N/A	N/A	N/A	N/A	5	N/A
Availability	25	20	10	20	20	15
Absenteeism	25	25	15	25	25	25
Tenure	25	25	25	25	25	25
Total Points	100	100	100	100	100	100

Source: FACT EA, cl. 29.6.

B.3 Container terminal rosters are very complex raising questions about how well they accommodate flexibility for employers and certainty for employees

Container terminals operate 24 hours a day, seven days a week with three eight-hour shifts — day, evening and night. The rostering to accommodate these shifts is different for permanent full-time (fixed rosters) and permanent guaranteed wage and casual workers (flexible shift allocation).

In 2014, about 60 per cent of employees were estimated to be on fixed rosters. A further 39 per cent had permanent guaranteed wage roles with very flexible shift allocations, and 2 per cent were casual employees.⁴ While these data are dated, there is nothing to suggest the composition of the container terminal workforce has changed substantially in the intervening years.

Fixed rosters have some flexibility

All container terminal EAs have a fixed roster or rosters for staff involved directly in moving cargo on and off vessels (general operations roster) (box B.4).⁵

These rosters allocate workers to the day, evening or night shift, or rostered time off. Workers will also have days when they know they are working, but not which shift. Terminals notify workers which shift they are allocated to by a specified time before that shift starts.

These arrangements along with mechanisms to cancel or extend shifts build some flexibility into fixed rosters, albeit in a complex way. Approaches differ somewhat across operators and so the flexibility afforded is also likely to differ.

Box B.4 – Examples of fixed rosters

DP World's fixed roster for its Melbourne terminal and Hutchison's fixed roster for its Sydney terminal are two examples of how rostering in container terminals works for permanent full-time employees. Both use different approaches to provide flexibility for the operator and certainty for employees.

Irregular and grey-off days are ones where employees know they will (or could) be working on a particular day, but not which shift (discussed further below).

⁴ MUA refers to permanent guaranteed wage workers as irregularly engaged workers. Data excludes maintenance workers. Commission estimates based on MUA data (sub. 59, p. 99). Data does not add due to rounding.

⁵ Fixed rosters also apply for other employees — for example, maintenance workers, rail workers and electrical and mechanical officers (DP World Melbourne EA, Part B, cl. 1.5; DP World Sydney Enterprise Agreement 2020 (DP World Sydney EA), Part B, cl. 1.9; FACT EA, cl. 32.3; Patrick EA, part B: sch. 4 — Port Botany, cl. 5.2.3).

DP World Melbourne general operations roster for permanent full-time employees

Week	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
1	Day (D)	D	OFF	OFF	OFF	OFF	OFF
2	Irregular (I)	I	I	I	I	OFF	Evening (E)
3	E	E	E	E	E	OFF	D
4	D	D	D	D	D	OFF	OFF
5	OFF	OFF	Night (N)	N	N	N	N
6	Rostered Week Off						
7	D/E	D/E	D/E	OFF	OFF	E/D	E/D
8	E/D	E/D	OFF	E/D	E/D	E/D	OFF
9	D	D	D	D	D	D	OFF
10	OFF	I	I	I	I	I	OFF
11	E	E	E	E	E	OFF	D
12	D	D	D	D	OFF	OFF	OFF
13	OFF	OFF	N	N	N	N	N
14	Rostered Week Off						
15	D/E	D/E	D/E	OFF	OFF	I	I
16	I	OFF	OFF	D	D	D	D

Source: DP World Melbourne EA, Part B, cl. 1.1.

Hutchison Sydney operations roster for permanent full-time employees, roster 1

Week	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
1	E	E	GREY-OFF	OFF	N	N	N
2	N	N	OFF	GREY-OFF	GREY-OFF	OFF	D
3	D	D	D	D	D	OFF	OFF
4	N	N	N	N	OFF	E	E
5	Rostered Week Off						
6	E	E	E	OFF	OFF	GREY-OFF	OFF
7	D	D	D	D	OFF	D	D
8	GREY-OFF	OFF	E	E	E	E	OFF

Source: Hutchison EA, Part B: sch. 5 – Sydney Operations Rosters, cl. 1.2.

Working days where the shift is notified by a specific time

Container terminal operators use a variety of rostering arrangements where employees know they will (or could) be working on a particular day, but not which shift. These arrangements can include:

- day or evening shifts (or other combinations of two of the three shift times)
- irregular shifts where workers could be allocated to any of the three shifts
- ‘grey rostered off days’ (Hutchison EA, part B: sch. 5 – Sydney Operations Rosters, cl. 2.1) and ‘alteration of off days’ or ‘black days’ (Patrick EA, part B: sch. 1 – Brisbane, cl. 4; Patrick EA, part B: sch. 4 – Port Botany, cl. 5.3.2) — where a person has the day off, but is aware they could be asked to work if they have built up a certain amount of debits.⁶

These more flexible types of shifts also interact with ‘orders of pick’. For example, people who have a shift allocated in the roster (for example, day, evening or night) will be picked before people working on ‘black days’ (Patrick EA, cl. 22.6).

Notification periods vary between terminal operators. For example, for the day shift, container terminal agreements have a notification time between 1:45 pm and 5:00 pm the day before for a shift which starts between 5:00 am and 9:00 am⁷ (DP World Brisbane EA, part B, cl. 1.17.1; DP World Fremantle Enterprise Agreement 2020, part B, cl. 1.6.1; DP World Melbourne EA, part B, cl. 1.10.3; DP World Sydney EA, part B, cl. 1.20.1; FACT EA, cls. 23.6, 27.2.6; Hutchison EA, cls. 26.5–26.6; MUA, sub. 59, pp. 97–104; Patrick EA, cl. 22.12, part B: sch. 3 — East Swanson Dock, cl. 4.1; VICT EA cl. 32.10). And employers also have to follow safety rules about continuous shifts or multiple night shifts (FACT EA, cls. 27.2.1, 27.2.5).

Notification has been the subject of recent, lengthy industrial disputes. A major issue during the three-month strike at Qube’s Fremantle terminal in 2021 was employees seeking notification of a shift at 2 pm instead of 4 pm (Marin-Guzman 2021c).

Cancelling shifts enables operators to reallocate labour

Shifts can also be cancelled by a terminal operator. For example, in the DP World Port Botany terminal when there is no work available a permanent worker on a fixed roster can have their shift cancelled (part B, cl. 1.1.3(a)). Notification for cancellation follows the same rules as other shift allocations (part B, cl. 1.1.3(e)), with the implication being that if something changes to lower the workload after a specified notification time, the shift will continue regardless.

Cancelled shifts become part of a system of shift credits and debits. Credits accrue when an employee works on a rostered day off: debits, when a shift is cancelled. There are differences between terminal operators on how shift debits are called in. One example is Hutchison’s grey rostered off days — workers have the day off unless they have over 23 ordinary hours in debit (Hutchison EA, part B: sch. 5 — Sydney operations rosters, cl. 2.1). Patrick has a similar arrangement (Patrick EA, part B: sch. 4 — Port Botany, cl. 5.3.2).

Depending on the operator, a person’s debits can also determine the likelihood of their shift being cancelled:

Subject to primary skills, employees with the lowest number of cancellations will be cancelled prior to those with the higher number of cancellations. (DP World Melbourne EA, part B, cl. 1.1.3(m))

Similarly, a person ‘working up’ credits is placed further down the order of pick (that is, which workers get allocated to a shift) (Patrick EA, cl. 22.6).

⁶ How debits and credits work is discussed in more detail below.

⁷ For weekend work, notification happens on Friday afternoon.

There are some limits to the flexibility provided to operators to cancel shifts. At DP World (pers. comm., 18 July 2022), for example, a recent change means there is now some flexibility to cancel shifts, however, there are limits on how often that can occur. At DP World's Port Botany terminal (part B, cl. 1.1.3(b)) a worker on a fixed roster can have up to six shifts cancelled in a year, while at their Melbourne terminal the limit is eight (part B, cl. 1.1.3(b)). Because this is a relatively new arrangement, the effect is still being worked through.

Extending shifts is another potential source of flexibility

The standard shift length of eight hours can be extended by up to four hours by the terminal operator, subject to maintaining employee health and safety. An employee can refuse 'unreasonable' overtime.

An extension is notified during the eight hour shift and compensated for with overtime rates (see, for example, Hutchison EA, cl. 27 and Patrick EA, cl. 23). Outside of public holidays — which receive greater compensation — overtime ranges from double to triple time and a half; arrangements which reflect the Stevedoring Award (Hutchison EA, cl. 27; Patrick EA, sch. 6).

There can also be caps on the number of shift extensions an employee can be required to work in a week. For example, at DP World Port Botany (part B, cl. 1.18.6) this is capped at two.

Part of the workforce has flexible shift allocations

The work arrangements for permanent guaranteed wage employees provide a high degree of flexibility about the deployment of labour, but not necessarily labour costs because they are often provided with minimum salary guarantees (box B.5). For example, at Patrick, a guaranteed wage employee is an employee '... on a fully irregular roster who has a minimum annual guarantee and terms and conditions in accordance with this Agreement' (sch. 10).

Box B.5 – Example of a guaranteed wage employee roster

At DP World's Sydney terminal, the arrangements for permanent guaranteed wage employees (called variable salary employees) are totally irregular, but the EA provides an indicative roster.

Whilst the Agreement provides for [variable salary employee]'s to be totally irregular in terms of allocation to work, the Company agrees to continue to provide an indicative roster of work for [variable salary employee]'s over a 4-week period in accordance with the following table (cl. 12.4.1)

Indicative roster for variable salary employees

Week	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
1	I/OFF	D/OFF	D/OFF	D/OFF	D/OFF	D/OFF	D/OFF
2	D/OFF	N/OFF	N/OFF	N/OFF	N/OFF	N/OFF	N/OFF
3	N/OFF	E/OFF	E/OFF	E/OFF	E/OFF	E/OFF	E/OFF
4	E/OFF	I/OFF	I/OFF	I/OFF	I/OFF	I/OFF	I/OFF

Source: DP World Sydney EA, Part B, cl. 12.4.1.

Some container terminal operators have caps on the number of permanent guaranteed wage and casual employees. For example, at Hutchison's Brisbane terminal (categories of employment — Brisbane, cls. 2.1.2–2.1.3), the number of permanent part-time employees is capped at 48. This cap will fall to 40 if eight permanent guaranteed wage employees are promoted to full-time permanent employees. The number of casual employees is capped at 50 (categories of employment — Brisbane, cl. 3). At their Sydney terminal (categories of employment — Sydney, cl. 2.1), there is no cap on permanent part-time employees and the number of casual employees is capped at 30. The FACT EA limits the proportion of employees that have flexible shift allocations:

The parties have agreed to maintain a minimum of 51% of the operational workforce employed as [fixed salary employees]. The remaining 49% can be made up of irregularly engaged employees. (cl. 26.1.5)

At Patrick's Brisbane terminal, the EA stipulates that of the 195 new employees to be recruited after the commencement of the EA, 92 will be full-time permanent employees, 67 will be grade 2 permanent employees and 36 will be permanent guarantee employees (part B: sch. 1 – Brisbane, cl. 18).

B.4 EAs contain strict rules about which employees can be picked for a shift

All container terminal operators in Australia and at least one towage company have a clause (or clauses) in all or some of their EAs which specifies the order of pick (DP World Melbourne EA, part B, cl. 1.11; FACT EA, cl. 27.2; Hutchison EA, part B, sch. 6, cl. 9.1; Patrick EA, cl. 22.6; Svitser, sub. 5, p. 6; VICT EA, cl. 32.6). As discussed in chapter 9, these clauses contain detailed prescriptions about which types of employees can be rostered on for a shift, generally requiring employees to be picked in the order of permanent full-time, permanent guaranteed wage and then casual (MUA, sub. 59, p. 107).

The level of complexity and prescription differs between operators. For example, the Hutchison clause for its Brisbane operations (box B.6) is at the more complex end of the scale.

For some operators, the order of pick also differs between their operations in different ports. Some EAs — for example, Patrick (cl. 22.6) and VICT (cl. 32.6) — have a relatively high degree of flexibility, with clauses stipulating that '[n]othing shall prevent the Company [from] varying this sequence to accommodate skill, cost or abnormal circumstances etc'.

Box B.6 – Hutchison order of pick clause for its Brisbane operations

9. Order of pick

9.1 The following will be the order in which Employees are allocated. The steps shall be followed in order by the Allocator at all times:

9.1.1 Employees on the PFR [permanent fixed roster] working rostered shifts

9.1.2 Employees on the PFR working N/IRR [night/irregular] shifts or PFR Employees with the lowest number of A/WE [available/weekend] shifts worked

9.1.3 Employees on the PFR working payback hours

Box B.6 – Hutchison order of pick clause for its Brisbane operations

- 9.1.4 Employees on the PFR working Day for Day
- 9.1.5 Permanent Part Time Employees working to the Minimum Weekly Salary of 16 hours
- 9.1.6 Employees on the PFR working for credit
- 9.1.7 Permanent Part Time Employees working Additional Hours
- 9.1.8 Supplementary Employees
- 9.1.9 Employees on the PFR working voluntary Overtime
- 9.1.10 Permanent Part Time Employees working Overtime

Source: Hutchison EA, part B, sch. 6, cl. 9.1.

B.5 EA clauses constrain subcontracting

Chapter 9 discusses the existence in container terminal EAs of clauses that aim to regulate the use of labour hire and contractors. Box B.7 provides an example of such a clause, from the DP World Melbourne EA. DP World noted in its submission that the operation of the clause has been the subject of a dispute determined by the Fair Work Commission (FWC) in *Construction, Forestry, Maritime, Mining and Energy Union v DP World Sydney Ltd* [2019] FWC 4884 (DP World, sub. 49, p. 55).

Box B.7 – DP World outsourcing clause for its Melbourne operations

32.0 Outsourcing

- 32.1 It is not the intention of the Company to engage any additional contractors to supply personnel to fill any jobs, duties, functions or related tasks covered by the Agreement.
- 32.2 Core equipment and tasks (e.g. [quay crane], [automated straddle carrier], Straddle, Cargo Care, [rubber tyred gantry] and lashing) shall continue to be maintained/performed/operated by employees covered by this Agreement.
- 32.3 If Employees covered by this agreement are appropriately skilled, have the capability and capacity to perform the work they will be the first considered to perform the task, prior to engaging contractors.
- 32.4 Specialist maintenance tasks may be outsourced after consultation, with the nominated employee representative, in accordance with the following checklist:
 - a. Verify that maintenance employees lack the appropriate skills, time or qualifications;
 - b. The name of the contractor and the type of work is identified;
 - c. The likely duration of the contractor's engagement is identified; and
 - d. That all contractors are appropriately qualified.

Box B.7 – DP World outsourcing clause for its Melbourne operations

- 32.5 It is not the intent of the Company to reduce the number of Permanent Maintenance employees conducting existing work.
- 32.6 The parties recognise the following tasks are currently outsourced:
- a. Cleaning;
 - b. Security;
 - c. Linemarking; and
 - d. Certain maintenance tasks.
- 32.7 It is the intention of the Parties to continue to have core equipment maintained through the engagement of in house permanent Tradesmen (Electrical and Mechanical), other than specialist tasks which may/will continue to be handled by suppliers, contractors and other parties.
- 32.8 The Company will undertake an annual skills audit and after assessment, providing additional, training, skills and experience to the existing Maintenance staff to deliver optimised maintenance outcomes and opportunities.
- 32.9 Where the use of contractors exists within the classifications covered by this agreement, the parties shall discuss where training and skills development could be considered for existing maintenance staff with the aim of removing or reducing the need for outsourcing or contracting out. These discussions shall be directed at ensuring the achievement of cost effective, efficient and optimised maintenance outcomes for the Company. Discussions will include consideration of the merits of training and skills development against the ad hoc requirement to use contractors or outsourcing arrangements including the cost of training against the frequency/currency of skills use.
- 32.10 Where existing and/or contractual arrangements are in place, these shall continue. This does not prevent the parties discussing the arrangements currently in place, as outlined in the paragraph above.
- 32.11 Where tasks are outsourced or contractors engaged the Company will provide the [Employee Representative Committee]/Site Committee updates on forecasted length of engagement and reasons for continued use.
- 32.12 Notwithstanding the above, any Employee (Permanent or casually engaged) may be required to carry out any normally outsourced task as directed by management.
- 32.13 For the avoidance of doubt, this clause is not intended to act as a prohibition or limitation on the use of contractors or outsourcing (whether referred to or not in this clause).

Source: DP World Melbourne EA, cl. 32.0.

B.6 Decisions to automate processes are constrained by EAs

Container terminal EAs impose a range of requirements in relation to automation and technological change. They vary in the extent to which they impose prerequisites or impediments to automation.

Consultation terms generally prescribe a process that must be followed, including triggers for commencement and timeframes. In relation to consultation, the EAs for DP World (sch. 4) and Patrick (sch. 11 — technological change, cl. 1.2.3) both require nine months of consultation, while the Hutchison EA requires 12 months (cl. 8.2). Examples of elaborate (and very similar) consultation processes around automation can be found in the Patrick EA (sch. 11) and the agreements covering DP World's Sydney (sch. 4) and Melbourne (sch. 4) operations. For example, DP World's Sydney EA (box B.8) requires consultation with an independent panel comprised of both an employer and employee appointed representative to have the final say in the event of disagreement (sch. 4, cls. 4.1.7, 4.1.9) (see also Patrick EA, sch 11; Hutchison EA, cl. 8).

Container terminal agreements also provide for redundancies resulting from technological change to be dealt with differently from other redundancies. Under the Patrick (sch. 11, cl. 1.3–1.4) and DP World Sydney (sch. 4, cl. 4.4) EAs, redundancies resulting from automation or other technological change attract an additional payment of 12 and 15 weeks' pay respectively. As noted in chapter 9, the Hutchison EA (cl. 8.4) provides that 'no employee shall be made redundant due to the implementation of automation and/or technology or mode change', although employees' hours can be reduced (cl. 8.5).

As discussed in chapter 9, the complex consultation terms are of greater concern because those requirements can create significant impediments to the making or implementation of business decisions about the introduction of the automation.

Box B.8 – DP World Sydney EA 2020 automation clause

Schedule 4 — Automation

- 4.1 In the event that the Company elects to introduce a significant change to the mode of operation at a terminal during the life of the Enterprise Agreement, the process outlined below will apply.
...
- 4.1.3 The Parties will then immediately commence discussions regarding the Mode Change. The discussions will commence no later than nine (9) months in advance of the scheduled go live date.
- 4.1.4 The Parties, in the first instance will seek to reach agreement regarding roles, rosters, labour arrangements and requirements. The Parties agree that the hours of work shall be 32 hours per week, unless otherwise agreed by the Parties.
- 4.1.5 The Parties will make themselves reasonably available for intensive discussions between nine (9) months and six (6) months in advance of the scheduled go live date.
- 4.1.6 An Independent Panel will be formed and finalised at the commencement of intense discussions or no later than nine (9) months from the scheduled go live date.

Box B.8 – DP World Sydney EA 2020 automation clause

- 4.1.7 In the event that the Parties are unable to reach agreement the Parties will refer the outstanding points/issues to the Independent Panel for consideration.
- 4.1.8 The outstanding matters must be referred to the Independent Panel as early as six (6) months and as late as three (3) months in advance of the go live date of the new mode of operation.
- 4.1.9 The Independent Panel may conciliate if they determine it is an appropriate approach. The Independent Panel will be empowered by the Parties to arbitrate the outstanding issues. The Parties agree to be bound by the decision of the Independent Panel.

The consultation requirements contained in most container terminal EAs are well beyond the baseline consultation obligations required under the *Fair Work Act 2009* (Cth). The Act provides that agreements must include a term that requires the employer to consult with their employees about ‘a major workplace change that is likely to have a significant effect on employees; or a change to their regular roster or ordinary hours of work’ and allows for representation of employees for consultation purposes (s. 205). If no such term is included, the model consultation term (*Fair Work Regulations 2009*, sch. 2.3) (box B.9) is taken to be a term of the agreement (s. 205).

Notably, the model consultation term does not impose mandatory timeframes for consultations or discussion and, while requiring the employer to give genuine consideration to matters raised by employees, the final decision on whether to proceed with the change is retained by the employer.

Box B.9 – Model consultation term (*Fair Work Regulations 2009*, sch. 2.3)**Model consultation term**

1. This term applies if the employer:
 - a. has made a definite decision to introduce a major change to production, program, organisation, structure or technology in relation to its enterprise that is likely to have a significant effect on the employees; or
 - b. proposes to introduce a change to the regular roster or ordinary hours of work of employees.

Major change

2. For a major change referred to in paragraph (1)(a):
 - a. the employer must notify the relevant employees of the decision to introduce the major change; and
 - b. subclauses (3) to (9) apply.
3. The relevant employees may appoint a representative for the purposes of the procedures in this term.
4. If:
 - a. a relevant employee appoints, or relevant employees appoint, a representative for the purposes of consultation; and
 - b. the employee or employees advise the employer of the identity of the representative;
 the employer must recognise the representative.

Box B.9 – Model consultation term (*Fair Work Regulations 2009*, sch. 2.3)

5. As soon as practicable after making its decision, the employer must:
 - a. discuss with the relevant employees:
 - i. the introduction of the change; and
 - ii. the effect the change is likely to have on the employees; and
 - iii. measures the employer is taking to avert or mitigate the adverse effect of the change on the employees; and
 - b. for the purposes of the discussion — provide, in writing, to the relevant employees:
 - i. all relevant information about the change including the nature of the change proposed; and
 - ii. information about the expected effects of the change on the employees; and
 - iii. any other matters likely to affect the employees.
6. However, the employer is not required to disclose confidential or commercially sensitive information to the relevant employees.
7. The employer must give prompt and genuine consideration to matters raised about the major change by the relevant employees.
8. If a term in this agreement provides for a major change to production, program, organisation, structure or technology in relation to the enterprise of the employer, the requirements set out in paragraph (2)(a) and subclauses (3) and (5) are taken not to apply.
9. In this term, a major change is **likely to have a significant effect on employees** if it results in:
 - a. the termination of the employment of employees; or
 - b. major change to the composition, operation or size of the employer's workforce or to the skills required of employees; or
 - c. the elimination or diminution of job opportunities (including opportunities for promotion or tenure); or
 - d. the alteration of hours of work; or
 - e. the need to retrain employees; or
 - f. the need to relocate employees to another workplace; or
 - g. the restructuring of jobs.

Change to regular roster or ordinary hours of work

10. For a change referred to in paragraph (1)(b):
 - a. the employer must notify the relevant employees of the proposed change; and
 - b. subclauses (11) to (15) apply.
11. The relevant employees may appoint a representative for the purposes of the procedures in this term.
12. If:
 - a. a relevant employee appoints, or relevant employees appoint, a representative for the purposes of consultation; and
 - b. the employee or employees advise the employer of the identity of the representative;the employer must recognise the representative.
13. As soon as practicable after proposing to introduce the change, the employer must:
 - a. discuss with the relevant employees the introduction of the change; and

Box B.9 – Model consultation term (*Fair Work Regulations 2009*, sch. 2.3)

- b. for the purposes of the discussion — provide to the relevant employees:
 - i. all relevant information about the change, including the nature of the change; and
 - ii. information about what the employer reasonably believes will be the effects of the change on the employees; and
 - iii. information about any other matters that the employer reasonably believes are likely to affect the employees; and
 - c. invite the relevant employees to give their views about the impact of the change (including any impact in relation to their family or caring responsibilities).
14. However, the employer is not required to disclose confidential or commercially sensitive information to the relevant employees.
15. The employer must give prompt and genuine consideration to matters raised about the change by the relevant employees.
16. In this term:
- relevant employees** means the employees who may be affected by a change referred to in subclause (1).

Abbreviations

ABCC	Australian Building and Construction Commission
ABF	Australian Border Force
ABS	Australian Bureau of Statistics
ACL	Competition and Consumer Act 2010 (Cth) sch. 2 ('Australian Consumer Law')
AGSR	Australian General Shipping Register
AI	Artificial intelligence
AISR	Australian International Shipping Register
AIMPE	Australian Institute of Marine and Power Engineers
AMSA	Australian Maritime Safety Authority
ANZSCO	Australian and New Zealand Standard Classification of Occupations
ASC	Automatic stacking crane
ASIC	Australian Security and Investments Commission
BITRE	Bureau of Infrastructure and Transport Research Economics
CCA	Competition and Consumer Act 2010 (Cth)
CFMMEU	Construction Forestry Maritime Mining and Energy Union
CPPI	Container Port Performance Index
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cth	Commonwealth
DAFF	Department of Agriculture, Forestry and Fisheries
DAWE	Department of Agriculture, Water and the Environment
DEA	Data envelopment analysis
DESE	Department of Education, Skills and Employment
DEDJTR	Department of Economic Development, Jobs, Transport and Resource
DITRDC	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
DISER	Department of Industry, Science, Energy and Resources
ECP	Empty container park
ECWG	Empty Container Working Group
ESC	Essential Services Commission (Victoria)
ESCOSA	Essential Services Commission of South Australia
FACT	Flinders Adelaide Container Terminal
FMC	United States Federal Maritime Commission

FW Act	Fair Work Act 2009 (Cth)
FWC	Fair Work Commission
GDP	Gross domestic product
GPS	Global positioning system
HPA	Hutchison Ports Australia
HPV	High productivity vehicle
ICT	Information and communications technology
IMO	International Maritime Organisation
IoT	Internet of things
IPART	Independent Pricing and Regulatory Tribunal
IT	Information technology
MASS	Maritime autonomous surface ship
NTC	National Transport Commission
OECD	Organisation for Economic Co-operation and Development
PBLIS	Port Botany Landside Improvement Strategy
PCS	Port community system
RORO	Roll-on, roll-off
RTO	Registered training organisation
SME	Small and medium enterprises
TAC	Terminal access charge
TEU	Twenty-foot equivalent unit
TfNSW	Transport for New South Wales
THCs	Terminal handling charges
VBS	Vehicle booking system
VET	Vocational education and training
VTS	Vessel traffic services
WAPC	Western Australian Planning Commission
WHS	Workplace health and safety

Glossary

Term	Description
Accredited or formal training	A program of training leading to vocational qualifications and credentials that are recognised by the attainment of a formal qualification or award. This can include whole courses or selected modules of a course.
Air draft	Maximum overall height of a vessel when in the water, measured as a vertical distance between the waterline and the highest point on the vessel.
Automated stacking crane (or ASC)	An unmanned overhead gantry crane used in a container terminal, mounted on fixed rails and controlled automatically, used for stacking containers and loading or unloading them onto vehicles.
Automation	The technique of making an apparatus, process or system operate automatically, replacing (or significantly reducing) the need for human labour.
Beam	The width of a ship.
Berth	A ship's allotted space place where it can be moored and secured, and where it can be loaded and unloaded alongside a quay.
Berth window	The time window allocated to a ship to berth to load and unload cargo, primarily in relation to the scheduled arrival and dwell time allowed for working a ship at a container terminal.
Bill of lading	A document that establishes the terms of contract between a cargo owner and the shipping line. It serves as a document of title, a contract of carriage and a receipt of goods.
Blank sailing	An occurrence where a shipping line cancels the voyage of a scheduled service, or where certain scheduled ports are omitted along a particular route.
Blue-water	The area where activities are undertaken at sea, outside of the protected waters of ports and harbours.
Blue-water rates	Freight rates negotiated between the cargo owner and the shipping line for transportation between ports. These rates do not include ancillary charges levied by a shipping line, such as port specific 'terminal handling charges'.
Booking slot	The allocated time window for a landside transport operator to pick up or deliver a container to a container terminal.
Break-bulk cargo	Non-bulk cargo that is not containerised. It can include unitised cargoes as well as miscellaneous goods in boxes, bales, cases or drums. For example, assembled vehicles, steel coils and pallets of timber.
Bulk cargo	Cargo (such as coal, ore, sand or oil) that is carried loose, takes up the shape of the ship's hold and is handled by direct application of conveyors, grabs, pumps, elevators and so on.
Bulk carrier or bulker	A vessel designed to carry bulk cargo such as ore, coal, grain, crude oil or natural gas. It may be designed for 'dry bulk' or 'liquid bulk' cargoes.
Cabotage	The carriage of cargo directly between ports of a single nation.
Cargo owner	The person(s) or firm(s) engaged in the trade in goods and customers for import or export services. The cargo owner may act directly as the importer or exporter or engage agents such as a 'freight forwarder' to act on their behalf.

Term	Description
Carrier	A person or firm providing a transportation service, principally a shipping line or landside transport service provider.
Cartel	An association of competitors that, by agreement, limits the degree of competition that would otherwise prevail in the buying and selling of goods and services by members of the cartel.
Channel fees (also ship, navigation or conservancy fees or dues)	Charges by a port authority levied on a vessel for each harbor entry, usually on a per gross tonnage basis, to cover the costs of port infrastructure and marine facilities such as channels, buoys, beacons and vessel traffic management system. Ports may separately levy channel and conservancy/navigation fees depending on organisational and regulatory structures.
Common carrier	A person or firm that provides transportation of goods or passengers for a fee or reward, advertises its services as generally available to the public and usually provides scheduled services between specified locations. Common carriers are bound to accept any reasonable request to carry goods and are strictly liable for the loss or damage to cargo in their care.
Conference	A particular type of route-specific agreement between shipping lines regarding the provision of liner services and the carriage of cargo. Shipping lines agree to apply common freight rates, coordinate the scheduling of sailings and ports of calls, regulate capacity and allocate cargo and revenues.
Consortium	A group of shipping lines combining to deliver a shipping liner service under a 'vessel sharing agreement'.
Container line (or container shipping line)	A firm that provides containerised 'liner services'. These firms manage resources (including vessels and containers, that they may directly own or lease) to enable them to provide a network of regular container ocean freight services which they market to cargo owners.
Container terminal	A designated area within the port for the handling of containers and the working of container vessels, including the provision of vessel berths, quay cranes, areas for short term stacking and holding of containers, and interfaces with landside transport modes. The area also provides a secure zone for customs and border protection activities.
Container terminal operator	A firm that provides resources and co-ordinates activity associated with the unloading and loading of container vessels.
Container vessel	A ship specially equipped and divided into cells into which shipping containers can be stacked.
Contract carrier	A person or firm that is not a 'common carrier' and who, under special and individual contracts or agreements, transports cargo by private arrangement with a cargo owner for a fee or reward.
Crane intensity	Total number of allocated crane hours divided by the elapsed time from labour first boarding the ship to labour last leaving the ship. Crane intensity is an input to calculating 'net crane rate' and 'ship rate'.
Customs broker	A person or company, licenced by the government customs authority, to enter and clear goods through customs on behalf of a cargo owner.
Cut-off time	The latest time a container may be delivered to a terminal for loading onto a ship.
Data	Representations of facts that are produced by activity in an industry or system.
Dead weight tonnage (DWT)	The capacity of a vessel measured by tonnage when fully loaded.

Term	Description
Detention or demurrage	A penalty charge against a cargo owner for delaying transport equipment beyond an agreed free time allowance included in the transport agreement. Demurrage is used primarily in the context of delays to chartered vessels but may also be used in connection with delays to containers within a terminal. Detention is used for delays to containers outside of terminal.
Draft (or draught)	The depth of a ship while in the water, measured as a vertical distance between the waterline and the lowest edge of the bottom of a vessel.
Dry bulk	Loose, mostly uniform cargo such as a grain, ores, coal, fertiliser, and cement that is transported in bulk carriers.
Elapsed crane time	The crane time allocated by the container terminal operators. It is computed as the total allocated crane hours less operational and non-operational delays. Elapsed crane time is an input to calculating the 'crane rate'.
Elapsed labour rate	An indicator of labour productivity. The elapsed labour rate is computed as the number of containers handled divided by the 'elapsed labour time'.
Elapsed labour time	The elapsed time between labour first boarding a ship and labour last leaving the ship, less any time the labour has not worked, including non-operational delays. Elapsed labour time is an input to calculating 'elapsed labour rate'.
Empty container park (ECP)	A firm whose business is to store empty containers on behalf of container shipping lines. They may also provide ancillary services such as container cleaning, repairs and repositioning of containers to other parks or port terminals.
Flag or flag State	The jurisdiction under whose laws a merchant vessel is registered or licensed and is deemed to be the nationality of the vessel. The flag state is responsibly for regulation of manning levels, safety standards and consular representation aboard the vessel. A national flag is flown by the vessel as a means of identifying its nationality while engaged in international navigation.
Freight forwarder	A person or a company that organizes shipments for cargo owners to transport goods from the manufacturer or producer to a market, consumer or final point of distribution. The duties of the forwarder include but are not limited to booking space on the ship, providing all necessary documentation, and arranging customs clearance. Accredited forwarders may also act as a 'customs broker'. The forwarder may also arrange landside transport, storage and handling on the cargo owner's behalf.
General cargo vessel	A vessel that can accommodate a variety of cargo types, primarily loaded as break-bulk cargo.
Gross crane rate	The average number of containers (or TEUs) moved per gross crane hour. It is calculated as total container movements divided by the total hours all cranes worked (the time between the first and last lift).
Gross tonnage (GT)	A measure of a ship's overall internal volume, used primarily as a means of determining manning regulations, safety rules, registration fees and port fees. It is not a measure of a ship's mass (such as dead weight tonnage) or cargo capacity.
Harbourmaster	An officer in charge of vessel movements, safety, security and environmental issues within a port or other confined waters.
Higher-skill	Occupations based on ANZSCO skill levels 1 and 2 with a skill level commensurate with a diploma, bachelor degree or higher qualification.

Term	Description
Hinterland	An inland region over which a port sells its services and from which it draws cargo. Most ports will have a dominant market share over cargo within their hinterland, although the markets may be segmented by cargo type, commodity, capacity of transportation links and the service capabilities of competing ports (for example, the hinterland for liquid bulk services at a port may not be identical to that of container services).
Idle time (hours)	A measure of the average time that a ship spends in berth, net of the average time taken by the cranes to complete the loading and unloading operations.
Informal training	Unstructured training that usually occurs on the job through interactions with co-workers as part of day-to-day work, for example, on-the-job coaching, mentoring or reading on the internet.
Information	The meaning drawn from the facts represented by data
Infrastructure access charge	Now referred to as 'terminal access charge' (see below).
Inland port	An intermodal terminal facility located remotely from the port at which cargo owners can deliver or pick-up containers to connect directly to port container terminals and shipping services. These facilities are usually linked to the port by rail services.
Intermodal	Transport involving transfer between two or more modes to exploit the comparative advantages of each mode.
Internet of Things (or IoT)	'Internet of things' describes groups or individual objects with sensor processing ability and other technologies that connect and exchange data with other devices and systems over communications networks.
Landside	Geographic inland region beyond the landside port boundary. This encompasses activities undertaken by domestic logistics systems including road and rail.
Landside carriers or transport operators	Truck or rail operators who transport containerised goods between container terminals and the cargo owner's premises, and empty containers between cargo owner premises and empty container parks, under contract to the cargo owner.
Landside interface	The area within a container terminal that facilitates the exchange of containers between container terminal operators and landside carriers.
Landside port boundary	The line of delineation between port and landside activities. The boundary represents the point of interface between port and landside activity areas. It also acts as a jurisdictional and contractual boundary; for example cargo crossing the boundary from port to landside must be customs duty paid or moved under bond.
Lashing	The process of securing cargo (or containers) aboard a ship to ensure safe passage at sea, or the releasing of cargo bound to the ship to allow unloading.
Lashing bar	A metal pole of varying length with connectors at each end that allows containers to be lashed to a ship and each other when undertaking a sea voyage.
Length overall	The measure of a length of a ship from furthest point at the front (bow) to rear (stern).
Lift	The measurement of a movement undertaken when loading or unloading a single container on a vessel. Lifts may be from the vessel onto the wharf (import lifts), from the wharf to vessel (export lifts), or between locations on the same vessel for operational purposes (restow lifts).
Liner (vessel)	A ship sailing between specified ports on a regular basis, engaged in 'liner service'.

Term	Description
Liner service	A regularly scheduled, common carrier container service provided by a container shipping line.
Liquid bulk	Liquid product (such as crude oil, compressed gas or petroleum) that is loaded directly into a ship's hold, and handled using pipes, pumps and tanks.
Load factor	The capacity utilisation of a vessel measured in terms of full containers divided by the 'TEU capacity'.
Lower-skill	Occupations based on ANZSCO levels 4 and 5 with a skill level commensurate with completing year 10 or a Certificate I, II or III.
Marineside	Area for all on-water activities extending beyond the quayline of the port and within the harbour.
Medium-skill	Occupations based on ANZSCO level 3 with a skill level commensurate with a Certificate III with a minimum of two years training on the job or a Certificate IV.
Mooring	Process of securing ship to a quay using ropes (known as 'mooring lines').
Multi-purpose Vessel (MPV)	A vessel designed to handle a variety of cargo types that includes break bulk and containerised cargo. These vessels are favoured in trades with thin volumes and constraints at small ports (such as islander trades) where there is insufficient demand to economically support purpose built container, bulk or RORO vessels.
Net crane rate	The average number of containers (or TEUs) moved per net crane hour. It is calculated as total container movements divided by the total hours all cranes worked (the time between the first and last lift) less any operational and non-operational delays.
On-berth hours	An indicator of the time a ship spends in berth. It is the elapsed time between the time a ship arrives at berth and the time of its departure from berth.
Onsite training	Any accredited, unaccredited or informal training which occurs onsite. This can either be accredited training delivered by an in-house RTO, an external RTO coming onsite or any unaccredited and informal training taking place onsite.
On-water roles within ports	Roles involved with the movement of a ship in and out of the harbour and include jobs such as marine pilots, tugboat pilots and engineers and harbour masters.
Pilotage	The act of assisting a ship's master with navigation through confined waters, including entering and leaving a port.
Port community system (or PCS)	A technology that enables the sharing of document information between stakeholders that interact in or with a port. A PCS allows public and private stakeholders to upload documents to a single online platform and provides visibility over the status and content of these documents.
Port rotation	The order in which a 'liner service' visits each port in a round trip voyage, for example Singapore–Brisbane–Sydney–Melbourne–Adelaide–Fremantle–Singapore. The port rotation dictates the transit time for cargo between any two origin-destination ports.
Port state	A nation that is party to international port state control agreements; that undertakes the inspection of foreign ships to verify safety and environmental compliance and can enforce international regulations onboard substandard vessels.
Port waters	Area of on-water activity controlled by the port.
Quay crane	A large, rail mounted crane capable of moving along the wharf to load and unload ships. This term is used primarily to refer to specialised container gantry cranes (also known as ship to shore cranes) used in container terminals.

Term	Description
Quayline	Line of delineation along at the waterside edge of a wharf. The quayline represents the point of interface between land and water based activities. It also acts as a jurisdictional and contractual boundary; for example health and safe regulations on either side of the quayline are managed by different regulators, although stevedores may work across this boundary when unloading ships.
Quayside	Land area within the port between the quayline and landside port boundary where cargo is handled and may be stored temporarily when being exchanged between ships or landside transport modes.
Rail mounted gantry	An overhead gantry crane mounted on fixed rails, used for loading and unloading vehicles and stacking containers in a container terminal.
Reach stacker	A type of container handling equipment with an extendable hydraulic boom which is used to move and stack containers, and to load and unload trucks and trains.
Reefer	Refrigerated container.
Roll on, roll off (RORO)	A type of vessel design for handling wheeled cargo, in particular cars and trucks. Other types of cargo can be accommodated using special trailers. These vessels are fitted with multiple decks and ramps (similar to a multi-story carpark) and can be loaded and unloaded by driving cargo across a ramp connection to the wharf. Many RORO vessels for new cars are operated in liner services similar to container shipping lines.
Rolled cargo	Containerised cargo that is rescheduled by the container shipping line from its original booked voyage and moved (rolled-over) to a later service.
Rubber tyred gantry (or RTG)	An overhead gantry crane using tyres and guideways, used for loading and unloading vehicles and stacking containers in a container terminal.
Ship	A large, ocean going vessel fitted out for the carriage of goods or passengers.
Ship rate	The average number of containers (or TEUs) moved on or off a ship in an hour. This can either use a gross or net measure of time. It is calculated as the (net or gross) crane rate multiplied by the average number of cranes used ('crane intensity').
Shipper	See 'cargo owner'.
Shipping line	A firm that provides ocean freight transportation services, coordinating resources (which it may own, lease or sub-contract) to sell to cargo owners. Shipping lines will also accept obligations for carriage of goods including international conventions applicable to an ocean 'bill of lading'. Most shipping lines will focus on specific regions or cargo types (for example dry bulk, liquid bulk, or containerised cargo), although major lines operate globally and may provide diversified shipping and logistics services.
Shipping register	Record maintained by a nation state, in accordance with international maritime conventions, that gives registered ships a distinct nationality, state flag and identity (name) when engaged in international navigation.
Shuttle carrier	A type of container terminal handling equipment that can lift and transport containers between its legs without the need for rails or guideways. However, it has limited ability to stack containers unlike the similar 'straddle carrier'.
Sliding	A strategy adopted by shipping lines where, following service delays, they attempt to recover advertised sailing schedules by slowing down a delayed vessel to arrive in port at the time of

Term	Description
	the subsequent schedule service call. While this may result in delays to some cargo on the current voyage, it enables subsequent voyages to return to schedule.
Slot	Space within a container cell on a vessel for a container.
Slot charter	Agreement by one container shipping line to buy bulk space or slots on a vessel owned or managed by another container shipping line.
Staging	The breaking of a container journey between the port and cargo owner's premises into two or more trips via a container carrier's depot.
Stevedore	A dock worker engaged in the loading and unloading of a ship. This primarily relates to the manual handling of cargo (particularly bulk or break bulk commodities). Dock workers using mechanical equipment in container terminals are also known as 'operators'.
Stevedoring company	A firm that employs dock workers to load and unload ship's cargo, which may be bulk, break-bulk or containerised. (In common usage these firms may also be referred to collectively as 'stevedores').
Straddle carrier	A type of container terminal handling equipment that can lift, transport and stack containers between its legs without the need for rails or guideways. Various sizes can stack containers two, three or four units high.
Sweeper vessel	An unladen container ship intended to evacuate empty containers from a port.
Tanker	A vessel specifically designed to handle liquid bulk products. Vessels may have only a single tank for a specific commodity (for example, crude oil or natural gas tankers) or have multiple tanks to carry a variety of liquid commodities.
Technical efficiency	The measure of effectiveness with which a given set of inputs is used to produce an output. A firm is said to be technically efficient if a firm is producing the maximum output from the minimum quantity of inputs, such as labour, capital, land and technology.
Terminal access charge (TAC)	Charges collected by container terminal operators from landside transport operators when collecting or delivering laden (i.e. not empty) containers. Previously known as infrastructure access charge.
Terminal handling charge (THC)	Charges issued by shipping lines to cargo owners to recover the costs involved in the handling of a container at a port terminal. Shipping lines may allocate different input costs to their contract freight rates and THCs depending on local agreements and mix of business with different ports and container terminals operators.
TEU capacity or TEU intake	Volumetric measure of the nominal maximum number of container slots on a container vessel. Operational capacity is usually below stated TEU capacity, being limited by the combined mass of cargo and containers relative to the ships 'dead weight tonnage' and permitted 'draft' when navigating port channels.
Trade lane (or trade)	The geographic origin/destination regions which shipping services connect, for example, China–Europe or Australia–Singapore.
Transshipment	The transfer of cargo from one vessel to another at an intermediate port between the port of origin and the final destination port.
Twenty-foot equivalent unit (TEU)	A standard unit of measurement for shipping containers. One TEU is equivalent to one 20-foot international shipping container. One 40-foot international shipping container is equivalent to two TEU.

Term	Description
Twistlock (or box connector)	A device used to attach containers to the deck of a ship or to each other, to ensure they are loaded securely onboard a ship. The device interlocks with standard dimensional locking points at the corner of each container. Road and rail equipment is also able to be fitted with similar devices to permit intermodal transportation.
Unaccredited training	A program of structured training or instruction that does not lead to the attainment of a formal qualification or award, for example, short courses, product-specific training and industry- or organisation-specific training. This could also include a training package tailored to the needs of a business delivered by a registered training organisation (RTO).
Under bond	Cargo moving or stored under customs control where duty has not yet been paid and the cargo has not been released to the cargo owner.
Vehicle booking system	Electronic system used by container terminals to manage appointments for vehicles to pick up and deliver containers in predefined 'booking slots'.
Vessel	Common term for watercraft, which includes boats, ships, yachts and barges.
Vessel sharing agreement	A route-specific agreement between shipping lines regarding the provision of liner services through the co-ordination of resources and allocation of vessel capacity. Shipping lines agree to coordinate the scheduling of sailings and ports of calls, provision of vessels by each party to the service, and allocation of capacity on each voyage for parties to the agreement. Setting of freight rates, container revenues and direct vessel operating costs remain the responsibility of the individual shipping lines.
Vessel traffic service(s) (VTS)	System used by port managers, usually under control of the harbourmaster, to track and schedule vessels through confined or port waters and manage safety and protect the port environment. The system may also co-ordinate pilots, tugs and other vessel support services when entering or leaving port.
Voyage	A vessel's unique journey between ports. For a liner service, this would be each trip around the scheduled port rotation.
Wharf (or quay)	A structure built alongside the water to allow ships to berth and to provide an area for the loading or discharge of ships cargo. A wharf can be divided into multiple berth locations that may accommodate a variety of lengths of ship.

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