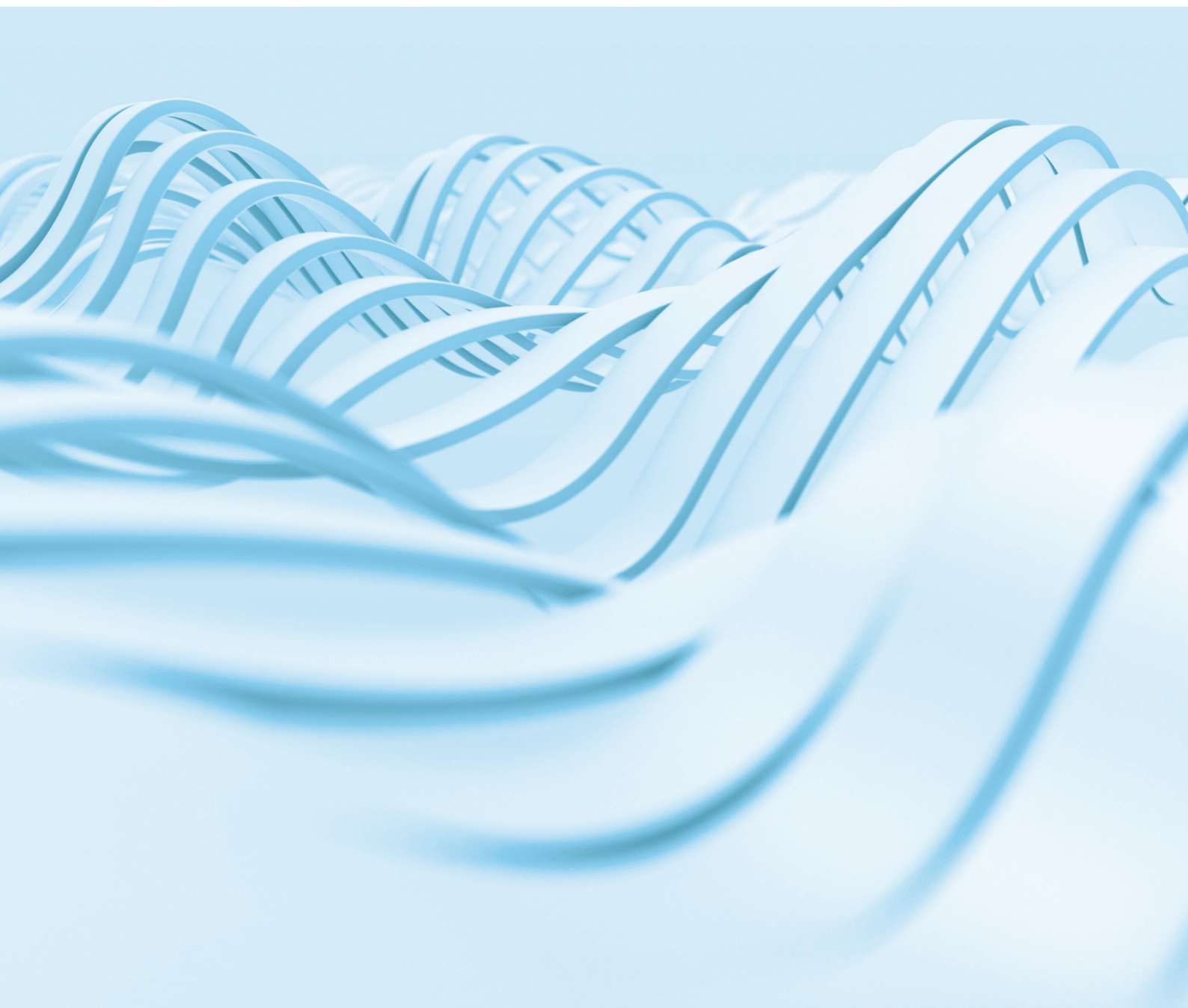




5-year Productivity Inquiry: A competitive, dynamic and sustainable future

Interim report



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.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

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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 interim report and comment on it by written submission to the Productivity Commission, preferably in electronic format, by 21 October 2022.

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

The Commission will prepare the final report after further submissions have been received and discussions held with participants. The Commission will forward the final report to the Government in February 2023.

Public hearing dates and venues

Dates and venues will be listed on the inquiry website once confirmed.

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:

Michael Brennan	Chair
Alex Robson	Commissioner
Stephen King	Commissioner
Lisa Gropp	Commissioner

Terms of reference

I, Josh Frydenberg, Treasurer, pursuant to parts 2 and 3 of the *Productivity Commission Act 1998*, hereby request that the Productivity Commission undertake an inquiry into the Australia's productivity performance and provide recommendations on productivity-enhancing reform. This inquiry is the second of a regular series, undertaken at five-yearly intervals, to provide an overarching analysis of where Australia stands in terms of its productivity performance. The first report, *Shifting the Dial* was completed in 2017.

Background

Australia's economy has performed strongly in recent decades enjoying robust growth in incomes and living standards following 28 years of consecutive economic growth interrupted by the COVID-19 pandemic. Australia's economic recovery from the pandemic has been world leading however to ensure Australians continue to enjoy higher living standards, we need to continue to focus on the task of lifting productivity.

Productivity growth is vital for Australia's future, particularly as the Australian and global economies emerge and begin to recover from the economic impacts of COVID-19. The 2021 Intergenerational Report makes it clear that future growth in income and living standards will be driven from productivity growth as the participation effects of young migration are offset by an ageing population. Global and domestic productivity growth in recent decades however has slowed. Changes brought about by the COVID-19 pandemic and the global and domestic policy responses will also provide a unique historical context for this Review.

Given the scale and nature of the economic shock caused by the COVID-19 pandemic, it is expected to have an enduring impact on Australia's productivity challenge. The acceleration in the uptake of technology by business and individuals has stimulated growth in remote work, online commerce, businesses' digital presence and innovative delivery of public services like health and education. The pandemic has affected business models in some key sectors and underscored the need for labour mobility across the economy.

In this environment, Australia needs policy settings that foster a flexible and dynamic economy, that is able to adapt in the face of economic challenges and opportunities. Policy settings should encourage the economy to adapt to the growing importance of digital technologies, including through developing a skilled labour force. They must also be forward looking and support an environment that promotes economic dynamism, entrepreneurship and appropriate risk-taking, and innovation and technological adoption.

Against this background, the Review can play a critical role in making high-value and implementable recommendations to support Australia's productivity growth. Lifting Australia's productivity growth will involve a combination of economy-wide and structural reforms, in addition to targeted policies in particular sectors to push Australian industries closer to the global frontier.

Scope of the inquiry

The Commission is to review Australia's productivity performance and recommend an actionable roadmap to assist governments to make productivity-enhancing reforms. Each recommendation should qualitatively and quantitatively estimate the benefit of making the reform and identify an owner for the action and a timeframe in which it might occur.

Without limiting related matters on which the Commission may report, its report to the Government should:

1. Analyse Australia's productivity performance in both the market and non-market sectors, including an assessment of the settings for productive investment in human and physical capital and how they can be improved to lift productivity.
2. Identify forces shaping Australia's productivity challenge as a result of the COVID-19 pandemic and policy response.
3. Consider the opportunities created for improvements in productivity as a result of Australia's COVID-19 experience, especially through changes in Australia's labour markets, delivery of services (including retail, health and education) and digital adoption.
4. Identify priority sectors for reform (including but not limited to data and digital innovation and workforce skills) and benchmark Australian priority sectors against international comparators to quantify the required improvement.
5. Examine the factors that may have affected productivity growth, including domestic and global factors and an assessment of the impact of major policy changes, if relevant.
6. Prioritise and quantify the benefit of potential policy changes to improve Australian economic performance and the wellbeing of Australians by supporting greater productivity growth to set out a roadmap for reform.
7. Revisit key recommendations and themes from the previous five yearly review in light of the above, where relevant.

The Commission should have regard to other current or recent reviews commissioned by Australian governments relating to Australia's productivity performance and include comparisons of Australia's productivity performance with other comparable countries. The Commission should support analysis with modelling where possible and qualitative analysis where data is not available, and this is appropriate.

Process

The Commission should consult widely and undertake appropriate public consultation processes, inviting public submissions. The Commission should actively engage with Commonwealth, and state and territory governments. The final report should be provided to the Government within 12 months of receipt of these terms of reference.

The Hon Josh Frydenberg MP
Treasurer

[Received 7 February 2022]

Acknowledgements

The Commission acknowledges and thanks Hudan Nuch, Gwendaline Jossec, Cameron Eren, Anand Bharadwaj, Toby Markham, Andy McClure, James Smith, Shelby So and Jonathan Vandenberg for their work on this interim report and its underlying analysis. Rosalyn Bell and Commissioners Martin Stokie and Joanne Chong provided guidance and input to this interim report.

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Foreword

Productivity growth is determined predominantly by decisions taken by people in businesses: about what they produce and how they produce it; about adopting new ideas, technologies and processes; and about developing new and better-quality goods and services.

Business decisions reflect the commercial incentives and environment they face. And while such decisions are not directly defined by government policy, they certainly are enabled, influenced or constrained by it.

The challenge for policy is to ensure that businesses face market prices that are not unnecessarily distorted and ideally are broadly reflective of social costs. This encourages productivity enhancing decisions. It enables productive firms to flourish, and resources to shift to their highest valued uses. Most fundamentally, this requires an open economy with dynamic, contestable and flexible markets.

There are a number of headwinds and trends warranting attention. Some are global and largely beyond our sphere of direct control or reflect structural changes — such as the continuing shift to a services-based economy. How we respond to these forces will be critical for the settings facing businesses to deliver future productivity growth.

- **Significant uncertainty pervades the global trade landscape** resulting from both the pandemic and geopolitical tensions. While supply-chain issues need to be dealt with, businesses generally have the incentive and capacity to do so efficiently. The need for economic resilience must not veil revitalised protectionism or selective industry policy, given the inefficiency and rent-seeking they can bring.
- **Investment growth has been subdued in recent decades likely driven by a variety of global and local factors.** Historically, capital deepening has been a major source of labour productivity growth and goes hand in hand with innovation. Removing undue barriers to investment, particularly the unintended effects of policy and regulatory settings, will be important going forward. In addition, **Australia's full employment conditions underscore the importance of having resources used optimally** and the need for rigorous assessment of public investment.
- **Trend declines in aggregate measures of competition and business dynamism are cause for vigilance, but a more micro lens is required.** While a well-functioning regulatory regime plays a vital role, promoting contestability and competition will require other policy levers, including openness to FDI and trade, particularly in services. Industry-specific interventions will be particularly influential in those services where governments already have a significant role in the market.
- **Climate change and global decarbonisation efforts will entail costs, uncertainty, and opportunities.** In adapting to the physical risks of climate change, governments must avoid locking in development pathways that lead to higher future costs. Least cost transition to a net-zero emissions economy will require more consistent price signals, credible offset markets, and transparency to promote alignment between the vast array of policy programs.

The Commission invites stakeholders to respond to all issues raised in this interim report. As an interim report, it reflects our early findings. And while it does not include a detailed review of all relevant policy levers, stakeholders should not feel constrained in their responses.

1. Competitive and dynamic markets

Key points

- ✱ **Competitive and dynamic markets drive productivity growth. They do this by rewarding and encouraging businesses to develop new and better-quality goods and services, or adopt more efficient production methods.**
 - Relatively slow investment growth, dampened business dynamism and limited competitive pressures in the burgeoning government-dominated services industries are likely to be acting as a collective handbrake on Australia's productivity growth.
- ✱ **Efficient investment and productivity go hand in hand. Yet business investment as a share of GDP has declined relative to its long-run average in Australia, as it has across a number of advanced economies. This likely reflects both structural and cyclical factors.**
- ✱ **Policy should not attempt to 'reverse' long-term structural shifts, such as the growth of the services economy. Nor should policy promote investment at any cost. However, the potential dampening effects of some policy and regulatory settings, often hidden and unintended, warrant attention.**
 - Public investments should always be rigorously assessed for social net benefits especially when the opportunity costs of scarce labour and other resources are at a premium. In the absence of net social benefits, tax or subsidy support for particular industries or business types will generally increase costs for others, potentially allocating resources to low value activities and encouraging rent seeking.
 - Pressures for greater self-reliance in the wake of the COVID-19 pandemic and geo-political disruptions pose significant risks to efficient investment and productivity growth.
 - Overall business investment levels do not appear to have been particularly responsive to declining costs of capital. This underscores the need for a deeper focus on productivity-enhancing reforms to improve expected risk-adjusted returns.
- ✱ **Competition and business dynamism, when measured at an aggregate level, appear to have declined. Examination of particular sectors could help identify where consumers face limited product choice, where contestability is lacking, and where policy changes could improve market outcomes.**
 - Promoting competition and dynamism will require a suite of policy levers and a sectoral focus — particularly in sectors where contestability has been stubborn and where government regulation and funding have significant influence.
 - It is important that our competition laws remain fit for purpose in the context of contemporary challenges. Principles of good regulatory design can help ensure any reforms will promote (and not hinder) productivity.

1.1 Introduction

Markets are a crucial mechanism for promoting productivity growth. Competitive pressures, combined with the profit motive, lead businesses to innovate and improve their operating efficiency and to invest in improved means of production, and developing new and better-quality goods and services. And as more productive firms increase their market share by providing better and cheaper goods and services, they crowd out less productive firms, allowing resources to flow to more productive uses. The end result is national productivity growth.

Investment, competition, and business dynamism can each be helped or hindered by government interventions.

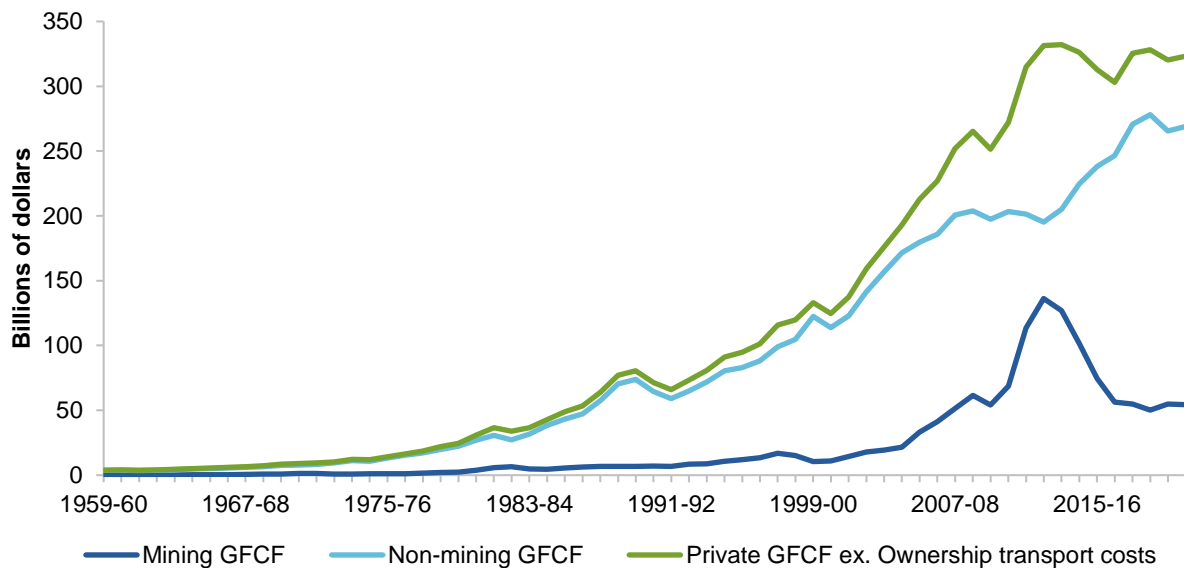
- Investment leads to a higher capital to labour ratio (i.e. capital deepening), which tends to mean more output per hour worked (i.e. labour productivity) as well as new technologies, which can influence innovation and multifactor productivity. Governments can influence investment levels (and thereby the extent of capital deepening) by contributing public investment and by intervening in markets through policy and regulation, each being subject to risks and costs (section 1.2)
- Contestable and dynamic markets ensure resources are allocated to their most productive use and that entities with few prospects of improving exit the market ('natural selection' of the fittest). While Australia employs advanced methods of regulating the competitiveness and contestability of markets, other policy levers may be required to ensure contestability leads to productivity growth (section 1.3).

1.2 The investment challenge

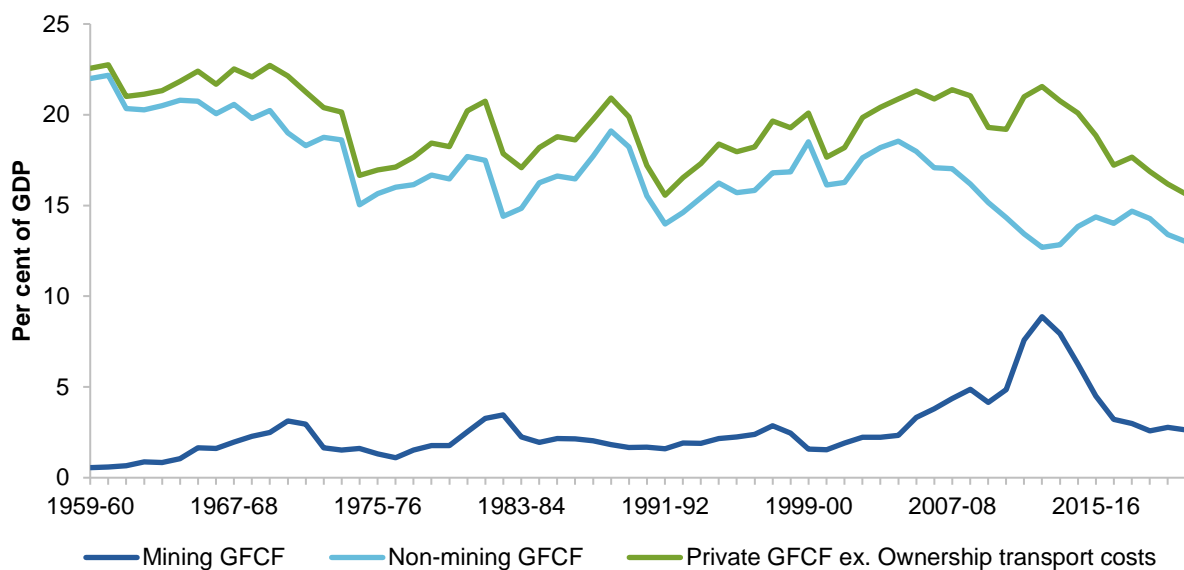
Non-mining business investment in Australia has generally trended lower as a percentage of GDP over recent decades (figure 1.1). Similar patterns have been observed across a number of other advanced economies (Debelle 2017; Hambur and Jenner 2019; Minifie 2017), suggesting that structural factors may be playing a role. Post-global financial crisis, lower than average capacity utilisation rates in key Australian sectors may have also made a contribution. While business investment intentions for 2022-23 have started to increase in levels terms (figure 1.2), following a notable increase in capacity utilisation rates during COVID-19, additional factors may have contributed to subdued investment growth over recent years and a reversal may necessitate changes in a number of policy areas.

Figure 1.1 – Non-mining investment remains subdued

a. Private gross fixed capital formation (GFCF), 1959-60 to 2020-21

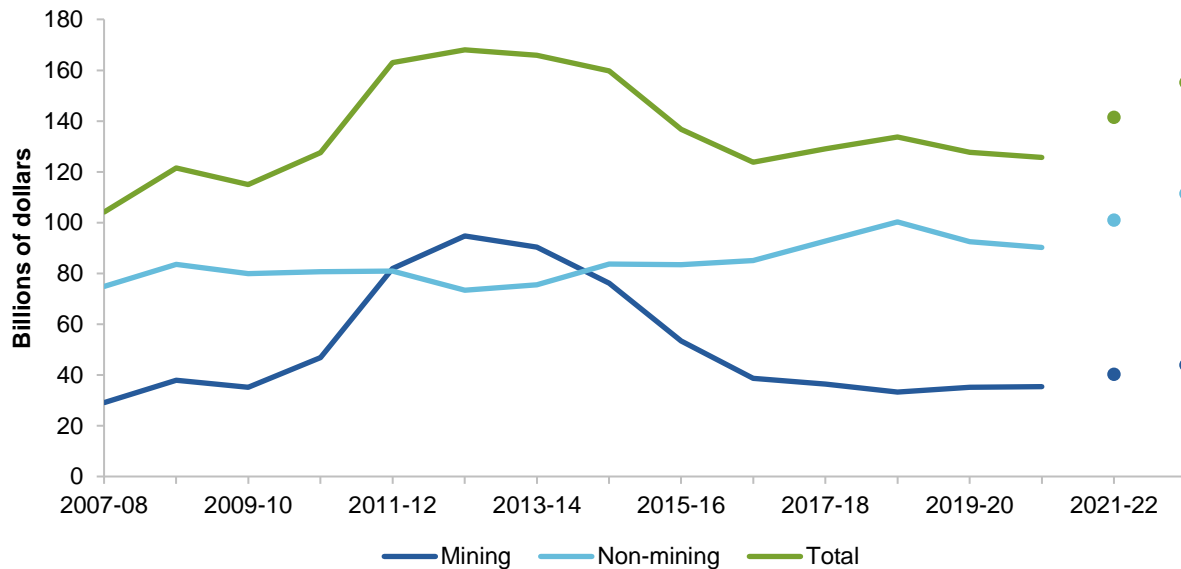


b. Private gross fixed capital formation (GFCF) as percentage of GDP, 1959-60 to 2020-21



Source: ABS (2021a).

Figure 1.2 – Though businesses expect to increase investment in the next two years
Capital expenditure intentions^a



a. Forecasts are firms' expected capital expenditure; adjusted for past average differences between expected and realised spending.

Source: Productivity Commission estimates based on ABS (*Private New Capital Expenditure and Expected Expenditure, Australia, March 2022*. Cat. no. 5625.0).

What explains subdued investment growth?

Two aspects of aggregate investment are useful to keep in mind in unpacking the likely causes of the decline: first, aggregate investment is made up of individual investment decisions made within the relevant business environment; and second, aggregate investment reflects the composition of the economy, as well as the heterogeneous experiences of different sectors across the economic landscape.

Investment decision-making

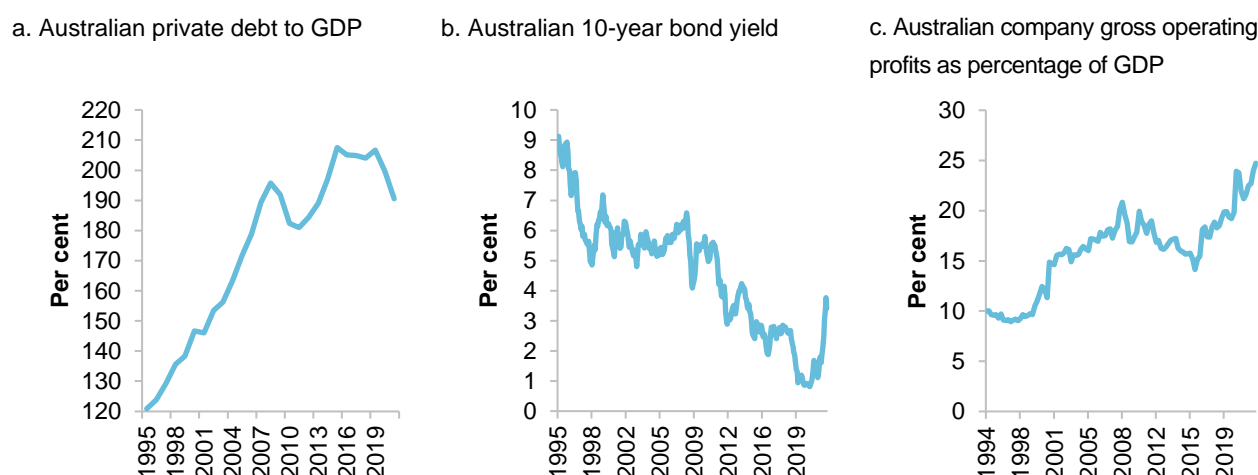
Businesses make investment decisions based on expected net returns. These expectations are a function of the business's own capabilities as well as a range of external factors — the policy and regulatory environment, the prevailing and expected future economic climate, current and forecast levels of demand, borrowing costs — viewed through a lens of risk and uncertainty. Some international evidence suggests that the global decline in investment is related to slower economic growth (Gutiérrez and Philippon 2016). However, for non-mining investment in Australia, the RBA recently found that:

... [investment] spending ... has been even weaker than predicted by our standard aggregate model. Similarly, we have examined firm-level data and found that corporate investment has been consistently weaker than would be predicted based on past relationships with Tobin's Q (a forward-looking measure of investment opportunities).

While financing constraints have been found to play a role in explaining weak investment outcomes internationally, Australian business data suggests that the cost and availability of finance is generally not weighing on investment in Australia (DeBelle 2017, pp. 9–10). Aside from recent increases, nominal borrowing costs have been at relatively low levels for the past decade (figure 1.3, panel b).

At the same time, profitability rates have been relatively stable (figure 1.3, panel c), which intuitively, would contribute positively to investment growth. Generally speaking, declining borrowing costs should stimulate investment growth, bringing down private returns to capital. But instead, the evidence points to a growing wedge between risk free rates and the private return to capital. This might suggest alternative influences on business decision making.

Figure 1.3 – Australian debt, profits, and the cost of borrowing



Source: OECD (*OECD.stat, Financial indicators – stocks: Private sector debt*); RBA (*Capital Market Yields – Government Bonds – Monthly, July 2022*); ABS (*Business Indicators, Australia, Cat. No. 5676.0*).

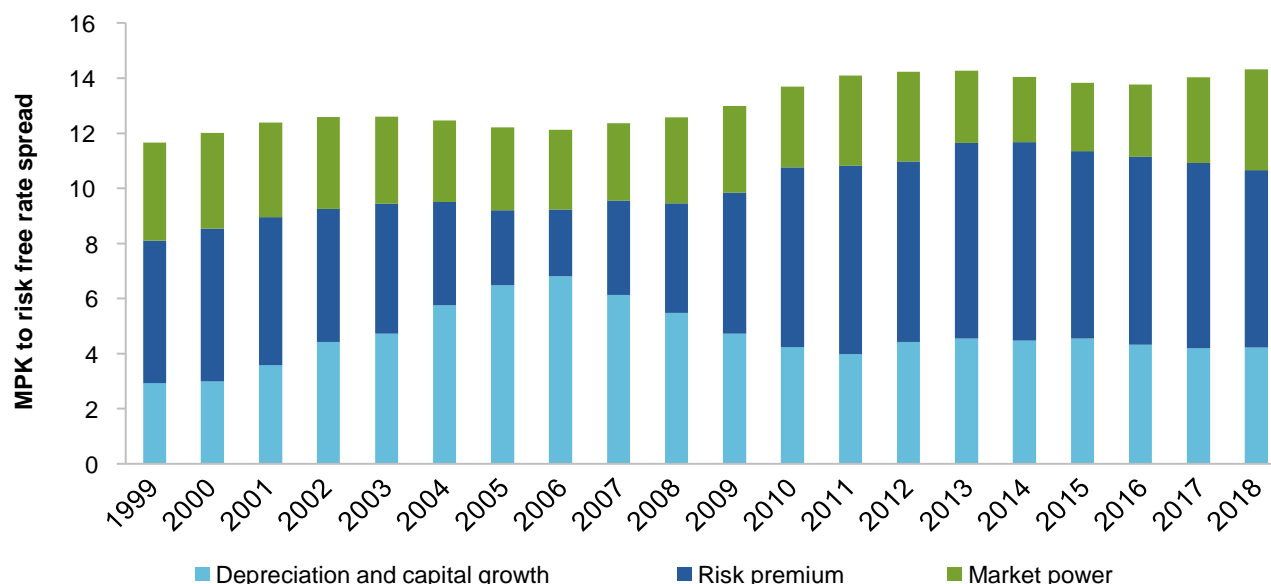
A range of factors are relevant to individual investment decisions, including the opportunity cost of capital, perceptions of risk, and the degree of market power enjoyed by firms.

By some measures, the market risk premium (the additional return investors require to be compensated for taking on risk) has increased in Australia, particularly since the global financial crisis (figure 1.4).¹ While higher risk premiums are likely to have contributed to subdued investment growth, it is unclear to what extent they reflect perceptions that risks have increased (i.e. a greater likelihood of negative events, or that their cost has increased) in general, or changing attitudes to an unchanged level of risk (i.e. increased risk aversion) or simply increased responses to a risky environment. The market risk premium is likely to rise when various financial events alter firm perceptions of risk and the likelihood of an adverse outcome.

Economic shocks and events are also likely to influence investment decisions in other ways. The opportunity cost of capital is likely to have changed during the mining boom (around 2010 to 2012), skewing investment at the time towards the mining sector. Finally, market power enjoyed by firms may increase the rate of return achieved on those investments, relative to what might otherwise be the case.

¹ An estimation of the relative contribution of each of these factors to the wedge between the private return on capital and risk free rates can be obtained by adjusting the standard riskless user cost of capital to reflect changes in market power and changes in risk. The Commission is undertaking separate research analysing risk in business decision making, with publication forthcoming.

Figure 1.4 – Components of investment to risk-free rate spread
Five year moving average



Source: Productivity Commission estimates.

It is difficult to establish empirically whether risk aversion itself has risen in Australia over the past decade. Qualitative evidence suggests that businesses have tended to require expected returns on capital to exceed the cost of capital by a high margin (i.e. high ‘hurdle rates’) (Lane and Rosewall 2015). Australian survey evidence suggests that hurdle rates have remained broadly constant even while borrowing costs have fallen over the past decade (Edwards and Lane 2021). Consistent with these observations, data from Australian-listed companies show that the aggregate return on invested capital (ROIC) has been ‘high and relatively constant over the past 20 years, notwithstanding a large decline in 2020’ (p. 14). To the extent that hurdle rates remain broadly unchanged while borrowing costs fall, business investment will be lower than what we would otherwise expect, weighing on productivity growth over time.

Structural changes are having a limited effect

Aggregate measures of investment can mask the heterogeneity of experiences across the economy. For instance, technological progress has given rise to new opportunities for investment, and this has occurred unevenly across sectors.

Long-term structural changes in the economy are likely to have had an enduring effect on the nature and level of investment. In particular, the shift towards a services-driven economy may mean that a lower rate of investment in physical capital may be necessary, while investment in intangibles (such as trademarks, software and managerial capacity) are likely to play a stronger role. (PC 2020b, pp. 10–11). Minifie (2017) pointed to a group of service industries that were ‘less than half as capital intense as the average non-mining market sector’, noting that they had comprised half of market sector output in the early 1990s, growing to almost two-thirds in 2017.

Other evidence suggests structural change has only had a limited effect on investment levels since the GFC. Hambur and Jenner (2019) use Australian firm-level tax data² to demonstrate that compositional change in

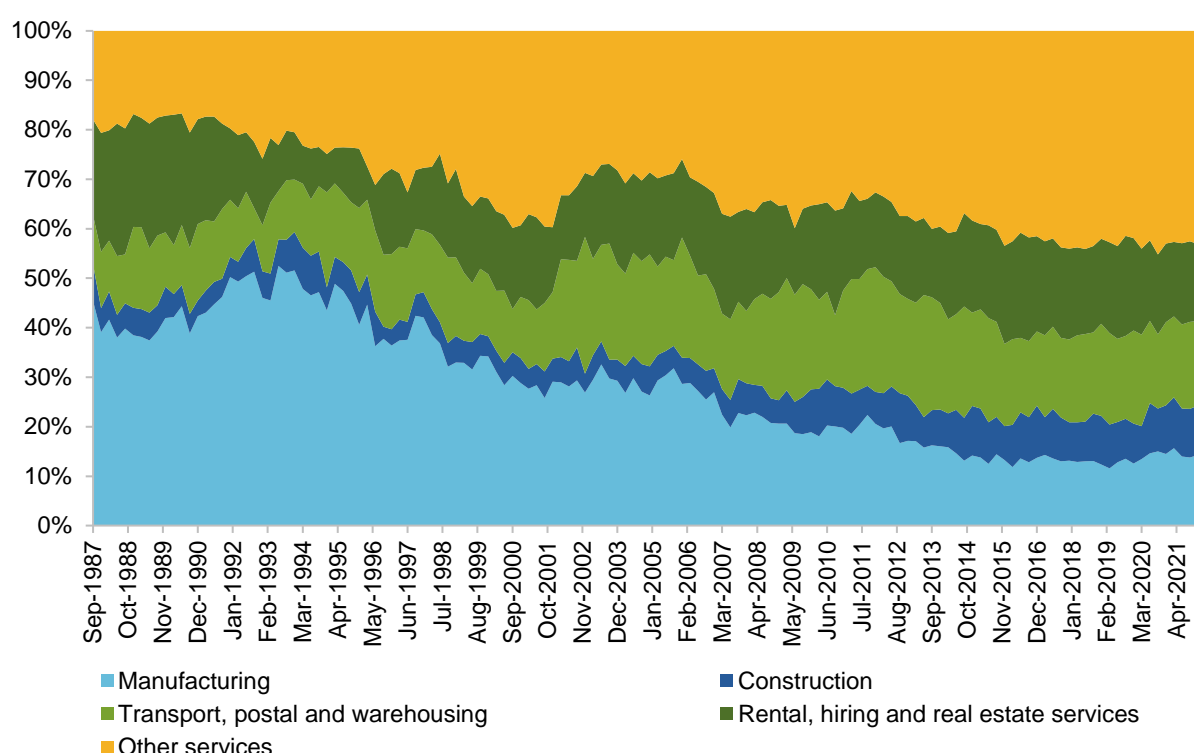
² Using the Business Longitudinal Analysis Data Environment (BLADE) dataset.

the economy explains only a ‘very small share’ of the decline in post-GFC investment. They found that investment declined for firms regardless of industry, age, or cohort. Moreover, the overall investment intensity rate (the change in capital stock relative to output) declined by around 5 per cent in the past decade, in part due to a lack of productivity growth and lower depreciation rates.

Private capital expenditure has varied across industries over time (figure 1.5). Investment in manufacturing reduced significantly as a proportion of capital investment — largely coinciding with reductions in government assistance to the sector, general reduction in manufacturing output, and a broader structural shift towards resources. In addition, changes to the type of manufacturing undertaken have contributed significantly to the decline in the investment intensity of that sector (Hambur and Jenner 2019).

Figure 1.5 – Private capital expenditure has varied by sector^a

Quarterly private capital expenditure by industry, proportion of total



Source: ABS (2022).

Investment levels are, not surprisingly, also related to firm size. The decisions of a relatively few larger firms have often driven trends in observed aggregate investment. The RBA found that small and medium enterprises (SMEs) comprised over 99 per cent of non-mining firms, but accounted for only about 60 per cent of non-mining investment. Firms with output between \$50 million and \$5 billion represented just 0.3 per cent of all firms, but were responsible for at least one-third of all investment (Dyan 2021, p. 3). The largest 30 firms accounted for almost 10 per cent of investment.

Access to credit for investment can be more complicated for SMEs. While new sources of finance have become increasingly important for SMEs (PC 2021c),³ the availability of credit for SMEs more broadly and its

³ Based on data from September 2021, the Commission found the main remaining gap was in the market for unsecured finance between \$250 000 and \$5 million (p. 39).

uptake will be influenced by further development of the non-bank lending sector, as well as greater awareness among SMEs of new financing options (pp. 41-46). Reforms to the bank capital framework due to come into effect from January 2023 may also make SME lending more attractive to banks at the margin (Bank and Lewis 2021, p. 45).

Implications for policy

Subdued investment growth warrants attention. Measured investment levels may underestimate investment in intangibles, which is increasingly important to service industries.⁴ However, the long run impacts of subdued investment growth on Australian living standards could be significant. While investment is not without costs (e.g. foregone consumption), these trends warrant attention in at least some sectors.

The objective should not be to ‘undo’ or ‘reverse’ structural causes where those causes are desirable. The relative decline in investment has not been due to any singular consistent cause or trend, despite relative consistency across time and indeed in other advanced economies. In part, lower investment intensity may be the result of developments that are not wholly undesirable, such as structural shifts in the economy and the reliance on longer-lived assets. It may also reflect perceptions of and attitudes to risk, or undesirable developments, such as low productivity growth that reduces returns on investment.

A broader view of policy is required. The hurdle rates for investment observed in Australia have been relatively consistently high over the past decade, suggesting higher risk premia offsetting lower capital costs. This suggests that any attempts by governments to influence investment decisions will require consideration of a broader mix of policy settings — not only the cost of funds, but also those policies that influence the broader economic climate and uncertainty around funding.

Importantly, policy should acknowledge and reflect the fact that **productivity and investment are interrelated**. Productivity-enhancing reforms can promote economic growth and improve returns to investment. In turn, investment promotes productivity. But interventions to bolster investment levels directly will need to consider the consequences for efficiency and productivity, given the potential for public interventions to skew resource allocation.

Policy principles to support investment and productivity

Broadly, the suite of policy issues discussed across this report will have a bearing on investment. In some cases the links will be relatively direct — for instance, aspects of foreign investment are discussed in the context of trade policy settings (chapter 2). In other cases, it will be implicit — Australia’s climate change policy settings (chapter 3) will help to determine the efficiency of resource allocation across the economy.

And while the tax and transfer system plays a significant role in shaping investment, this interim report does not explore tax settings in detail, given the case for (overdue) reform is well argued and evidenced in previous reviews (see Henry et al. (2010)).

Investment is not without costs — it uses up scarce resources that could otherwise be used for current consumption. An important role for government is ensuring that investors face prices (output prices, input prices and interest rates) that are not distorted and broadly reflect social costs so that investments increase national income. In practice, this means that policy settings would neither discriminate in favour of particular kinds of investment nor consumption over investment. Governments should apply the same net social

⁴ The Inquiry companion report — Innovation for the 98% — details capital spending in physical and intangible assets over the past 60 years (figure 1.11).

benefit test to their own investments, rejecting public projects that do not maximise social net benefits (taking into account the costs of taxation).

Public investment should be carefully assessed

Public investment not only contributes directly to aggregate levels of investment, but can also promote private investment, partly due to private sector delivery of public projects but more broadly through benefits of using infrastructure and potential generation of spillovers throughout the economy (DeBelle 2017).

As the economy approaches full employment, the opportunity cost associated with any public expenditure and the potential for crowding out will be heightened, not only in relation to other areas of public funding, but also in relation to the resources available to the private sector. While public funding in a number of areas is typically well-justified by the positive spillovers possible, this does not override the need to carefully assess the opportunity cost of using public funds for this purpose. As such, governments will need to consider both where it is possible to scale back public funding and how public expenditure could be made more efficient.

Improvements could be achieved in the ongoing provision of public infrastructure, both in the project selection stage (with strong cost-benefit analyses) as well as proficient procurement processes (PC 2014). There are a number of opportunities to promote innovation and efficiency in government procurement (discussed in a separate interim report).

In addition, governments will increasingly need to consider the use of pricing mechanisms (subject to sufficiently targeted concessions) to manage infrastructure usage, maintenance expenditure, and capacity (PC 2017b, 2021b).

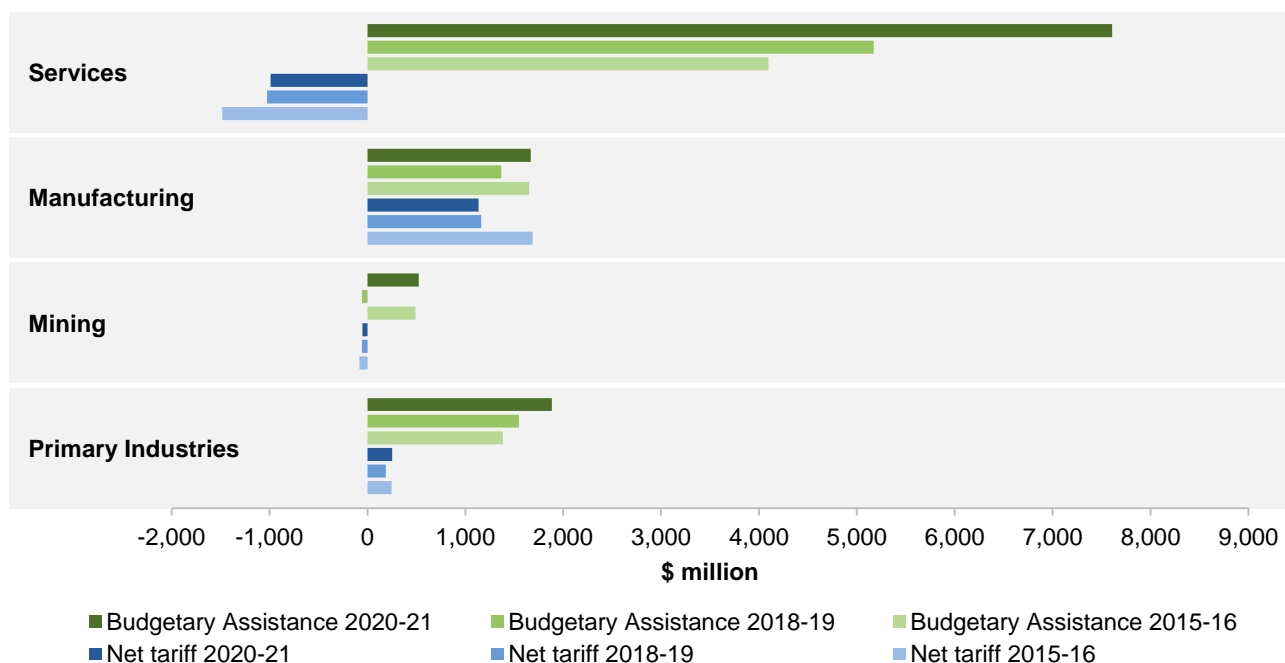
Industry assistance creates distortions

Australian Government assistance to industry has reached historic high levels — even after excluding economy-wide COVID-related programs of expenditure (figure 1.6). Aside from once-off emergency expenditures, significant amounts of expenditure have been committed over the next decade.

Some public expenditure programs deliberately or inadvertently discriminate in favour of a particular section of the economy. This includes outlays, concessions, or other favourable conditions for particular sectors, industries, or businesses of a particular type or size. To the extent that supports are material enough to prevent business exits, this reduces business dynamism and impedes more efficient allocation of resources (section 1.3).

Government assistance to industry would ideally be geared towards projects or sectors with significant social spillovers that cannot be captured by private investors (that is, private investment alone will not lead to the most productive level of investment). To best utilise scarce public funds, the government should rigorously check that the spillovers reflect a failure of private investment markets. Costs and benefits should be assessed, including the alternative uses of funds and potential to crowd out private investment. With the current full employment conditions, it is important to consider the risk of reallocating resources away from more productive uses to those with lower or less certain payoffs.

Figure 1.6 – Industry assistance has increased in the past five years^a
Net tariff assistance and budgetary assistance 2015-16 to 2020-21



a. Excludes economy-wide expenditure programs such as JobKeeper, Boosting Cashflow for Employers, Backing Business Investment, and the expansion of the Instant Asset Write-Off.

Source: Productivity Commission estimates.

One of the risks of industry assistance is that it can continue for a prolonged time without scrutiny. There are often strong in-principle rationales for government intervention initially (for instance, with regard to COVID-19 pandemic and climate change). But without sufficient policy scrutiny, in-principle rationales can provide ‘cover’ to poor public investment choices, open-ended assistance and rent-seeking behaviour (PC 2022d). Indeed, these risks could be particularly prominent where disrupted global trade leads to calls for protectionism, economic self-reliance and autarky (chapter 2).

One example of industry assistance is the concessionary tax treatment of small businesses.⁵ On one hand, supporting smaller businesses could make markets contestable for new market entrants, given that start-ups and new firms can be smaller than established incumbents. On the other hand, these concessions risk skewing market share artificially towards smaller businesses, regardless of their relative efficiency.

A less distortionary way to improve small business viability would be to extend tax relief to all businesses and/or reduce the various compliance costs associated with regulation. The latter would benefit businesses broadly, but would be particularly beneficial for smaller businesses, given there are fixed costs of compliance and these can create a barrier to entry for small business. Improvements could include a more efficient

⁵ In the five years prior to COVID-19, tax concessions to industry had grown significantly, largely driven by concessionary treatment of small business (PC 2020d, p. 13). Small business continued to be the focus of assistance in 2020-21, after excluding the three largest COVID-related programs. A large part of the tax advantage for small business was the concessional corporate — initially intended as a broader reform but only legislated for small businesses — providing an advantage to small businesses equivalent to \$900 million in 2020-21 (PC 2022d). State and Territory taxes such as payroll tax also provide favourable arrangements for small business via thresholds.

workplace relations system and employer-sponsorship of migration (discussed in a forthcoming interim report) and lower costs of trade (chapter 2).

Some argue there may be more justification for focusing on regulatory and other settings that facilitate *new entrants* rather than all small business (Eslake 2022). Some tax settings already contribute to this — Australia already has a generous loss carry forward regime, relative to international peers. Recent reforms to the Employee Share Scheme should provide some benefit to startups by allowing concessional treatment of shares provided to employees. Further improvements to contestability may be better promoted by means other than tax concessions (section 1.3).

In addition, the risks associated with industry assistance will likely be prominent in Australia's decarbonisation efforts. Significant ongoing public expenditures have already been put towards supporting emerging technologies. While new technologies will be crucial for decarbonising, there are risks that selected technologies fail to commercialise, or prove ineffective in the mitigation task, or provide poor additionality (PC 2022d). And while some degree of risk is inherent in such investments, governments can often be reluctant to (or persuaded not to) abandon investments when technologies fail to develop (Banks 2008, p. 15; Emmery 1999; Neely 1993; *The Economist* 2010; 2022). Regular and transparent review of public expenditures will remain crucial to minimising the potential for such market distortions.

Another aspect of public expenditure that risks distortion occurs where government business enterprises access market debt to fund the expenditure. 'Debt neutrality' is a core aspect of Competitive Neutrality principles that are applied to government business enterprises at the Commonwealth, state and territory levels. As described in the competitive neutrality Guidelines for Managers:

... the market will offer lower rates of borrowing to government business activities that enjoy explicit government guarantees. The market may also offer lower rates of borrowing to government businesses without an explicit guarantee because it considers that government ownership itself reduces the risk of default (i.e. that there is an implicit government guarantee for such business activities). You may therefore be charged a rate of interest that is less than that paid by your competitors purely as a consequence of government ownership. (Commonwealth of Australia 2004, p. 22)

While the market rate of debt for a private project reflects the project risk, the lower government debt rate paid by a government business enterprise (GBE) reflects the transfer of risk to the taxpayer. Without proper adjustment, government investments may appear to be efficient even when they are not. It is important that debt neutrality principles are properly applied in order to remove such distortions — at times, this entails GBEs paying a debt neutrality charge, which is then factored into pricing.

Regulatory settings and the next waves

Governments can promote investment by providing regulatory settings that reduce undue impediments to commercial decisions, without sacrificing the social benefits of regulation. The Commission has provided numerous examples of regulatory areas where this would be advantageous, including planning and zoning regulations (PC 2017c, 2021a); regulatory approvals (PC 2013); and more efficient freight transport (PC 2020a).

Other reform opportunities would help to address challenges for future investment. In the immediate term, this includes addressing the implications of full employment conditions.

More generally, policy settings should facilitate the next waves of investment opportunities, including the investment required for the decarbonisation of Australia's economy, and opportunities linked to new business models and other innovations. This includes trade policy settings that influence the import of technology from overseas, such as tariff and non-tariff barriers at the border, and foreign investment

settings (chapter 2). The transition to a net-zero emissions economy by 2050 will also entail a significant wave of new investment (chapter 3).⁶



Finding 1.1

Subdued investment growth should be met with productivity-enhancing reforms

Australia's subdued (non-mining) investment growth likely reflects a number of factors. To some extent, lower investment levels are the result of desirable developments, including structural shifts in the economy and changes in technology. Persistence of investment hurdle rates, despite falling borrowing costs over the past decade, suggest that risk perceptions may have also played a role. Broader policy reform aimed at making Australia's business environment more conducive to growth can promote investment. Productivity-enhancing reforms that promote economic growth can improve returns to investment, further supporting productivity growth in the process.

1.3 Competition and dynamism

In a well-functioning market, competitive pressures push prices towards costs and move resources to their most efficient uses, improving overall productivity. A dynamic, competitive market allocates (and reallocates) resources to more efficient firms and more productive industries. It supports the spread of new ideas, innovation and creative destruction, which replaces the old with the new, and is necessary for sustained economic growth. In the long-term, dynamic, competitive markets can drive sectoral shifts in the economy towards higher productivity and an economy's overall comparative advantage.

While both competition and business dynamism are typically productivity enhancing, the situation can vary from market to market. For example, market concentration is typically associated with poorer incentives for innovation and higher prices.⁷ However, it is sometimes claimed that intense competition can have ambiguous effects on productivity, for example where there are economies of scale or where firms need to generate profits to internally fund investments. Both of these claims are, at best, incomplete as general propositions.

Increased competition is not the same as an increased number of competitors. A market with a small number of businesses that vigorously compete may be more productive than one with many under-sized small businesses. And competition can push businesses to adopt a scale that minimises costs. This may involve only one or a few businesses operating successfully, say as a 'natural monopoly' or 'star firm' (Andrews and Hansell 2019). There is little concern for productivity if competition is vigorous. But increased concentration raises the risk that competition will be muted, a risk that underpins our competition laws, which aim to protect the competitive environment even in concentrated markets.

⁶ AEMO estimated that the NEM itself would require about \$170 billion of capital investment to 2050. This would include a nine-fold increase in grid-scale wind and solar capacity and a near five-fold increase in distributed solar (AEMO 2022a). Deloitte estimated that the transition to net zero would require \$70 billion of capital reallocated away from emissions intensive assets, and \$420 billion of new investment to shift to 'productive and competitive net-zero economy' (DAE 2022).

⁷ As noted by Schumpeter (1911), businesses have an incentive to minimise competition by maximising market share and exploitation. In practice, this interest rates on credit cards in Australia did not decrease between 2011 and 2021 despite the cash rate being lowered from 4.75 per cent to 0.10 per cent. That the four largest banks hold 92 per cent of all credit card loans has been cited as an explanation (Jericho 2022).

Australia's product markets are typically characterised by a few large businesses and many small businesses under intense competitive pressures. Some argue that these small businesses may lack the managerial resources and incentives to innovate. This may particularly be the situation for businesses that are 'falling behind' their rivals (Aghion, Akcigit and Howitt 2013). In such circumstances, it may be business failure or new entry that releases the "gale of creative destruction" to improve productivity in the relevant market. Such disruption has costs, such as temporary or long-term unemployment, and these costs may differ between industries (Cairó 2013). Government policy should help facilitate these changes by making the industry level changes driven by innovation and competition as smooth as possible. This does not mean that government limits change. Rather it assists the process where necessary, providing a safety net and potentially retraining opportunities for those individuals most heavily impacted.

Even in markets where there are few observed domestic players at a given point in time, contestability of that market — including possible entry from potential domestic competitors or the threat of competition from overseas imports — can weaken any link between market concentration on the one hand, and productivity, costs and consumer welfare on the other. Careful analysis of overall individual market conditions is required before any strong policy conclusions can be drawn.

In summary, the market environment that will foster innovation and productivity will differ between different industries. There is no 'one size fits all' model that can be applied over all — or even more than a few — markets. Rather, it is the strength of the competitive *process* rather than the number or size of businesses in a market per se that drives the wide range of market environments that underpin productivity growth.

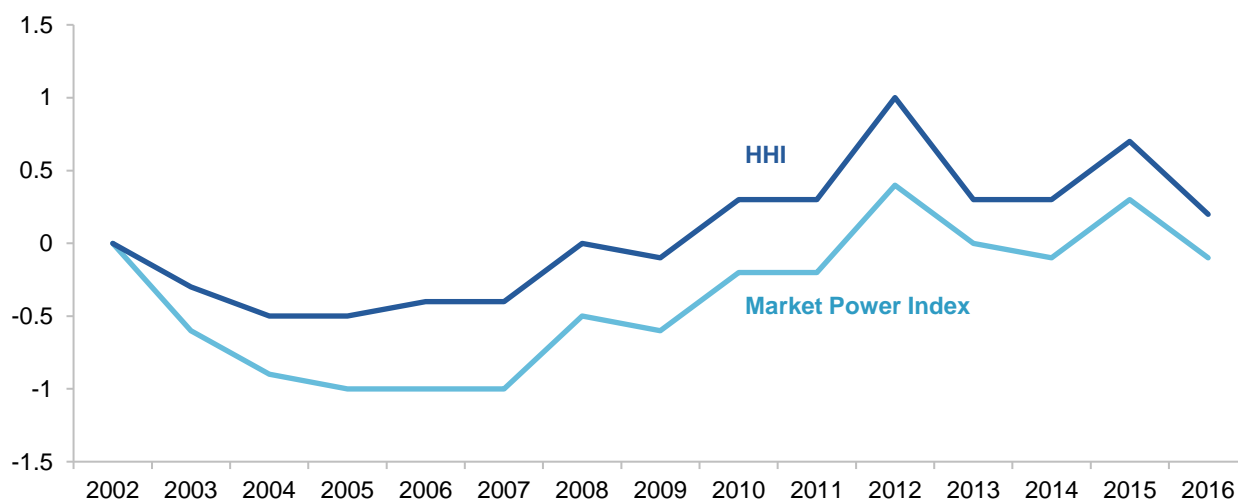
The state of competition

Many sectors of the Australian economy are relatively concentrated. The banking, supermarkets, mobile telecommunications, internet service provider, fuel wholesale and retail, and general insurance sectors all have four-firm market shares of 70 per cent or more. The average level of concentration in these sectors has not changed much since the early 2000s (Minifie, Chisholm and Percival 2017, pp. 14, 27).

However, recent studies have shown that across a number of aggregate measures, proxies for competition and business dynamism have declined in Australia in the past two decades.

Overall concentration in the Australian economy increased between 2002 and 2016 (figure 1.7). The rise in concentration has occurred alongside a decline in entrepreneurship, but there is no evidence that this relationship is causal (Bakhtiari 2020). Market concentration and productivity are negatively correlated, except for in export-intensive industries, where the relationship is reversed (likely due to intense competition in international markets) (Bakhtiari 2019). It is therefore not unexpected that the rise in concentration has been accompanied by a decline in Australia's productivity.

Figure 1.7 – Industry concentration has increased since the early 2000s
HHI and market power indices^a



a. The Herfindahl-Hirschman Index (HHI) is a measurement of the concentration of economic activity. The market power index is the principal component of the HHI and the log of firm population.

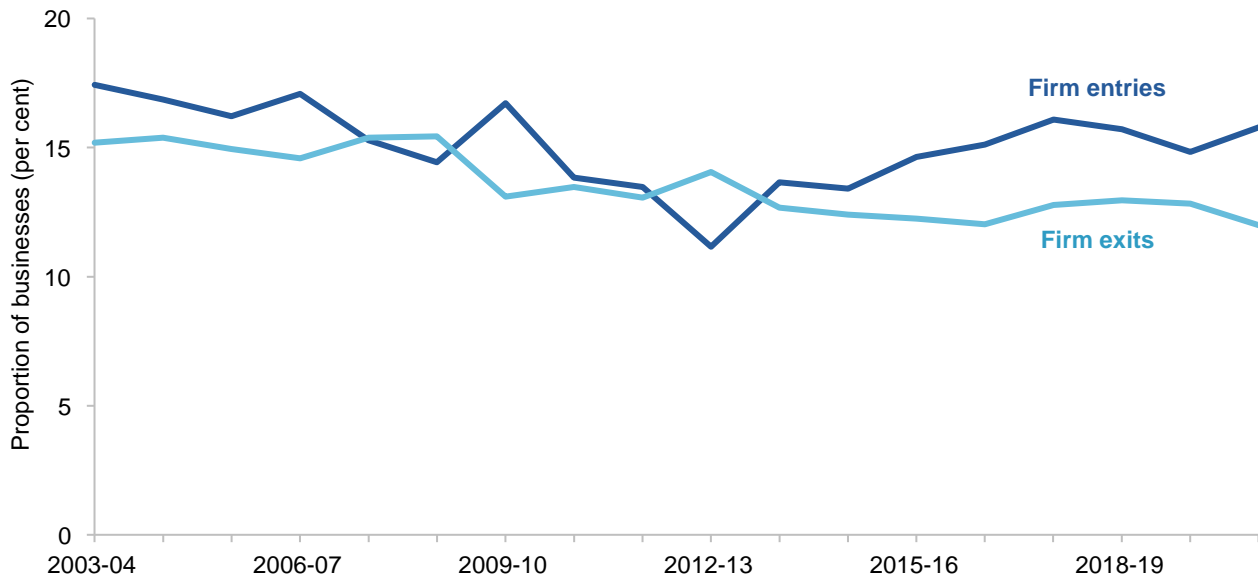
Source: Adapted from Bakhtiari (2020).

Rates of firm entry and exit declined between 2003-04 and 2012-13 (figure 1.8). While Bakhtiari (2018) highlights that business churn had been declining in Australia between 2003 and 2015, the rate of firm entry increased in the years prior to the pandemic, but exits continued to decline. Both entry and exit rates fell at the onset of the pandemic, but increased in 2021. The vast majority of Australian businesses are non-employing — comprising of sole traders and independent contractors. Trends in dynamism differ somewhat between employing and non-employing businesses (figure 1.9 panels b and c), potentially influenced by developments such as COVID-related assistance and growth in the gig economy.⁸ The overall increase in firm entries in the past decade is concentrated among sole traders and independent contractors. The decline in firm exit rates, in particular, of both employing and non-employing businesses, could be indicative of reduced competition and limited pressure for resources used in less productive businesses to shift to more productive businesses.

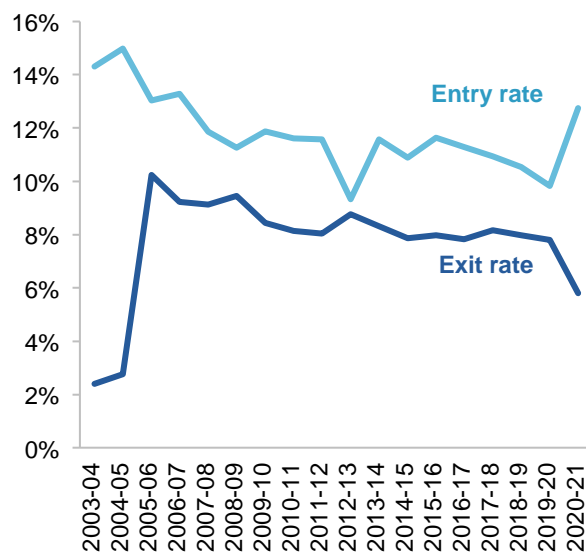
⁸ For example, a substantial amount of COVID-19 related assistance provided in the second half of 2019-20 and during 2020-21, focusing largely on employing businesses. In addition, the gig economy has come to prominence during the past decade, likely affecting the counts of business entries.

Figure 1.8 – Firm entries and exits in Australia^a

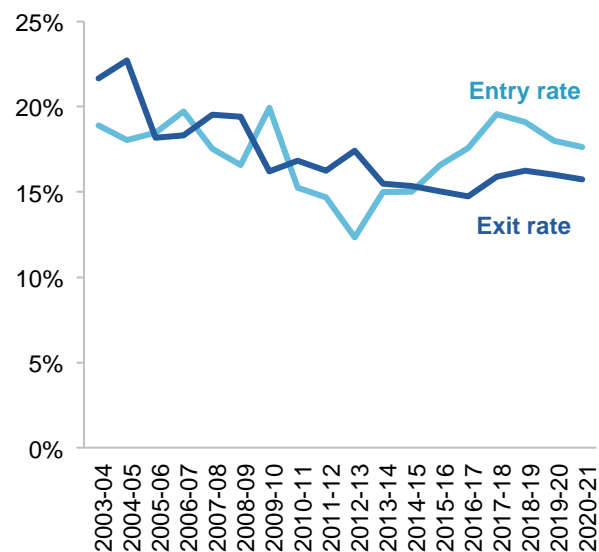
a. Firm entry and exit rates, all businesses



b. Firm entry and exit rates, employing businesses



c. Firm entry and exit rates, non-employing businesses



a. Entry and exit rates are expressed as a percentage of the number of businesses operating at the beginning of the period.
Source: ABS (*Counts of Businesses, Including Entries and Exits*, cat. No. 8165.0).

Mark-ups are likely to have increased. Firm mark-ups on their input costs — possible when competitive pressures are weak — are estimated to have increased steadily between 2004 and 2017 (Hambur (2021)).⁹ The observed mark-ups could be the result of declining competition, but could also be due to changes to technology that increase economies of scale; shifts towards products and services that involve more fixed costs; or increasing competition encouraging businesses to provide better products that earn higher margins (Wainscoat and Twort 2022).

⁹ The best prevailing estimates of mark-ups are based on proxies without the benefit of firm-level price data, although Hambur (2021) notes that this is more likely to affect levels rather than the estimated changes over time.

Overall, these trends in aggregate concentration, mark-ups, and dynamism appear to align in suggesting that existing markets may have become less competitive. However, interpreting these results in a policy context is difficult. Economic activity *might* have skewed towards markets that are traditionally less competitive. Alternatively, within existing markets, market shares *might* have skewed further towards larger players.

Aggregate trends tell us little about how competition is experienced by consumers. Even when broken down by industry, the nation-wide level of concentration may say little about the degree of competition experienced by consumers in a given area. Rossi-Hansberg, Sarte and Trachter (2020) studied the United States and found that in most industries, large firms at a national level help to reduce concentration and increase product-market competition at a local level, by entering uncompetitive local markets. This may not hold for Australia, where often large national businesses already have a presence in most local markets. However, the broader lesson is clear. While industry-level competition appears to have declined in Australia, it is difficult to infer how the degree of consumer choice may have changed in particular localities or for particular products and services.

As discussed above, competition not only depends on existing firms in a market. It also depends on the potential for entry of new businesses into a market when profits are high or consumer choice is low. However, the *contestability* of a market is not immediately observable in market concentration and dynamism statistics.¹⁰ Even markets with a small number of firms may be highly competitive if there is the credible threat of entry (Baumol 1982). In principle, it is the threat of entry rather than actual entry that drives contestability. It depends on low barriers to both entry and exit by business. That said, if there is little history of actual entry in a market, despite high concentration and high profits, the market is probably not contestable, even if barriers to entry and exit cannot easily be identified.

Implications for policy

It is not clear from the existing research what is driving the aggregate trends in competition and dynamism. This means that the impact of these trends, both on productivity and for policy, are uncertain. The impacts may differ from market to market, so that a micro lens is required to determine how competition is changing, how it affects consumers, and what implications that may hold for reform.

First, the aggregate trends in competition, such as increasing concentration, is not in itself evidence that anti-competitive conduct has gone unchecked. Indeed, in some markets, such as online search, it is likely that concentration has risen because one or a few innovative businesses have been able to serve consumers better. In those situations, concentration reflects consumer gain, not anti-competitive conduct. While in some markets increased concentration is not necessarily a result of anti-competitive actions, this does not obviate the role for a functional antitrust regime (Bakhtiari 2021, p. 72). Policymakers should regularly review **competition laws and regulations** to make sure that they are fit for purpose. Any changes to these competition laws and regulations should be guided by specific evidence of what is causing poor outcomes, what might be failing within the current framework, and whether existing regulations are sufficiently flexible to deal with emerging competition concerns.

Second, governments should focus on specific markets that exhibit poor competitive outcomes — where evidence suggests consumers are experiencing poor choice, where firms face poor incentives to improve efficiency, or where there are known barriers to contestability. Various **market constructs** have been shown to impede effective competition, including lease agreements between private firms, or contractual terms regarding sales commissions.

¹⁰ Baumol defined a contestable market as one where entry is free and exit is costless (Baumol 1982, p. 3), although a more practical interpretation would be that barriers to entry and exit may be relatively low.

Governments should also focus on sectors where policy changes could make the biggest difference to consumer welfare. One obvious example is markets where existing regulations unnecessarily impede competition. More broadly, in a number of industries, various forms of **government involvement** (in the forms of public funding, provision, and regulation) can create less contestable and less competitive markets.

Finally, Australia's relative openness to trade and foreign investment will be key element in competitive markets (chapter 2). In many instances, **contestability from foreign market entrants**, either through imports or established overseas businesses commencing operations in Australia, is a particularly important avenue for competition. In addition, **trade in services** has increased globally and is likely to be a key area of new competition for Australian firms.

Improving competition law and regulation

The objective of the *Competition and Consumer Act 2010* (CCA) is to 'enhance the welfare of Australians', rather than to produce specific benefits (or costs) to a particular sector, industry, or firm. The focus of the Act is on competition as a means to achieve enhanced economic welfare — particularly consumer welfare. This does not mean that other social goals, such as equity or employment, are unimportant. Rather it means that these other goals should not be imposed on Australia's competition laws.

Competition is a state of ongoing rivalry between firms — rivalry in terms of price, service, technology and quality. Market participants are mutually constrained in their pricing, output and related commercial decisions to some extent by the activity of other market participants (or potential market participants) (ACCC merger guidelines at 3.1).

This means that simple metrics such as the number of competitors, market shares or the extent of concentration often provide limited indications of both competition and consumer welfare.

It is important, as new products are launched and business practices evolve, to check that our competition laws remain appropriate to achieve their welfare objective.

Procedural improvements for merger approvals

A merger or acquisition is illegal under section 50 of the CCA if it would have the effect, or be likely to have the effect, of substantially lessening competition in a market.

A potentially anticompetitive merger can be cleared by any of three alternative procedures in Australia — an informal¹¹ review process by the ACCC, a formal authorisation¹² from the ACCC, and clearance from the Federal Court. While it is unusual to have three avenues for authorisation, it may not necessarily be problematic if they act as a form of triage. However, if it is systematically difficult for the Court to oppose a merger, it may be inclined to allow mergers that pose risks to competition. In addition, the three alternative procedures involve different legal standards and burdens of proof. For example, while an action before the Federal Court is determined on the

¹¹ If the ACCC does not oppose a merger through the informal process, this protects the merger parties from legal action by the ACCC (but not from other parties). If the ACCC opposes the merger but the parties wish to proceed, the regulator may seek an injunction before the Federal Court then pursue a s.50 merger case (and prove on balance of probabilities) that merger is anticompetitive.

¹² Merger parties may seek statutory protection from legal action under section 50 of the Act by lodging an application for merger authorisation, with an appeal avenue to the Competition Tribunal. While the merger authorisation is in force, the authorised parties will be able to acquire the relevant shares or assets without risk of the ACCC or third parties taking legal action for a contravention of section 50 of the Act.

balance of probabilities, a merger can only be formally authorised if the ACCC is 'satisfied' that it will not breach s.50. In practice, these differences could invite regulatory gaming by merger parties.

Issues with the current system of mergers control have been raised by various parties including the regulator. The ACCC considers that the merger control regime 'is skewed towards clearance' (Sims 2021). A systematic bias in the regime could be problematic for mergers control, regardless of the direction of the bias.

In part, this skew is attributed to aspects of the informal merger process that result in inadequate information and time for decision-making (Sims 2021). From a detailed ex post review of recent merger cases, the ACCC (2022b) merger parties and third parties often exaggerated certain claims (about the likelihood of new entry, expansion, or the exercise of countervailing power) and distorted or omitted critical information.

Other criticisms relate to the interpretation of the wording of s.50 by the courts. The key issues include:

- The legal interpretation of 'likely' in s.50 has been vexed in relation to 'more probable than not' or a 'real chance'.
- More broadly, arguments about future (hypothetical) states are challenging, in that they are predictive, must be based on evidence, and must meet the Court's standard of proof.

Different responses have been suggested as a means of addressing these issues. The ACCC has previously recommended the introduction of a new formal authorisation regime which mandates notification to and authorisation from the regulator; and legislative changes that would define 'likely' in line with its use in cartel regulation (Sims 2021). With regard to the latter, some have argued that such legislative changes would not resolve confusion around the counterfactual (Cao, King and Samuel 2022) and indeed similar legislation has worked better in New Zealand in the context of clearer directions from the Court (King 2021).

Moreover, the outcomes of merger cases brought before the courts may reflect the regulator's approach to litigation as much as it does the law or process. The ACCC's use of economic theory and modelling has not always been convincing in the Federal Court, which often pays greater focus to commercial realities and statements by business representatives about their own commercial decision-making (Cao, King and Samuel 2022; Jagot 2021; King 2021). As Jagot J (2021) noted, likelihoods are evaluated in a 'common-sense commercial context'. As such, it is unclear whether the need for legislative reform would remain if the regulator were to augment its approach to litigation.

The ACCC's proposed alternative merger clearance regime would provide more power to the regulator, and could have a number of different implications for productivity, depending on the design. Mergers are a key way to efficiently remove underperforming businesses from a market. So long as the market remains competitive, this will enhance productivity by better allocating resources. Shifting the merger regime's focus away from the 'commercial context' would risk placing more emphasis on theoretical constructs or modelling. Removing the role for the Court altogether places a great deal of power with the regulator, necessitating some other avenue of accountability. Whichever the direction of reform, the pursuit of a more functional mergers control regime should not come at the expense of good principles of regulatory design.

Changes are emerging in the regulation of dominant firms

The regulation of dominant firms has been the subject of debate both in Australia and internationally, particularly in regard to data and advertising of search-related services and social media (box 1.3). The ACCC noted that it has:

... growing concerns that enforcement under existing competition and consumer protection legislation, the Competition and Consumer Act 2010 (CCA) and the Australian Consumer Law (ACL), which by its nature takes a long time and is directed towards very specific issues, is

insufficient to address the breadth of concerns arising in relation to rapidly changing digital platform services. (ACCC 2022a, p. 4)

The proposed reforms in Europe and the US not only raise important questions about how to best regulate major digital platforms, but dominant firms more broadly.

Box 1.3 – Regulation of online platforms is evolving in different jurisdictions

European Union

The proposed Digital Markets Act (DMA) would designate ‘gatekeepers’ who are providers of ‘core platform services’, which are defined as online intermediation services (e.g. online marketplaces, booking sites.); search engines; social networking services; video-sharing platforms; number independent interpersonal communication services (e.g. messaging and chat apps); operating systems; cloud computing services; and advertising services provided alongside any of the aforementioned other core platform services. The DMA sets out multiple obligations for ‘gatekeepers’, including to: requiring the core services operated by all gatekeepers to:

- allow business users to offer their products elsewhere at different prices or conditions, and to choose the promotion and distribution channels used to reach end users;
- not prevent end users from acquiring content, subscriptions, features or other items outside the gatekeeper’s core platform services;
- not require business users to use or offer the gatekeeper’s identification services as a condition of using their core platform services, or to bundle any services with the gatekeeper’s core platform services.

United States

There are a number of bills under consideration in the US Congress that seek to address different issues and harms arising in digital platform markets.

The proposed Platform Competition and Opportunity Act would prohibit acquisitions by a covered platform if the business activities of the target compete with the covered platform, constitute a nascent or potential competitor, enhance or increase the covered platform’s market position, or enhance or increase the covered platforms’ ability to maintain its market position. The proposal also includes a reversal of the burden of proof, whereby the acquiring covered platform must prove the acquisition is not unlawful.

The proposed Ending Platform Monopolies Act would prohibit ownership or control of a business which creates the incentive and ability for a covered digital platform to self-preference their own products and services in a way that disadvantages competitors and undermines free and fair competition. It focuses on ‘eliminating conflicts of interest’ arising from dominant online platforms concurrent ownership or control of an online platform and certain other businesses.

Source: ACCC (2022a, pp. 110–116).

For Australia, the concurrent development of regulatory responses in multiple regions will itself pose challenges. While cooperation and co-learning will allow Australia to remain at the forefront of regulation, the divergence in regulatory approaches between major economies could ultimately cause complications for Australia and the market more broadly — proposed legislation in the United States and the European Union alone show significant differences in their treatment of acquisitions and competition (ACCC 2022a, pp. 110–116).

Regulations established in major global markets can also shape the development of the services that are offered in Australia. For example, the introduction of the General Data Protection Regulation (GDPR) in the EU resulted in many global digital service providers simply altering their service offerings world-wide. The small size of the Australian market can limit our ability to implement bespoke regulations, as service providers may simply decide that it is not worth the effort of developing a bespoke Australian product.

Designation of dominant firms and gatekeepers

Several proposed reforms internationally involve the use of laws that identify firms based on particular characteristics in order to apply particular regulations, prior to any proposed acquisition or other action. For instance laws proposed in the EU would involve designating dominant platforms as ‘gatekeepers’ (box 1.3). In principle, this is similar to the ‘declaration’ of access regimes in Australia.¹³ If Australia were to adopt an approach similar to that proposed in the EU, attention would be warranted on the institutional and procedural arrangements for designation. For example, there would be a potential conflict of interest if the authority that determined designation was also the authority that regulated the designated businesses.¹⁴

Conceptually, designating a firm as the subject of specific regulations (*ex ante* of any proposed commercial action) assumes an *entrenched* position of market power. With regard to digital platforms, there is good reason to question how entrenched any position would be in the long term, given technological progress. Historically, Facebook has not always been the most dominant social media platform (previously MySpace) and Google has not always been the most dominant search engine (previously Yahoo!). It has been argued that, because of network externalities, vertical and horizontal integration, and merger activity, this time is different and both Meta and Alphabet have entrenched dominance. However, to avoid inappropriate and unnecessary *ex ante* regulation, any designation of a business should be time limited, either through an application for review or a specific time limit.

In terms of how any designated firms would be treated, one of the main areas of focus is around merger control. The ACCC has previously argued that there would be value in a lower threshold to oppose mergers relating to digital platforms, given the difficulty in assessing future states and counterfactuals in this market (Sims 2021). It may be more valuable to pursue improvements to mergers procedures more generally, including within the current framework, as this would not only help to address such issues in the digital platform markets, but in the economy more broadly.

A further question relates to whether the *ex ante* designation proposed internationally will eventually apply to firms outside of digital platforms. If such an approach were to be adopted, either in Australia or in major international markets, it would present a significant departure in the regulatory treatment of dominant firms. It would have significant implications for innovation and competition in Australia, in part due to our reliance on large, established firms to enter already concentrated Australian markets.

¹³ Part IIIA of the *Competition and Consumer Act 2010* allows for third parties to share the use of certain infrastructure facilities of national significance under a regulated access regime. While services can be ‘declared’ to be subject to a regulated access regime by the National Competition Council, there are examples where infrastructure has been ‘deemed declared’ (such as rail, gas pipelines, electricity transmission networks).

¹⁴ To avoid similar conflicts, the Australian infrastructure access regime under Part IIIA of the CCA has one regulator to recommend declaration (the National Competition Commission) while another is involved in the regulation of declared businesses (the ACCC).

Market constructs that impede effective competition

Improvements in competition can be stubborn for many reasons aside from anti-competitive conduct or acquisitions. Rather, high barriers may be inherent in markets with particular characteristics or due to the nature of production (such as where economies of scale are present). Competition can be stifled by contractual arrangements or complex commercial interactions, and can be entrenched over time as markets mature. Policy focus is still warranted in these markets, however the solutions may not reside in competition law — rather, a number of different policy levers can be relevant to improving competition.

Financial services

The degree of competition in the financial services sector has been the subject of reform since deregulation. In its inquiry into Competition in the Australian Financial System, the Commission concluded that while financial services are dominated by large players, changes to market structure were unnecessary (and unlikely) to improve competition. Rather, policy should focus on reforms that alter *incentives* of financial service providers, bolster consumer power, and improve governance (PC 2018, p. 4).

Consumer choice in general insurance

The complexity of financial products can disempower consumers, weakening the extent to which consumer choice promotes competition. Consumers find it difficult to understand and compare the many facets of financial products, limiting their capacity and ability to shop around. In the case of general insurance, market research (conducted in 2014) showed that:

- Consumers frequently had some awareness of price differences and the potential savings that they could gain but their awareness did not align with the full extent of differences in the market.
 - In general, “...there was little to no understanding of why these price differences exist, how insurance is priced, and what influence various characteristics of the insured policyholder and the property have on the final premium.”
 - Understanding policy details and level of coverage was a key issue, with few knowing how to separate and interpret the different ‘fine prints’ offered by each insurer. Most admitted they did not ever read the PDS and of those who did, none were able to understand it given the complexity in wording and length of the document. (Fels and Cousins 2019, p. 12)

Complexity is an impediment to effective user choice and presents inherent challenges in improving competition for services like general insurance. It also creates scope for marketing to masquerade as competition. While the number of retail brands (and insurance products) has grown, there are relatively few insurers underwriting those products.

- The Commission noted that the four largest insurers underwrote 30 brands of insurance (PC 2018).
- The ACCC found that in northern regions of Australia, eight insurers sell the vast majority of home, contents and strata insurance via approximately 150 brands and intermediaries.

The proliferation of insurance products with slight variations has become a burden for consumers (PC 2018, p. 13) and make comparisons more difficult (ACCC 2020, p. 117). And while some degree of competition still exists between brands under the same insurer, it is limited, given the insurer has the incentive to maximise profits across the portfolio of brands that it underwrites. As such, this market structure creates the illusion of more competition than effectively exists.

An effective way to improve competition in insurance markets (with relatively little cost and minimal intervention) would be to empower consumer choice. Consumers could benefit from a better understanding of products, and knowing that they are choosing from products offered by competing insurers (and not just a diverse set of products from the same insurer). There would be value, in particular, in providing more information to consumers at the point of their decision-making — both in regard to which brands are underwritten by which insurers, and (for renewals) how their new premium compares with their previous one.

Competition in banking and home loans

While aspects of Australia's banking system remain highly concentrated, improvements in competition for some personal and business banking products have occurred in recent years, including via developments in new forms of finance. The ACCC observed that:

There are some signs of increasing competition in the banking sector, most notably in home loans and international money transfers (IMT). There has also been new entry by a range of neobanks and fintechs, who are playing an increasingly important role in the market, often with innovative technology and business models and a move to a more customer-centric platform-based models. We have also observed innovation in the provision of payments services, through new technologies and use of services such as the New Payments Platform. These innovations continue to enhance productivity of the financial services delivered to Australian consumers. (ACCC, sub. 72, pp. 9-10)

In some cases, regulation has yet to catch up with developments that reduce the benefits of competition for consumers. For example, incentive structures for brokers in the home loan market, which include trail commissions and 'clawback' of commissions, create conflicting incentives (PC 2018, pp. 324–331). The Commission's findings were in line with evidence from ASIC, which found that:

This standard model of upfront and trail commissions creates conflicts of interest. There are two primary ways in which these conflicts may become evident. Firstly, a broker could recommend a loan that is larger than the consumer needs or can afford to maximise their commission payment. This may also involve recommending a particular product or strategy to maximise the amount that the consumer can borrow (e.g. through the choice of an interest-only loan). In this report, we have referred to this as a 'product strategy conflict'. Alternatively, a broker could be incentivised to recommend a loan from a particular lender because the broker will receive a higher commission, even though that loan may not be the best loan for the consumer. We refer to this as a 'lender choice conflict'. (ASIC 2017, p. 10)

These structures — with their associated reduced benefits of competition for consumers — remain in place, following the abandonment of a slated ACCC review.

Urban planning and competition

The availability of viable locations and sites for particular types of business activities can influence market entry in some sectors, with direct implications for business dynamism and competition at the local level.

Depending on the type of business, what is a viable site may entail consideration of the site size, accessibility, or proximity to other businesses, consumer populations, infrastructure or logistics networks. Scarcity of sites with particular characteristics is, to some extent, unavoidable in urban areas. In some cases,

commercial constructs can also influence the availability of such sites — commercial leases have previously been shown to guard against the introduction of new competitors.¹⁵

More broadly, planning and zoning regulations at the state and territory level have proven to be a significant lever for facilitating (or restricting) market entry. Such regulations usually exist to deliver agreed social outcomes — such as public health and safety, or environmental amenity — but are often very prescriptive rather than outcome oriented in their specification or implementation and thereby may unduly restrict the setup of particular types of business. This can impede new entrants, or limit scope for existing businesses to experiment with different service offerings.

Broader structural trends in some product and service markets — the rapid growth in online retail and the increased feasibility of more people working from their homes, for example — bring to prominence the need for some flexibility in Australia's planning and zoning systems. In many areas, these trends are contributing to the increasing need for delivery and warehousing in urban areas (given growth in both e-commerce and urban density), and a shift away from manufacturing and other industrial occupations, and towards knowledge-based occupations in urban centres.

The competition for viable sites is likely to affect competition in some secondary burgeoning markets, particularly in urban areas. For instance, the transition to low emissions vehicles has already seen significant private investment into electric vehicle charging stations — the need for stations at various locations will depend on factors including uptake, charging times, and proprietary technologies. Indeed, as multiple vehicle technologies enter the market (potentially including battery-swapping and hydrogen charging) the ability to establish convenient refuelling networks will have significant implications for competition in the vehicle market. (Climate change transitions are discussed more fully in chapter 3).

Improving dynamism through planning and zoning reform

While some progress has been made to improve planning and zoning across all jurisdictions, further improvements should be prioritised.

Reforms to planning and zoning laws in Victoria in 2013 and 2018 are a useful example, in that there are relatively few commercial and industrial zones; the zones are standardised and have a broad range of allowable uses; and many commercial uses are as-of-right. The reforms were largely found to reduce set-up costs and increase the availability of suitable sites for particular businesses (such as small-scale supermarkets and large format retailers) improving competition (PC 2020e). Broadly these experiences support the idea that business zones should be as broad as possible (as noted by Harper et al. (2015) and the Commission (2021a)).

Where planning regimes are more agnostic to uses, and zoning is broader, this also avoids the need for rezoning processes. Current rezoning processes often involve consideration of the effects on incumbent businesses, including from increased competition. To this end, Harper (2015, p. 45) recommended that planning decisions should not be adversely influenced by the potential for competition between individual businesses, nor by the impact on the viability of existing businesses; and that restrictions should not apply to the number of a particular type of retail store in a local area, nor the proximity of particular types of retail stores to each other.

¹⁵ Across 2009 and 2010, the ACCC reached agreements with all major supermarket chains operating in Australia that they would not enter into any new leasing agreement which includes restrictive provisions, nor would they enforce any restrictive provisions in current leases beyond five years after the commencement of trading. Signatories included Coles Group Limited, Woolworths Limited, ALDI Foods Pty Ltd, Franklins Pty Ltd, SPAR Australia Limited, Australian United Retailers Limited, and Metcash Limited.

The Commission (2021a) has previously suggested improvements could be made by pursuing administrative efficiency, including by aligning plans at different levels of government; and addressing simpler applications outside of the assessment process.

Government interventions that impede effective competition

In a number of industries, regulatory restrictions and other government interventions are themselves the cause for limited contestability or poor incentives for efficiency. Policy could be particularly influential in these industries, largely because they already have such a significant role in the market. Some key examples include publicly funded and delivered services, as well as markets subject to industry-specific regulatory frameworks.

Market mechanisms in publicly-funded and delivered services

Increasingly, publicly funded human services are delivered by a mix of public, private and non-profit service providers. As market stewards, governments play a central role not only in enabling access to key services such as healthcare, the justice system and education, but also regulating quality — either directly through service agreements or indirectly through funding and revenue incentive structures. In the past decade, significant progress has been made in introducing competition and user choice to human services, although the efficiency of these varies between jurisdictions (PC 2017a, p. iv). Market mechanisms themselves can entail issues, particularly in human services where social objectives are critical. This underscores the need for considered market design and implementation, as well as ongoing stewardship.

The Commission has previously commented on market design and implementation in a range of publicly funded services:

- The potential to promote efficiency in health services is discussed in full in the Commission's (2021) information paper on Implementing Innovation Across the Health System;
- Facilitating innovation in human services is discussed in more detail elsewhere in the Productivity Review;
- The Commission has previously identified that the social housing system in particular was an area requiring reform. A suite of policy recommendations will be made in the Commission's forthcoming review of the Housing and Homelessness Agreement Review.

Market competition should be considered a means to an end — while it can improve outcomes in human services, such benefits may have limits, as:

... greater informed user choice, competition or contestability will not always be beneficial, and not all areas of human services are amenable to these mechanisms. The costs and benefits of a reform option depend on the characteristics of the people accessing the service, the characteristics of the service itself and the market conditions where service providers and users interact. (PC 2017a, p. 64)

By acting as market stewards, governments have an ongoing role in making sure the system works towards the intended objectives, particularly for service users. For example, disability and aged care have adopted more user-centric models of service delivery, involving more user choice of service provider, often facilitated by digital platforms. The platforms themselves facilitate choice, but have little to no influence on the actual supply or demand for services. With regard to aged care, Yong et al. (2020, p.3) argue that in practice:

... even with perfect information on prices and quality, consumer choice is often restricted to local areas since most consumers only search for aged care services around where they live. Competition in aged care is localised, meaning that providers enjoy substantial market power if there are few competitors in the local market.

In addition, once a service user is accustomed to a particular provider, there can be monetary and non-monetary costs of switching to an alternative provider.

One of the key barriers to competition in care services is the lack of labour supply, particularly in less populated locations. The Commission is reviewing issues relating to the aged care workforce in a separate inquiry process (PC 2022b). To some extent, the supply of labour will continue to depend on migration policy settings (discussed in a forthcoming Productivity Inquiry interim paper).

Governments may have other levers to entice workers to join and stay in care services industries, particularly given the role of public funding. For example, individual care providers often face delays in receiving their payments, even where the services are fully funded. This relates to delays in providing payments to service users, who then have the autonomy to arrange payments to providers, as per the user-centric model. There are potentially a number of different ways to improve the timeliness of payment without removing user autonomy — for instance, payments could be subject to a bulk-billing function similar to Medicare. Delays in government-provision of payments could be subject to transparency mechanisms, as is the case with government enterprise payments to small business.¹⁶

Private health insurance

In private health insurance, prices and profitability are highly dependent on policy settings. Tax incentives influence consumers' choices to purchase health insurance, particularly at younger ages. Premium increases require ministerial approval. And premiums are subject to community rating, in contrast to other types of insurance which are 'risk rated' and influenced by personal circumstances, demographic factors, or past experiences.

The extent of government involvement in the sector reflects the role that private health insurance plays alongside Medicare in the funding and provision of health services. As noted by Private Healthcare Australia, subsidies for private health insurance cost 30 cents in the dollar, while the alternative of providing more public services would cost 45 cents in the dollar (David 2019).

While a competitive market exists, its ability to incentivise improvements in efficiency are muted within this unique regulatory framework. BUPA noted that despite the existence of a 'substantial number' of large funds in the Australian market, competition is 'stifled':

... by the legislative framework that requires a process of a single, annual premium increase for health funds approved by the Minister for Health. This limits flexibility in adjusting price throughout the year, both in response to consumer demand and competition. Furthermore, the single annual increase requires funds to hold additional capital to account for changes in market conditions that, in other sectors, would be addressed by adjusting price. This additional capital could otherwise flow through to consumers in the form of lower premiums. (BUPA, sub. 69, p. 13)

Moreover, the personal income tax incentives for private health insurance mean that overall, consumption of private health insurance does not depend on the quality of service provided by the industry collectively. Indeed, consumers may hold onto private health insurance despite reductions in value-for-money or quality of service, simply in order to retain the Lifetime Health Cover protections. While suppliers may provide high-quality services, the incentives to improve efficiency are poor relative to many other industries.

¹⁶ The Payment Times Reporting Scheme requires large businesses and large government enterprises to report their small business payment terms and times.

Regression analysis covering the period 2010-2017 found a decline in technological change for several Australian insurers, resulting in declining productivity growth (Nguyen 2021). Nguyen also found that firms varied in terms of efficiency, with a U-shaped relationship with firm size.

In terms of outcomes for consumers, value for money has been questionable. The Grattan Institute noted that the ratio¹⁷ between claims and revenue tended to vary considerably between providers, with some at or below the minimum ratios as legislated in the United States (Duckett and Moran 2021, p. 22). Consumers are also increasingly opting for plans with fewer inclusions and higher excesses (p. 7).

While a decline in the demand for private health insurance would place more pressure on public finances, so too would many of the solutions suggested by industry, including increased targeted subsidies and tax exemptions (David 2019). Others have called for greater scope for insurers to provide discounts to customers, including to incentivise good health choices (BUPA, sub. 69, p. 13) which would potentially test community rating principles. Other settings, such as the governance of prosthetics pricing, is outside the control of private health insurers themselves, but has significant bearing on their provision (Duckett and Moran 2021, p. 18).

Regulation of retail pharmacy

Retail pharmacy is subject to a specific set of regulations regarding market concentration. At the Commonwealth level, the Pharmacy Location Rules regulate where retail pharmacies can operate, in order to 'ensure a well distributed geographical spread of pharmacies across Australia'. At the state and territory level, the ownership of pharmacies is regulated — in most jurisdictions, regulation stipulates that only a registered pharmacist (or a family member) can own a community pharmacy, and restrictions apply to the ownership of multiple pharmacies that are located near each other. Such rules have not been unique to Australia, although several countries such as the United Kingdom and United States now allow pharmacies to be co-located with supermarkets.

Both sets of regulations come at the cost of competition in retail pharmacy (AMA 2021; King, Watson and Scott 2017; PC 2015). As noted by the Review of Pharmacy Remuneration and Regulation found that:

The Pharmacy Location Rules have not established robust competition between independent pharmacies in some locations. Rather, in some locations, either individual pharmacists or small groups of pharmacists have been able to monopolise some or all pharmacies. This is inconsistent with the objective of Australia's competition laws.

At the same time, the regulatory framework is often ineffective in delivering other intended benefits.

- It is questionable whether setting a minimum distance between pharmacies would be effective in supporting community access to pharmacies (including rural and remote communities); and consumer safety would be protected by regulating conduct rather than ownership (PC 2015, pp. 53–54).
- The rules have not effectively safeguarded community ownership as intended, given 73 per cent of pharmacies in 2018 were owned by four major retail chains (AMA 2021, p. 5).
- While the regulations attempt to improve accessibility, there are fewer pharmacies per head of population. When the location and ownership rules were introduced, the population-to-pharmacy ratio was 3000 people per pharmacy — this increased to an estimated 4365 in 2014 and 4426 in 2022.

¹⁷ This ratio averaged around 86 per cent prior to COVID-19, rising in 2020 likely due to the effect of COVID-19.

As such, current regulations that have the stated aim of reducing market concentration are likely to instead reduce competition and establish local monopolies, with little countervailing benefit. These impediments to competition are purely due to the regulatory framework and could be changed by governments immediately.

There are broader questions about how the role of pharmacists alongside other health professionals, and whether reform is warranted regarding the scope of practice (discussed elsewhere in the Productivity Review).

Competition with government business enterprises

Governments can contribute directly to more competitive and dynamic markets by ensuring that their own Government Business Enterprises (GBEs) do not enjoy competitive advantages by virtue of public ownership. The regulation of competitive neutrality plays a significant role in a relatively narrow set of industries (where GBEs face competition or the prospect of competition). Despite this, competitive neutrality has potentially material implications for productivity.

First, GBEs tend to operate in industries that were historically networks with natural monopoly characteristics, but were increasingly open to competition (often as technology progressed and the economy grew in sophistication). This includes NBN Co, Australia Post, Moorebank Intermodal Company and some urban passenger transport enterprises (states and territories). These industries provide infrastructure or inputs relatively broadly across the economy.

Second, competitive neutrality deals with aspects of competition that make a material difference, particularly given the size of the GBEs and their competitors. Issues of debt neutrality in particular (where GBEs have access to finance on favourable terms) can amount to material advantages in dollar values. This not only has implications for competition in those industries, but as is the case with other forms of industry assistance, it would have distortionary effects on investment generally.

A key question for governments is whether the regulation of Competitive Neutrality is still fit for purpose. Typically, competitive neutrality is not enforceable in a court of law — recommendations are provided to ministers and treated as a matter of public policy. Such recommendations are routinely ignored at the state and commonwealth level.

The Harper review recommended a review of competitive neutrality. One such review was initiated at the Commonwealth level in 2017, but was not completed. Similar reviews were initiated and abandoned in some states. Only NSW is continuing to undertake its review of NSW competitive neutrality regulations (undertaken by IPART).



Finding 1.2

Action on competition could focus on particular industries

Trends in competition suggest the need for vigilance. However, the need for and nature of intervention varies between markets, given the optimal settings for productivity growth are dependent on the specifics of the market and the nature of production. Policy could be particularly influential in industries where governments have a significant role in the market, including in several industries where Government Business Enterprises are prominent; in publicly funded and delivered services; and in certain financial services such as private health insurance.



Information request

The Commission welcomes submissions detailing:

- specific markets that exhibit poor competitive outcomes — where evidence suggests consumers are experiencing poor choice, where firms face poor incentives to improve efficiency, or where there are known barriers to contestability
- examples of where Australia's openness to foreign market entrants has improved or could improve contestability.

2. Openness to trade and foreign investment

Key points

- ✱ **International trade and investment will be critical for driving future productivity growth and building economic resilience.**
 - Trade in goods and services and foreign direct investment (FDI) are key sources of competitive pressure for domestic firms and important mechanisms for facilitating the diffusion of knowledge and innovation. The benefits of openness in shaping Australia's economy have materialised over many decades.
 - Supply chain shocks and global upheaval do not diminish the case for openness. Indeed, as a small, advanced economy, increased global linkages are likely to be the best way for Australia to build resilience to deal with global uncertainties.
- ✱ **Australia's FDI screening regime should properly account for national security concerns, but care should be taken not to disincentivise investment.**
 - Application fees for foreign investors are increasingly used as a tax base. There are limits to which such taxes can be used without affecting the supply of FDI into Australia.
- ✱ **Removing residual tariffs would reduce costs to importing firms and assist more advanced production processes that form part of global supply chains.**
 - Australia's tariff regime provides little protection to domestic firms. Tariff revenue is likely already outweighed by compliance costs to importing business, and this will increasingly be the case as preferential trade agreements proliferate.
- ✱ **Trade in services is likely to be increasingly significant for productivity.**
 - Growth of trade in services stems from the advancement and proliferation of technology, as well as rising incomes among Australia's trading partners. Barriers exist both 'at the border' and 'behind the border'.
 - There are multiple policy and regulatory levers that would help Australia participate in the global growth in trade in services, including improvements to migration and FDI policy settings, and licensing regulations.

2.1 Introduction

Both trade and foreign direct investment are associated with sustained contributions to living standards, predominantly through their role in promoting competition and resource efficiency, innovation and, thereby, productivity growth.

Import competition provides domestic firms with an incentive to find ways to reduce costs and improve product quality. Exporting firms can also become more efficient as they compete in overseas markets, as they are exposed to more intense competition and greater potential returns to innovation.

Foreign direct investment (FDI) can be a significant source of competitive entry in industries with high barriers to entry — as has been the case for the Australian airline, supermarket, and news media industries to name a few.¹⁸ FDI can also be a form of trade in services, when foreign businesses establish new businesses or take over existing ones. In addition, some international empirical evidence suggests that FDI leads to productivity spillovers where large multinationals are involved with local suppliers (Javorcik 2004).

Trade is also an important channel for businesses to access new technologies and knowledge, via imports of technologies embodied in capital and intermediate goods, FDI and trade in technology (Kiriya 2012). Recent evidence from Australian microdata suggests that exporting is strongly correlated with innovation (in particular, that exporting firms self-select into innovative activity) (Tuhin 2016); and that exporting by SMEs in some industries is associated with more novel innovation (Majeed and Breunig 2021, p. 15).

Trade and foreign investment have shaped Australia's economy

Trade and foreign investment have been key drivers of the structural shifts in Australia's economy over several decades, which have allowed production to specialise in areas of comparative advantage, bringing substantial national income gains.

- Trade policy settings underwent significant reforms across the second half of the 20th century, resulting in a dramatically more open economy. While significant tariff reductions were implemented in 1947 (reducing tariffs to 30 per cent) and 1973 (reducing most tariffs by 25 per cent), the successive reforms between 1986 and 2010 brought tariffs to their current, historically low levels (below 5 per cent on average). The effective rates of assistance to manufacturing and agriculture sectors declined accordingly over the long term (figure 2.1, panel a).
- Similarly, Australia's policy settings with regard to foreign investment underwent significant reforms during and since the 1980s¹⁹, increasing the role of FDI in Australia. Australia receives more foreign investment than it sends out, and in the past decade in particular, the growth of foreign investment has helped make up for declining levels of domestic investment. In the past 20 years, FDI has favoured mining, agriculture, and property (figure 2.1, panel b).

¹⁸ Foreign direct investment (FDI) refers to investments where the foreign investor has control, or a significant degree of influence, over the management of the enterprise or asset. Generally, it refers to situations where an investor holds 10 per cent or more of the voting power in an organisation, but can involve other situations where the foreign investor has the ability to affect the decisions of the enterprise.

¹⁹ The Foreign Investment Review Board was established in 1976, at which time foreign investment screening was operationalised through a number of tests: a requirement to demonstrate that the investment would generate net economic benefits for Australia; requirements for Australian involvement in the investment; and an 'opportunities test', which considered whether Australians had the first opportunity to invest in particular projects (FIRB 1988). These tests were replaced in 1986 by a 'national interest' test, which has been in place since that time.

- As Australia opened up to international competition and investment, this helped drive structural change in the industrial composition of the economy (figure 2.1, panels c and d). Since the early 1980s, Australia's exports have been dominated by mining, as the share of agricultural and manufactured exports declined.

Australia is also party to a number of regional and bilateral trade agreements, which have largely proliferated well after the major waves of unilateral tariff reductions. Australia has 16 such agreements in force, 10 of which were implemented in the past decade (DFAT 2022a). Australia has signed bilateral agreements with almost all of its major trading partners — around 90 per cent of Australia's imports will be covered by preferences once agreements with the United Kingdom, European Union, and India are implemented (PC 2022c).

Global trade has also expanded over the long term, as production and supply chains have become more interdependent. Today, international trade is increasingly geared towards product components that are on-sold to other countries for further processing. This has resulted in significant efficiency gains to producers both globally and in Australia.²⁰

Openness has been an integral part of Australia's development into an advanced service-driven economy, and indeed has become Australia's default setting.²¹ Some of the benefits of open trade and investment have accrued over many years, as resources have shifted between sectors (i.e. away from manufacturing and towards services) and within sectors (e.g. towards more efficient areas of agriculture and higher-value manufactures).

New global uncertainties beg old questions

The integrated nature of the world economy has implications for how risk and uncertainty are spread. Disruption to production in one country affects others in the global supply chain. Breakdowns in trade between two countries can have various implications for trading partners. Trade itself can spread some forms of disruption, particularly where it relates to biohazards or disease.

At the same time, global trade has changed the way risks are managed. For instance, trade is a way of diversifying risk, such as where imported goods can make up for sudden shortfalls in domestic supply. International cooperation and trade can help the development and diffusion of scientific responses to biohazards or disease.

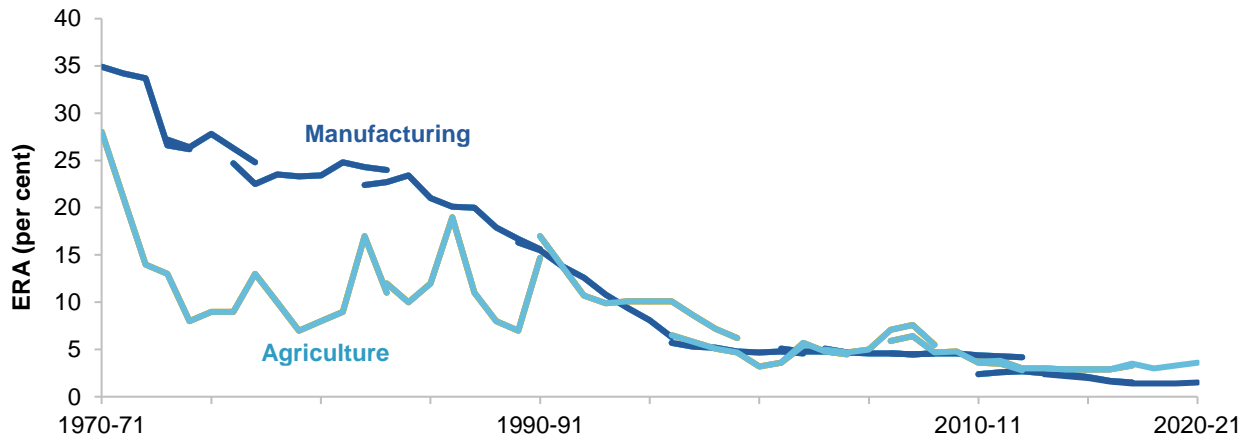
The double-edged nature of more open trade has been highlighted by the emergence of new sources of uncertainty in the past five years, including trade tensions, geopolitical events, and a worldwide pandemic — all of which are continuing to some degree (box 2.1). As a result, questions have arisen about the future of global trade, both for Australia and internationally.

²⁰ Australia's participation in global supply chains is primarily oriented towards the overseas processing of its exports, rather than the domestic processing of imported intermediate inputs for re-export. At around 15 per cent, Australia ranks relatively low internationally in terms of the foreign value added content of its exports — partly reflecting its specialisation in resource exports. The bulk of the foreign value-added embodied in Australian exports lies in mining products shipped to China.

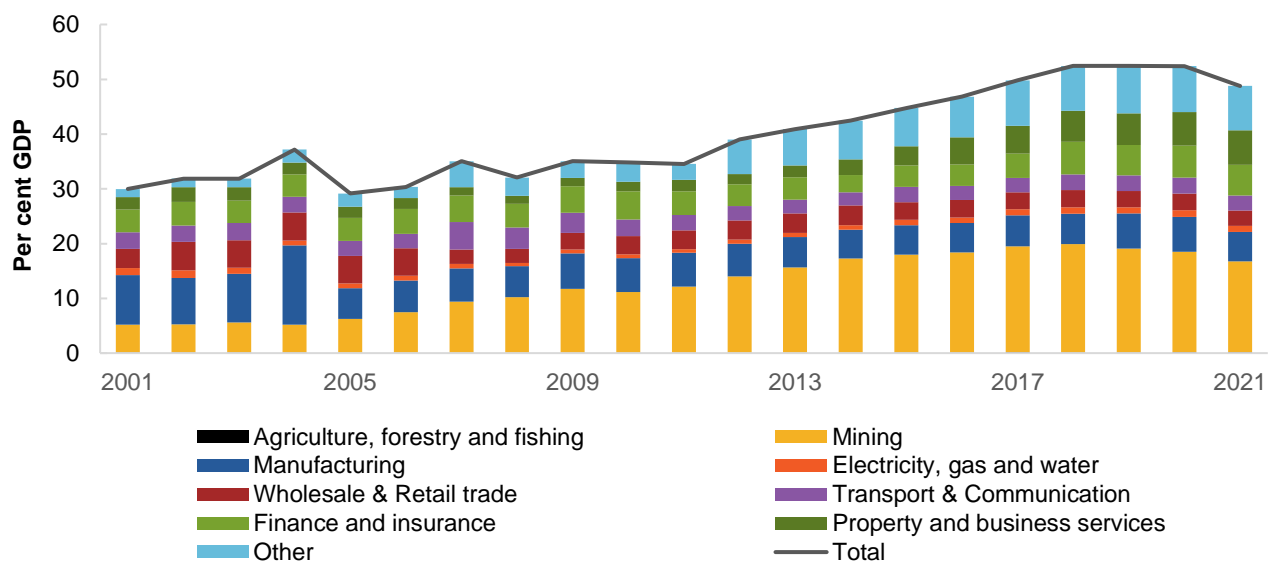
²¹ For example, there is evidence to suggest that the productivity growth experienced by Australia in the 1990s can be linked with the preceding microeconomic reforms, including significant trade liberalisation (Parham 2004; PC 1999).

Figure 2.1 – Trade and investment have shaped Australia’s economy

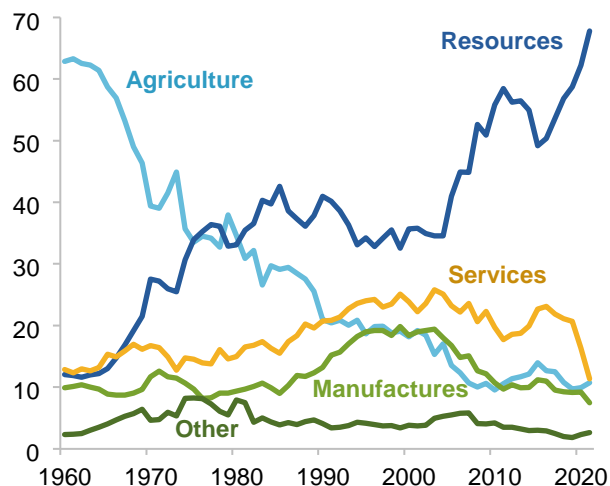
a. Effective rates of assistance have declined over several decades



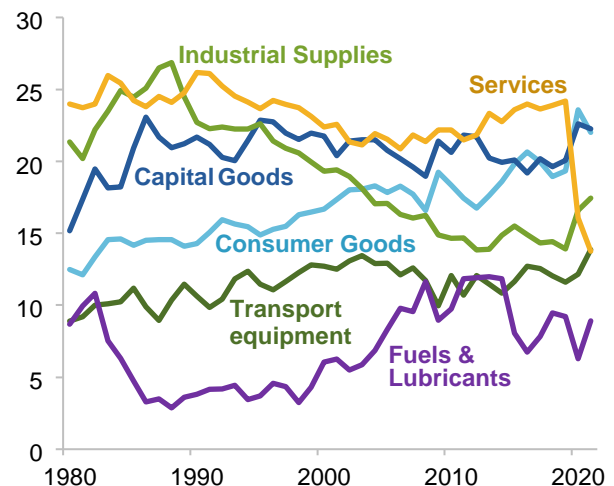
b. Foreign direct investment has increased particularly in some industries



c. Composition of exports (share of total)



d. Composition of imports (share of total)



Source: PC (2022d, 2022a).

Box 2.1 – Major sources of trade uncertainty in the past five years

The impact of COVID-19 on trade

The first two years of the COVID-19 pandemic led to widespread interruptions to economic activity. Despite recessions occurring in many countries, the negative effect on merchandise trade was relatively muted (figure 2.1, panel b).

Australian imports of consumer goods, for instance, quickly rose beyond pre-COVID levels. Between late 2019 and early 2022, Australian households maintained relatively stable consumption of essential goods, even increasing their consumption of discretionary goods (due to increased time at home and the lack of available services such as travel) (ABS 2022).

Protectionism and trade disputes

While protectionist sentiment arises from time to time in many countries, one of the more globally significant episodes occurred during the United States' 45th Presidential administration (between 2017 and 2021). Trade policy settings were in flux between the world's two largest economies — the United States and China.

Australia and China have also experienced flux in trade policy settings, with China implementing a series of trade measures in 2020 specific to Australian exports (PC 2021d), including:

- Anti-dumping tariff of 73.6 per cent and countervailing duty of 6.9 per cent on barley; and a tariff of up to 212 per cent and countervailing duty of up to 6.4 per cent on Australian wine;
- Suspension of imports from four Australian abattoirs due to mislabelling of products and health certificate requirements; suspension of relations with Australia's largest grain exporter, CBH, and another grain handler, Emerald Grain due to claims of weed seeds in a consignment;
- Preventing ships from unloading their cargoes citing quality reasons. Customs delayed quarantine inspection causing live lobsters to die at airports;
- Progressively suspending timber imports first from Queensland, then from Victoria, South Australia and Tasmania.

The incapacitation of the WTO Appellate Body has made it more difficult for dispute appeals to be heard and resolved (PC 2022d, p. 61). As an interim measure, an alternate body has been established by a subset of WTO members (not including the United States).

Trade bans caused by domestic shortage

Export bans have also been implemented in countries in order to manage price increases caused as domestic demand increases. Such bans are designed to protect domestic consumers from inflation, by forcing domestic producers to forego higher prices on the international market.

Recent examples include Malaysia's ban on chicken exports (in response to supply shortages) and China's global ban of urea exports (in response to domestic demands for fertiliser) (Lin and Chu 2022). The latter caused shortages in the diesel exhaust fluid AdBlue.

Geopolitical influences on trade

In early 2022, the onset of war in the Ukraine led to disrupted trade, particularly in food and energy (Ruta 2022). And while the energy shortages were felt most sharply in Europe, Australian fuel prices were also affected. The combination of the invasion of Ukraine; a lack of supply boost from OPEC; and

Box 2.1 – Major sources of trade uncertainty in the past five years

the ‘post-COVID’ recovery in global demand for oil, resulted in retail fuel prices reaching their highest levels since 2014 (ACCC 2022c).

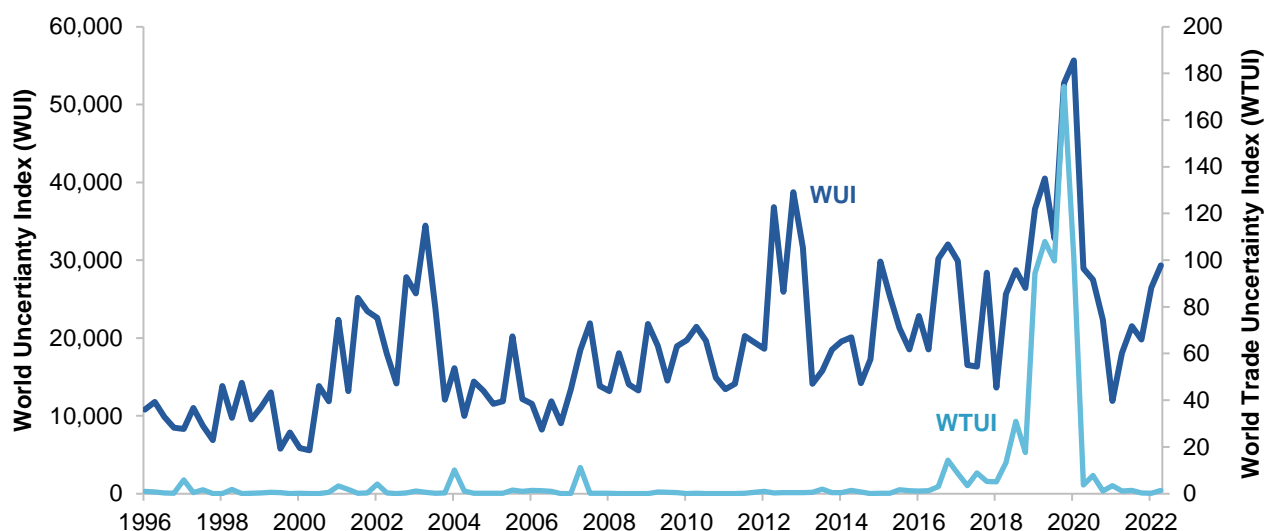
Trade and the climate transition

Other potentially significant developments are still in train, such as the potential for carbon border tariffs to be implemented in Europe and elsewhere. If the EU’s Carbon Border Adjustment Mechanism (CBAM) is implemented as currently proposed, it is likely to impact a relatively small number of Australian exporters (PC 2022d, p. 82). Greater costs could be levied on Australian exporters if similar carbon tariffs are adopted by Australia’s main trading partners.

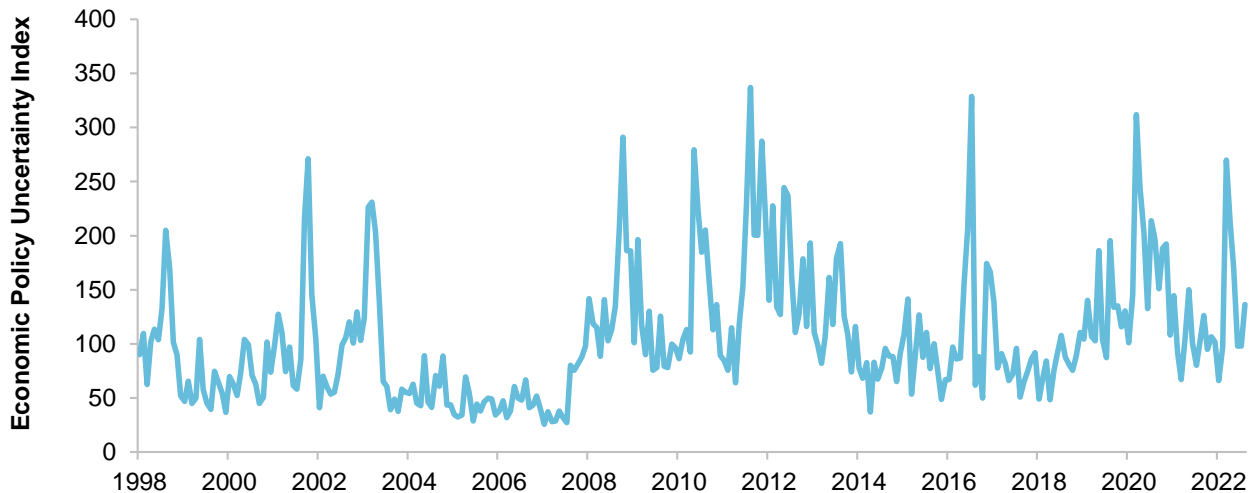
At a high level, evidence suggests that global trade flows have not diminished despite heightened uncertainty. Text-based indices of uncertainty show that the discussion of economic and trade uncertainty spiked during the trade tensions between the United States and China in 2016, and at the onset of the COVID-19 pandemic in 2020 (figure 2.2, panels a and b). In both cases, the resurgence of trade (both globally and for Australia) is suggestive of its central role in how nations manage major disruptive events. Moreover, in practice, the relationship between uncertainty and trade is not straightforward: the extreme uncertainty brought on by the global pandemic was less damaging to trade than the trade tensions in 2017, particularly for Australia (figure 2.2, panel c). This suggests that trade disputes — effectively, policy and regulatory risks — can provide the most significant shocks to trade itself.

Figure 2.2 – Trade tensions and COVID-19 caused significant trade uncertainty

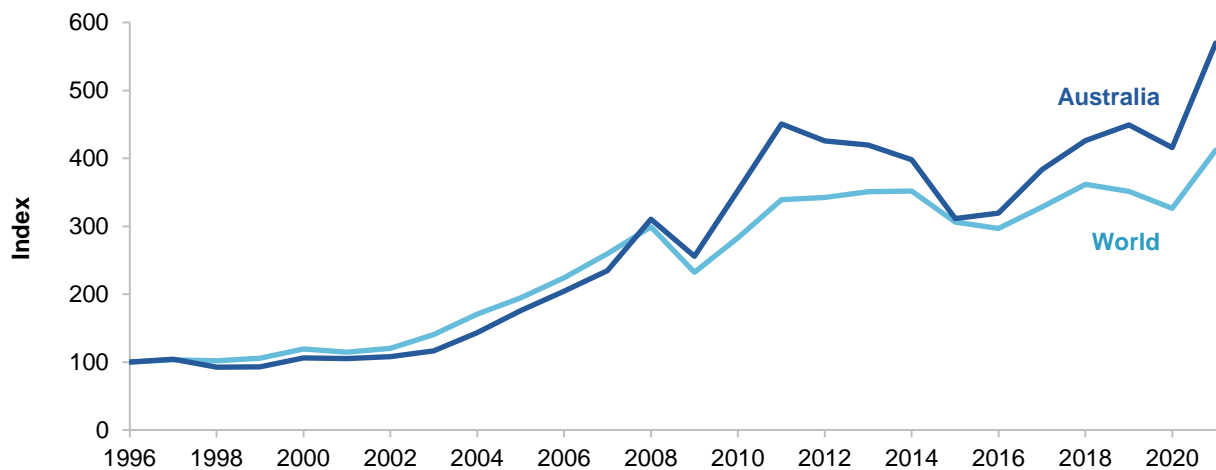
a. World Uncertainty Index and World Trade Uncertainty Index (based on text mining)



b. Economic Policy Uncertainty Index for Australia (based on text mining)



c. Global trade in merchandise



a. The World Uncertainty Index (WUI) and the World Trade Uncertainty Index (WTUI) are quarterly indices based on text searches. They are based on frequency counts of the word 'uncertainty' and its variants (and for the WTUI, uncertainty in related to trade) in the quarterly Economist Intelligence Unit (EIU) country reports of 143 countries from 1996 onwards. **b.** The Economic Policy Uncertainty Index for Australia is based on text archives for eight major Australian newspapers from January 1998 onwards, and is comprised of the number of articles containing the terms "uncertain" or "uncertainty", "economic" or "economy", and one or more policy-relevant terms: regulation, "Reserve Bank of Australia", RBA, deficit, tax, taxation, taxes, parliament, senate, "cash rate", legislation, tariff, war.

Source: Ahir, H, N Bloom, and D Furceri (2018 Updated to Q2 2022); WTO (2022).

The policy challenges for trade, investment, and productivity

As a small, open, advanced economy, trade and foreign investment will continue to shape Australia's exposure to competition and innovation. Both will influence the structure of Australia's economy. The state of global trade and investment will be an overarching determinant of productivity growth in both the short and long term.

While there are a great number of exogenous, international factors that are beyond the scope of Australia's decision-making, the Australian Government has relatively direct levers to determine the settings for trade and investment. How these levers are deployed in four key policy areas will have direct implications for productivity:

- Australia's overall approach to global trade and investment. Heightened global uncertainty has led to pressures for the Australian Government to intervene to bolster self-reliance. But decisions to intervene would bring their own risks and must be weighed carefully against the efficiency gains of openness — in practice, direct interventions would rarely be justified (section 2.2).
- With regard to merchandise trade, more open settings (globally) would improve productivity by allowing Australian exporters to access larger markets while decreasing the costs of imported inputs for domestic industry (section 2.3).
- Foreign direct investment introduces both competition and innovation to Australian markets but can also bring national security risks. Balancing the benefits and risks is challenging (section 2.4).
- As an advanced economy capable of delivering sophisticated services, the ability to trade services globally will help to shape Australia's productivity in the longer term. In the decade prior to the COVID-19 pandemic, Australia had only begun to participate in increasing global trade in services, often facilitated by digital technologies. Policymakers will need to be attuned to the impact of trade and investment settings, and 'behind the border' measures on Australia's services trade prospects (section 2.5).

2.2 Building trade resilience

The experiences of recent years have highlighted potential vulnerabilities in Australia's supply chains and the importance of 'economic resilience'. Several conceptualisations of resilience are relevant to Australia's productivity. The Commission has considered a 'resilient supply chain' as one that continues to function when exposed to shocks and adapts to changes (PC 2021d, p. 36). Others define economic resilience as the capacity to 'resist a particular shock and to recover rapidly to the previous level of growth or better' (Goetz, Fleming-Muñoz and Han 2016) or to 'prevent and prepare for, cope with and recover from shocks' (WTO 2021, p. 7).

Vulnerabilities in supply chains and markets often arise — and are resolved — without government intervention. For instance, 'just in time' production processes help firms minimise the costs associated with inventory, but can increase vulnerability to supply interruptions (PC 2021d; Stiglitz 2022). If multiple competing firms operate with similar processes, this raises the level of vulnerability at an industry level. As firms manage risks in their own self-interest, including through changes to sourcing, inventory, and production processes, this reduces vulnerability.

Even where such vulnerabilities do not relate to critical or essential goods, they can be relevant to productivity levels — particularly of the market sector. This raises questions regarding the role for government: namely, should government help avoid vulnerabilities altogether through trade policy; and to what extent should governments intervene in how vulnerabilities are managed.

This section considers the economic costs and benefits of different policy approaches. It does not include any analytical investigation of strategic concerns relating to geopolitical issues or national security.

Closing off is costly and strategic trade is tricky

Calls for 'onshoring' are a common response to global shocks. It is a truism that reliance on domestic production would avoid the risks associated with trade. However, it would involve forgoing the significant and ongoing mutual gains from trade. As discussed above, this not only affects the variety and costs of products and inputs, but also has implications for specialisation throughout the economy. Indeed, global trade has been relatively resilient to recent events that might otherwise have disrupted the economy.

While an absolute retreat from globalisation is unlikely, countries have increasingly in recent years been shifting their trade patterns and implementing forms of protection. For instance, the United States' approach

to strengthening supply chains will involve ‘partnering with allies’ (New Zealand Foreign Affairs and Trade 2022) — effectively biasing trade in favour of nations sharing geopolitical ties. The US Treasury Secretary noted that:

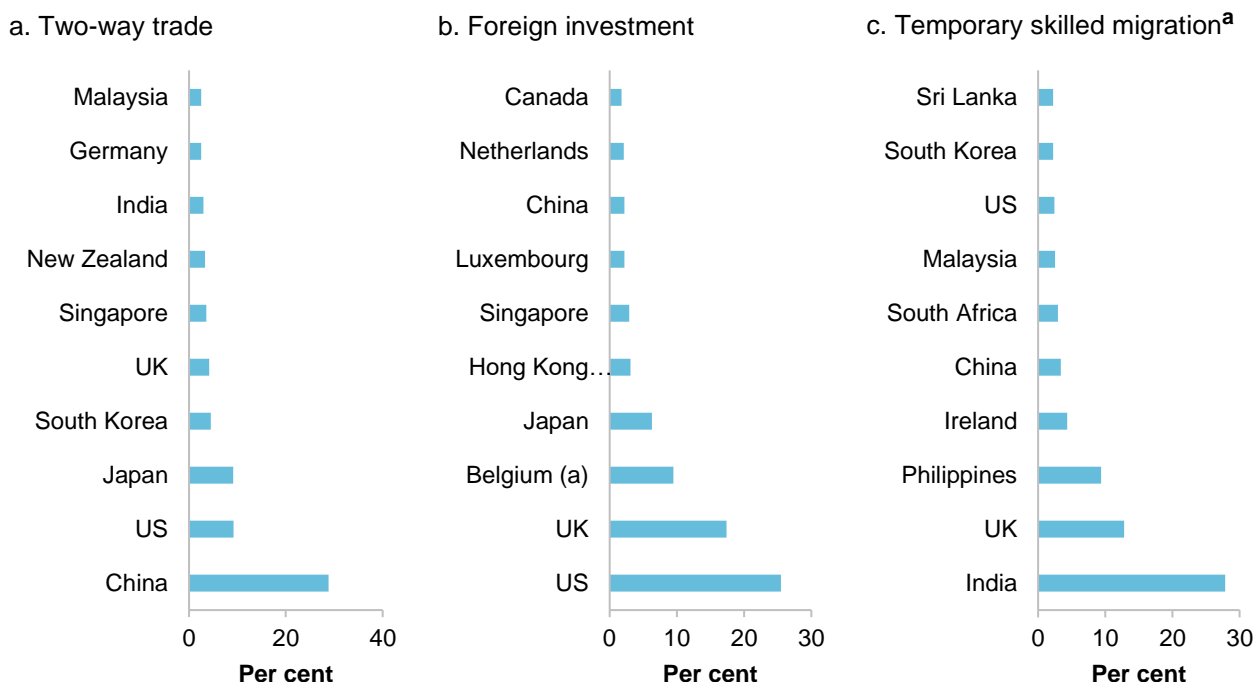
Working with allies and partners through “friend-shoring” is an important element of strengthening economic resilience while sustaining the dynamism and productivity growth that comes with economic integration. Friend-shoring is about deepening relationships and diversifying our supply chains with a greater number of trusted trading partners to lower risks for our economy and theirs. (Yellen 2022)

Governments could implement a range of restrictions or incentives to influence firms’ choices of foreign suppliers, and while this still realises some gains from trade, its distortionary effect is a risk to productivity. Businesses could be incentivised (or forced) to purchase goods at higher cost or lower quality than would have otherwise been the case. The implications for productivity would increase, the more broadly such actions were applied.

For Australia, the economic implications of any such shift in trade patterns would be shaped by its place in the global economy.

- First, trade patterns are determined, in part, by geographic proximity. Around 65 per cent of Australia’s two-way trade was within Asia (DFAT 2021c). Influencing markets to shift trade away from the region would likely entail substantial efficiency losses.
- Second, Australia’s trade is dominated by the world’s largest economic powers. Indeed, economic ties with Australia’s main trading partners also extend to foreign investment and migration. As such, strategic decisions with regard to one area of the economic relationship may have broader implications.

Figure 2.3 – Top ten source countries for trade, investment and temporary skilled migration
Percentage share of total inflows to Australia



a. Primary applicants granted.

Source: DFAT (2021c, 2021b); DOHA (2022).

Pragmatism for critical and essential goods

The Commission's report on *Vulnerable Supply Chains* developed a framework that allowed specific policy focus on 'critical' and 'essential' goods, as well as 'vulnerable' supply chains (PC 2021d). The Commission stressed that managing risks of supply chain disruptions 'inescapably entails costs on businesses, consumers and governments' (p. 1). As a fundamental principle, the Commission concluded that risks are best managed by those with both the incentives and capacity to mitigate them. In most cases, private firms are primarily responsible for managing risks in their supply chain, and governments need to consider the potential for interventions to 'crowd out' efficient private sector risk management.

At the same time, government intervention may be justified in isolated cases. This may include instances when private risk management is impeded (including by regulation) or where the residual risk resulting from market decisions is out of step with public benefit. Some ongoing functions of government are critical to risk management, such as ensuring regulations allow firms to adjust to major disruptions, and the promotion of a rules-based international trading system.

The policy response to a disruption will depend on specific circumstances — as exemplified by the recent shortages of urea for diesel fuel additives (box 2.2). A number of actions have improved Australia's access to diesel fuel additives, building a more resilient supply chain without moving entirely to domestic supply, nor to cease importing from particular suppliers. Neither was it necessary to adjust regulations relating to the use of diesel additives, which aim to promote environmental policy objectives.

The urea shortages also highlight that it will not be possible for governments to predict every vulnerability ahead of time. While the Commission (2021d) has provided a useful framework for identifying vulnerable supply chains, its empirical analysis did not identify the potential issues regarding urea (owing in part to data limitations). Moreover, it will certainly not be possible to predict every global disruption, nor stockpile for every shortage. As such, the 'response phase' will remain critical for policy.

Box 2.2 – A limited pragmatic approach for diesel fuel additives

The costs associated with managing supply chain vulnerabilities — to businesses, governments, and consumers — depends on the choice of strategy. These include:

... stockpiling, diversification of suppliers or markets, contingent contracting, developing domestic capability, or tolerating the residual risk, among others. They also depend on the state of preparedness of firms and governments. (PC 2021d, p. 1)

In late 2021, China's ban of urea exports led to shortages of the diesel fuel additive AdBlue, required for use of diesel fuels by Australian regulations. While this occurred after the publication of the Commission's report on *Vulnerable Supply Chains*, the framework of that report is useful in understanding the causes, adjustments, and alternate responses to the disruption.

Preparation, response, and recovery

Different risks are better treated in different stages. While a predictable risk might best be treated in the prevention stage, a highly uncertain risk might be better treated through response and recovery.

There appeared to be relatively little preparedness among businesses or government for a urea shortage, despite the critical nature of AdBlue and the highly concentrated import market for urea.

Box 2.2 – A limited pragmatic approach for diesel fuel additives

Diversification of supply

Australia continues to import the vast majority of its urea supply. At the time of the trade ban, China was the source of a significant proportion of the global urea supply and of Australian urea imports. At the height of the shortage, supply was increased from Indonesian exporters. Australia continues to import urea from China among other sources.

Domestic supply and stockpiling

The Australian Government provided a temporary subsidy to domestic firms to restart their production of urea in order to supplement imported supplies. No government stockpiling was undertaken.

Regulatory levers

The ACCC made a ruling to allow domestic producers of AdBlue to share information and collaborate to obtain adequate supply of refined urea, in the context of shortages.

An additional regulatory lever would have involved the relaxation of requirements to use diesel fuel additives in order to reduce particulate pollution. This lever was not used, perhaps due in part to the technical complications and warranty issues it could cause for some diesel engines.

A key form of preparedness for governments will be to have processes and principles in place to guide policy responses. To this end, the recent establishment of the Office of Supply Chain Resilience is a potentially useful addition to the decision-making infrastructure, as a source of expertise and due to its standing capabilities in monitoring.

In the rare cases that call for government intervention in the management of supply chains, the policy response can take many forms. The potential costs to public expenditure and to productivity can be material, particularly where such assistance is continued over time or gives rise to lobbying for its continuation and when firms fail to undertake their own risk management. Any such intervention should be subject to transparent and independent review.

Building resilience through openness

A key part of building economic resilience relates to vulnerabilities in the supply of critical goods. However, even these aspects of resilience are promoted by well-functioning markets, which themselves are bolstered (however indirectly) by open trade policy settings.

First, several Australian industries have proven relatively resilient in the context of recent world events, owing to their sophistication and adaptability. For example, the Port of Melbourne has noted that the freight and logistics sector proved adaptable and agile in the context of ‘increased regulatory controls, supply constraints, elevated demand, equipment shortages, changing distribution markets etc.’ (The Port of Melbourne 2021, p. 1). Other businesses leveraged existing capital infrastructure to produce new goods or services, including spirits distilleries pivoting to commercial production of hand sanitizer (Allen 2020). To the extent that resilience is the result of businesses’ access to capital or advanced management, these are likely to be improved by exposure to foreign trade and investment.

Similarly, protection can reduce economic resilience. If a trade shock leads to shortage, domestic firms and consumers will likely experience price increases — in addition to the costs associated with any tariffs. So firms and consumers suffer the cumulative effect on prices.

Second, Australia experiences significant supply chain disruption from *domestic* events. Major weather events affect agricultural yields in regional areas and other forms of production in urban areas. Goods that are not exposed to trade (including some fresh food products) can quickly fall into shortage. Trade has proven an effective way to reduce supply risks associated with domestic shocks.

Finally, to the extent that policy and regulatory risks are some of the main global risks to trade, it is important that Australia contribute to and promote more open trade. While under certain conditions regional or bilateral trade agreements can (collectively) contribute to more open global trade, greater contributions would materialise from Australia's participation in multi-party trade agreements and promotion of the international rules-based trading system.



Finding 2.1

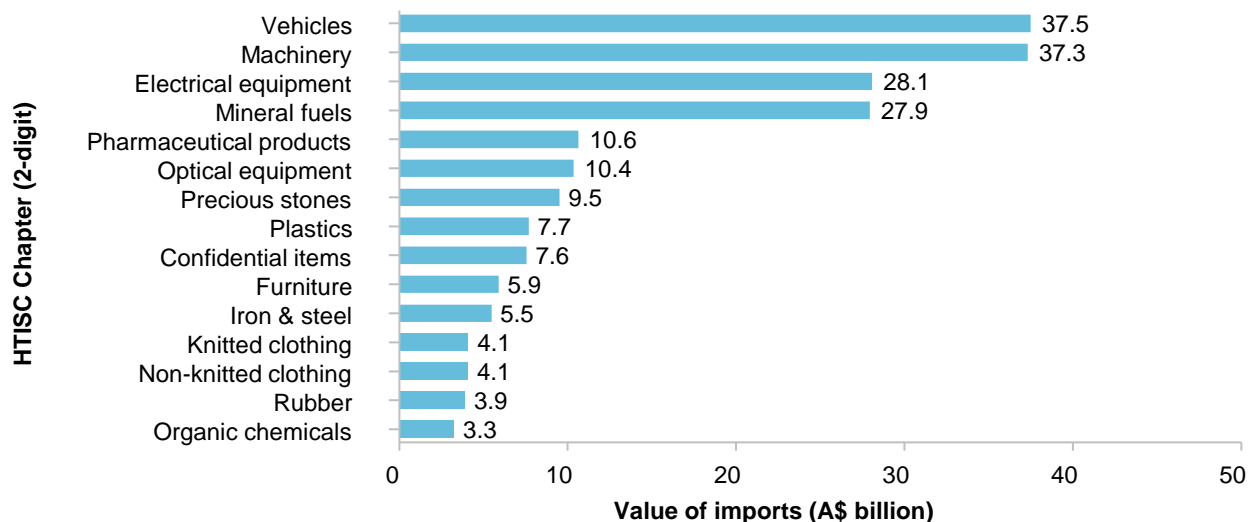
Building economic resilience and productivity through openness to trade and investment

Relative openness with regard to trade and foreign investment policy is conducive to productivity growth. Despite the presence of severe global economic uncertainty, Australia's productivity growth is best served by more exposure to the competition that comes with trade, more access to foreign direct investment, and a well-functioning rule-based system of global trade. Protectionism and industry assistance in the cause of 'self-reliance' would pose significant risks to productivity.

2.3 Addressing barriers to trade in goods

Both tariff and non-tariff barriers to trade result in costs for exporters to Australia and for Australian importers. The relevance to productivity is two-fold:

- Domestic firms may be less-exposed to import competition, removing a source of pressure to innovate, and leading to a misallocation of resources in the economy.
- The costs of imported inputs or capital goods can simply raise the costs of production for domestic producers, which also leads to suboptimal resource allocation. Australia relies heavily on the import of vehicles, machinery, electrical equipment, and fuels (figure 2.4), both for final consumption and as business inputs.

Figure 2.4 – Many of Australia’s imports are productive inputs**Value of imports by HTISC Chapter**

Source: PC (2021d).

The costs of tariffs

Australia’s historically low tariff levels are the cause of much less distortion to economic activity than was previously the case. However, the remaining tariffs are now responsible for a negligible amount of revenue and would offer relatively little protection to domestic producers. At face value, there is little difference between the economic costs associated with a tariff set close to zero and one set to zero.

However, Australia’s system of tariffs, concessions, and preferences entails compliance costs. Businesses expend resources (time and effort) to avoid paying tariffs. In its report on the Nuisance Costs of Tariffs, the Commission (2022c) has estimated total compliance costs were estimated to be \$0.7–2.2 billion in 2019-20. These costs arise mainly from businesses accessing preferences under preferential trade agreements.

- In some cases, businesses will avoid the compliance costs of preferences altogether and simply pay the statutory tariff. In such cases, the benefits of preferential trade agreements in reducing trade barriers is foregone.
- This can have uneven effects across industries and types of businesses. Smaller businesses will have fewer resources to devote to accessing preferences. Businesses importing more diverse mix of products will have a more complex task of understanding multiple tariff lines, or of obtaining certificates of origin from multiple suppliers. The combination of these factors are likely to affect, for example, importers of large shipments of vehicle parts, which may comprise hundreds of different parts from different manufacturers.

Some compliance costs could also be reduced by making it easier for businesses to interface with the tariff system — a process already underway via the Simplified Trading System (DFAT 2022b). However, other compliance costs would remain. For instance, importers need to comply with the rules of origin (RoO) contained in trade agreements which are imposed to prevent transshipment.²² But as Australia has implemented trade agreements with almost all of its trading partners, this reduces the incentive for transshipment and hence the need for strict RoO.

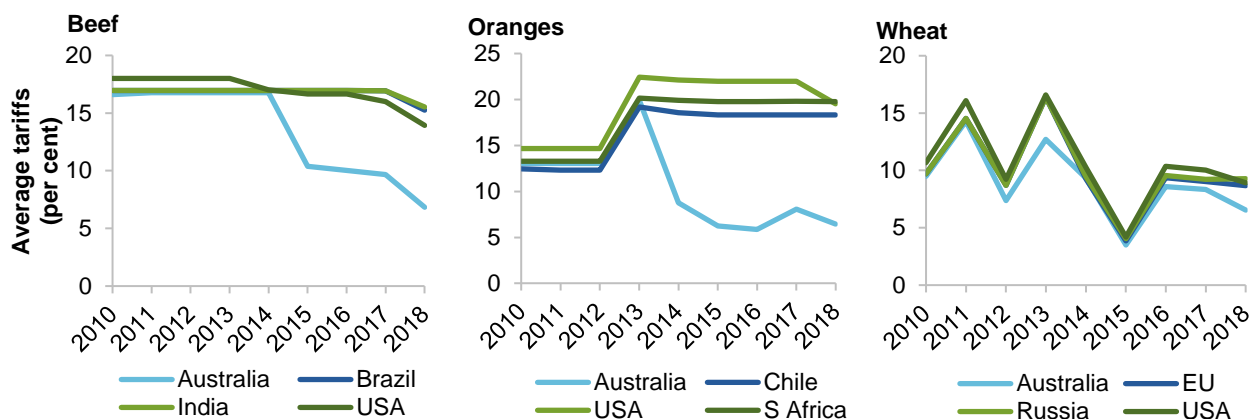
²² Transshipment refers to goods being shipped via an intermediate country to the destination country in order to benefit from the PTA that the intermediate country has with the destination country.

The compliance costs of tariffs would be avoided altogether if preferences were abolished, although this would leave Australian importers paying tariffs instead. Ultimately, reducing tariffs to zero would be the most effective way to reduce the costs to Australian importing businesses and consumers.

It is often argued that non-zero tariffs have inherent value in the negotiation of trade agreements. Aside from benefits to Australian importers, trade agreements remove barriers to Australian exporters operating in foreign markets. Australian firms may become more efficient when they can access overseas markets without barriers. In competing on more level terms with foreign producers in larger markets, they can be exposed to more intense competition and receive greater potential returns to innovation.

In some cases, trade agreements provide a trade advantage to Australian exporters compared to exporters in other countries (figure 2.5). For instance, when the Japan Australia Economic Partnership Agreement (JAEPA) was implemented Australia gained a tariff advantage over its competitors (such as the United States, Canada and New Zealand). However, these advantages were eroded as those competing countries signed agreements with Japan — at which point, JAEPA allowed Australian exporters to compete on equal terms with exporters from those countries (ABARES 2022, pp. 2–3). And while short-term tariff advantages benefit exporting firms, it is the longer-term effect of competition on equal terms that is likely to be conducive to productivity growth.

Figure 2.5 – Preferential trade agreements have benefited Australian agricultural exporters
Average tariff levels in Australia's FTA markets for Australia and other exporting countries



Source: ABARES (2022).

In any case, the Commission has previously found that most gains from trade liberalisation are likely to arise from domestic liberalisation (PC 2001, p. 5). This would suggest that unilateral tariff reform should be pursued regardless of marginal effects on trade negotiations.

In addition, it is unclear to what extent tariffs are valued in trade negotiations. Indeed, the value of Australia's remaining tariffs is likely to reflect the size of the Australian market as a share of global trade and the low rates of Australian tariffs (PC 2010, pp. 214–216). Given the size of compliance costs associated with Australia's tariffs, and the range of issues that are the subject of trade negotiations *aside* from tariffs, it is highly likely that the gains from domestic liberalisation of trade policy would outweigh the value of tariffs as leverage. Typically, governments do not attempt to estimate the opportunity cost of 'holding back domestic reform to maintain negotiating coin' (PC 2020c, pp. 11–12).

Tariff reform has only become more relevant given the state of the global economy in 2022.

- In the context of global uncertainty, building resilience in Australian industries (and the economy more broadly) would be bolstered by efforts to reduce the costs of imported inputs to production.

- Removing protectionism would improve the efficiency of resource allocation in the economy, which is increasingly important in the context of full employment conditions.
- Unilaterally reducing tariffs would send a strong message internationally in promoting freer trade, which is increasingly important where policy and regulatory risks are the main threats to trade.

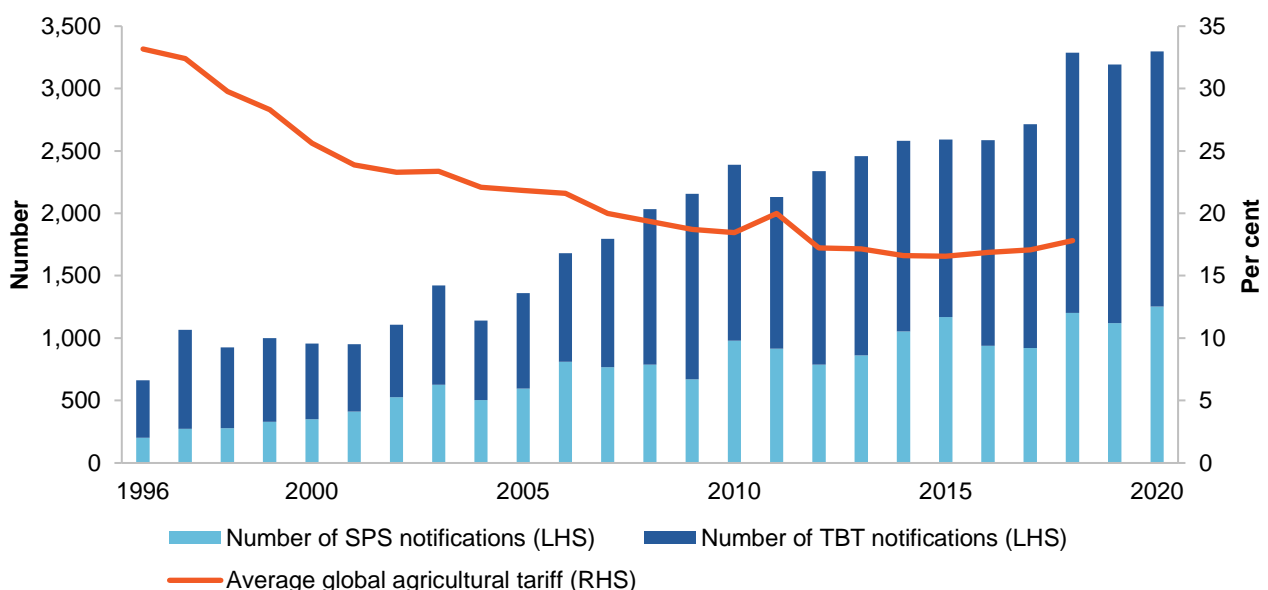
Shifting focus to non-tariff barriers

Non-tariff barriers to trade include administrative procedures or trade rules that ‘unjustifiably restrict the flow of goods and services’ (DFAT 2018). Non-tariff barriers at the border include certification and biosecurity requirements, pre-inspections, border and customs delays, product labelling, or packaging standards. Barriers ‘behind the border’ include regulatory rules, price controls, local ownership or foreign work regulations, rules of origin, or data storage and privacy requirements. The main forms of non-tariff measures (NTMs) faced by Australian exporters are technical barriers to trade (TBT) and sanitary and phytosanitary regulations (SPS), which account for the majority of NTMs faced by agriculture (ABARES 2022).

In the past 30 years, as global tariffs have declined, nations have become more and more likely to implement NTMs (figure 2.6). Globally, around 40 per cent of NTMs come from export certification, inspection and licensing. The economic cost associated with non-tariff measures has been estimated as being more than double that of tariffs (UNESCAP 2019).

Australia imposes a relatively high number of technical barriers to trade compared to others in the Asia-Pacific region (behind China, New Zealand, and South Korea), with the majority of NTMs imposed by Australia being technical barriers to trade. Generally, it is not uncommon for more developed economies to have more non-tariff measures, given their more developed legislative and regulatory frameworks (UNESCAP 2019). At the same time, Australia has been ranked the highest performer globally in its implementation of trade facilitating measures (alongside New Zealand), which partly offset the non-tariff measures (including transparent processes and paperless trade) (UNESCAP 2022, p. 10).

Figure 2.6 – Global tariff and non-tariff measures in agriculture



a. Technical barriers to trade (TBTs) relate to technical regulations, standards and conformity assessment procedures. Sanitary and phytosanitary (SPS) measures relate to human, animal and plant health.

Source: ABARES (2022)

NTM costs can stem from legitimate processes relating to quarantine and licensing and, as such, are not easily removed unilaterally or avoided through trade agreements. At the same time, some of the protectionism experienced in 2020 was in the form of suspensions due to mislabelling, quarantine issues, and customs delays (box 2.1).

With regard to non-tariff barriers implemented within Australia, the Australian Government launched a *Non-Tariff Barrier Action Plan* in 2018. The objectives of the plan were:

- to make it easier for business to report trade barriers
- to build the capability of frontline expertise to service Australian exporters
- to increase transparency of the government's actions to address non-tariff barriers (DFAT 2019, pp. 42–43).

While trade agreements help Australian exporters access foreign markets, their effect is limited with regard to NTMs. If governments are to reduce the risk of undue non-tariff barriers, this will require management of policy and regulatory risks through international cooperation on individual standards and general promotion of the rules-based system of trade.

Accepting international standards

The Australian Government regulates the first supply of certain goods through the use of standards and registers. These processes are administered to balance Australia's need for new and innovative imported products against consumer protections and public safety.

- Therapeutic goods will generally need to be entered in the Australian Register of Therapeutic Goods before they can be legal imported. The Therapeutic Goods Administration notes that their regulatory approaches are aligned with international counterparts wherever possible.
- Vehicle standards are regulated through Australian Design Rules, which cover aspects of vehicle safety, anti-theft, and emissions. Current Australian Government policy is to harmonise vehicle safety standards with international regulations where possible, with consideration given to the adoption of the international regulations of the United Nations.

In some cases, industry stakeholders have raised issues where such processes act as impediments to the use of less costly or more productive technologies. For example, the Commission's (2020a) report into National Transport Regulatory Reform found that ADRs (among other regulations) had discouraged or delayed the use of new heavy vehicle technology that could potentially improve productivity and safety (such as twin steer prime movers).

In 2021, the Australian Government sought comment on three potential changes to ADRs, relating to monitoring devices to detect other road users; wider vehicles; and vehicles with more efficient axle configurations. They noted that if implemented, some of the immediate benefits relevant to productivity include:

... less need for manufacturers to re-design or modify vehicles available in other markets ...

Further, the changes proposed in relation to vehicle axle configuration would help manufacturers to supply vehicles that are more efficient and/or productive, including vehicles able to complete the same freight task in fewer trips, which reduces both transport costs and exposure related crash risks (DITRDC 2021, p. 2)

With regard to the therapeutic goods, a review undertaken into medicines and medical devices regulation in 2016 resulted in several recommendations being implemented by the TGA, in part to reduce the time delay before imported medications reach the Australian market. These include the new priority review pathway and provisional approval pathway, which are slated to shorten the processes by up to three months and two years respectively (Therapeutic Goods Administration 2020).

More generally, where Australian standards present an impediment to state-of-the-art products from other advanced economies, this will increasingly be relevant to productivity as technologies progress. As previously recommended by the Commission, there would be value in accepting international standards that apply to goods, wherever practicable. While such standards would continue to play a crucial role in safeguarding public safety and consumer protections, it may be possible to make better use of international standards. In many cases, Australian consumers and businesses would generally be better served to the extent that standards adopted in other leading economies are ‘deemed to comply’ — a transparent review would still be possible in cases where the Australian Government identified a significant safety risk relating to an international standard.



Recommendation direction **Facilitating open trade in goods**

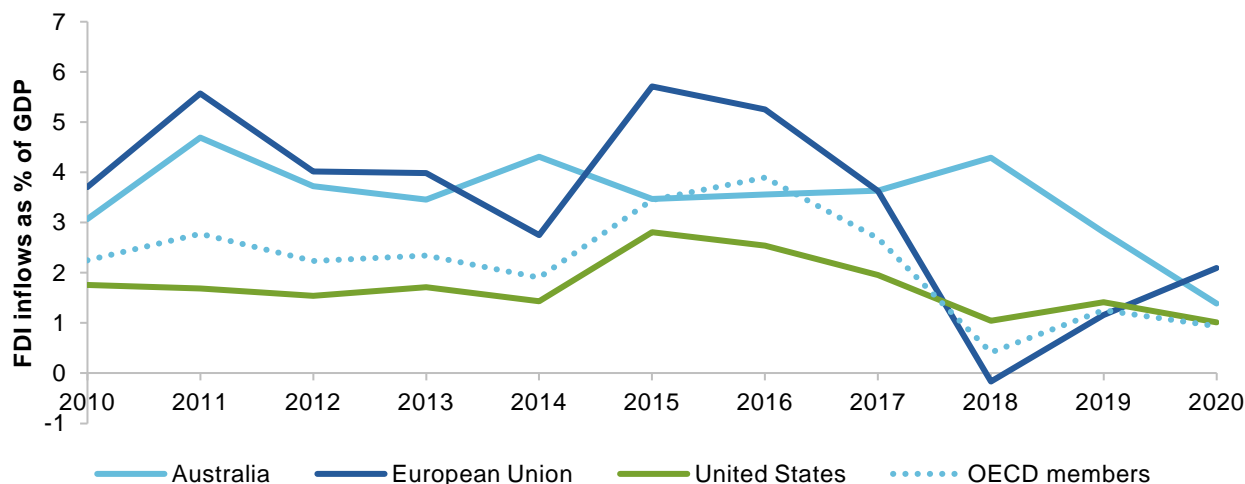
The Australian Government should promote open and resilient trade in goods, in part by reducing Australia’s statutory import tariff levels to zero and accepting international standards where practicable.

2.4 Avoiding undue constraints to foreign direct investment

Foreign investment has long been a feature of Australia’s capital markets. Broadly, as a net importer of debt-based financing, and a net exporter of equity-based financing, Australia has an interest in promoting the free flow of capital internationally. Inbound FDI flows have fallen as a percentage of GDP in recent years for Australia and several advanced economies (figure 2.7).

Foreign *direct* investment (FDI) is more directly associated with innovation at the firm level. For instance, Breunig and Majeed (2021) analysed the BLADE panel dataset of Australian businesses and found foreign ownership to be an important source of ‘technological growth and innovation novelty’, particularly for larger firms. Having foreign ownership was associated with a 1.2 per cent increase in the probability of new-to-Australia innovations, and a 1.1 per cent increase in the probability of new-to-world innovations.

Figure 2.7 – Australia has become less attractive destination for FDI
Inbound FDI flows as a percentage of GDP



Source: World Bank (2022a).

Opportunities to facilitate FDI flows

Governments have a role in regulating various aspects of foreign investment and, in doing so, to ensure the regulatory burden of compliance does not unduly deter investment. The importance of regulatory burden was reflected in recent industry consultations for the Australia's Service Exports Action Plan, where one of the industry recommendations (noted by the Australian Government) was to develop:

... accessible, user-friendly tools that give greater clarity to foreign investors on how they will be taxed in Australia (such as detailed 'scenario-based' taxation guides based around the categories of financial products specified in the APEC Asia Region Funds Passport). (DFAT 2021a, p. 46)

In 2020, the OECD found that Australia's FDI screening framework had been more restrictive than in most advanced economies (figure 2.8). A new foreign investment screening process began operation on 1 January 2021, implementing a more stringent framework largely designed to manage greater national security challenges. The key aspects of the new framework include:

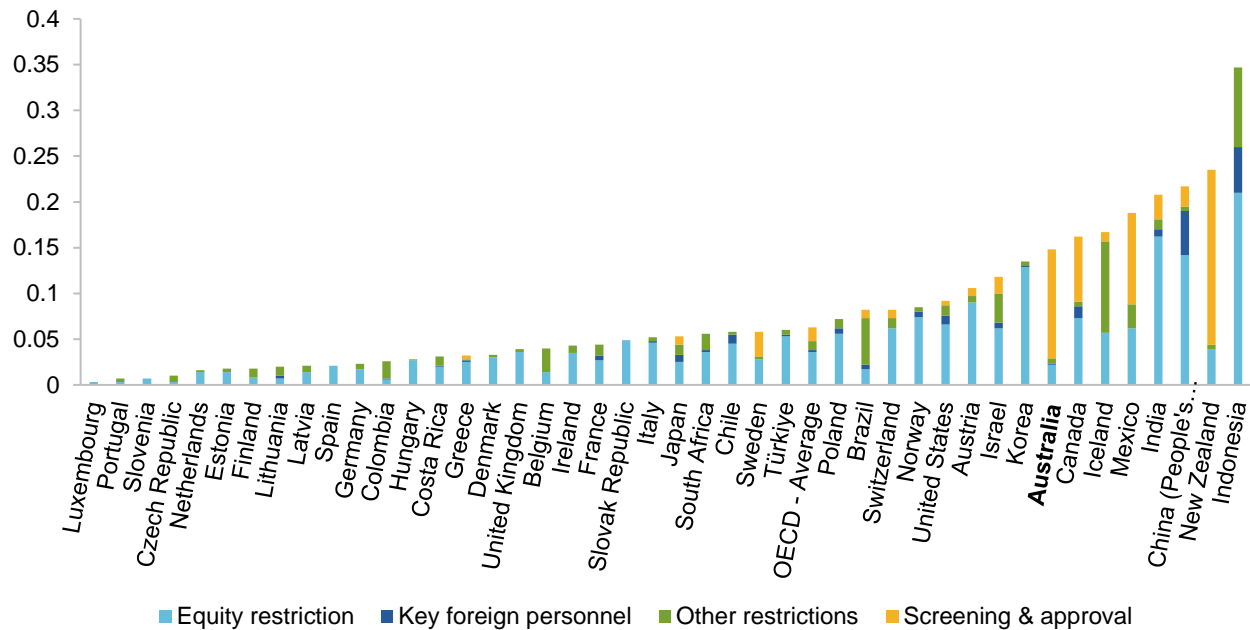
- Call-in powers for the Treasurer, allowing the Treasurer to review a foreign investment action that has not been notified.
- Last resort powers for the Treasurer, allowing the Treasurer to review investment actions which had been previously approved by the FIRB.
- Stronger enforcement powers for the FIRB, new categories of investments to be subject to screening, as well as a register of foreign ownership of Australian assets.
- A new fee structure for investment applications, involving higher fees across different categories of investment.

The Foreign Investment Review Board (FIRB) reported an overall increase in the number of FDI proposals in 2020-21, although trends differed according to the size and industry of investment (figure 2.9). The decline in lower-value investments could be a reflection of changes to application fees, which are now proportionally higher for the lower scale of investments. Alternatively, it could also reflect dampening demand for residential property and other categories of investment. Given that FDI levels are volatile year to year, and that the past two years would have been heavily affected by the uncertainty caused by COVID-19 pandemic, it will be difficult to determine the impact of recent changes to foreign investment screening for some time to come.

Figure 2.8 – Australia's FDI processes were already relatively restrictive in 2020
OECD FDI restrictiveness index

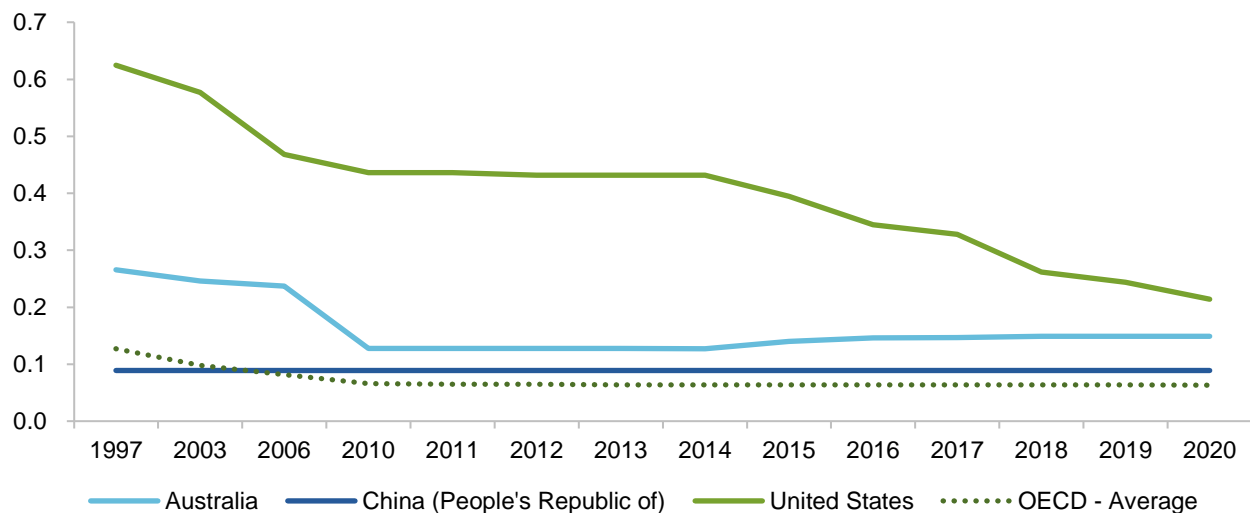
a. Screening is the most restrictive aspect of Australia's FDI policy

Index 1 = Maximum restrictiveness



b. Australia's FDI policy has long been more restrictive than the OECD average

Index 1 = Maximum restriction

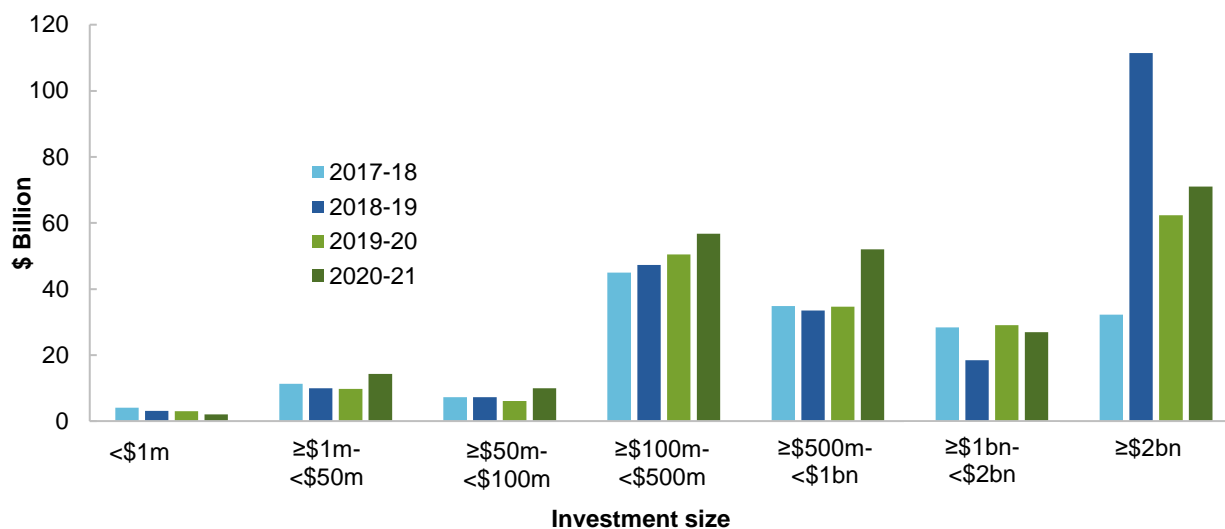


a. Australia implemented changes to its screening regime from 1 January 2022.

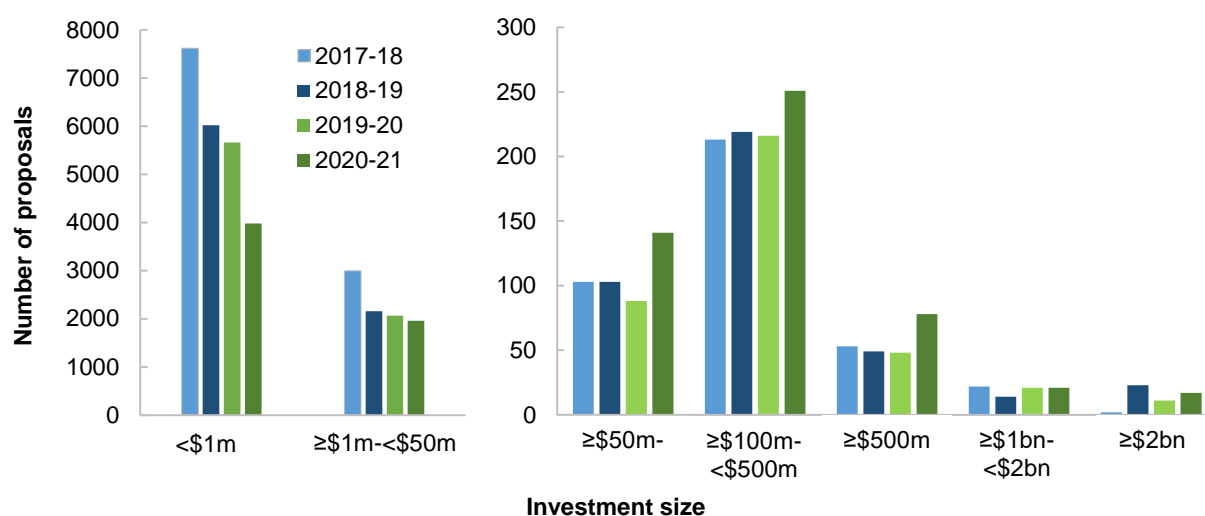
Source: OECD Foreign Direct Investment Regulatory Restrictiveness Index | Market openness Indicators.

Figure 2.9 – Trends in FDI applications vary by size and sector

a. Number of FDI applications by investment value



b. Value of FDI applications by sector



Source: PC (2022d).

Potential chilling effects of high barriers

What is certain is that the recent changes to the foreign investment screening process have increased the cost of making foreign direct investments (FDI) in Australia. This could be expected to reduce investment at the margin and to alter its composition.

One critical factor of Australia's screening framework is that it effectively places a tax on foreign investment (given that fees are in excess of cost recovery) at the stage of application (regardless of whether the investment is allowed to proceed). It is possible that over time, investors who have had previous applications rejected may reconsider their future investment intentions.

Moreover, despite fees that are already well in excess of cost recovery, they continue to be increased. Indeed, after being increased at 1 January 2021, they were doubled on 29 July 2022 (Chalmers 2022a). The most recent increase in fees alone was estimated to raise an additional \$455 million over the forward

estimates. Given the risk of affecting investment levels, the Australian Government should consider the efficiency of such a tax and its place in the tax system.

A further question relates to how the compliance costs of screening are treated alongside other 'costs at the border'. Namely, that aspects of the screening regime have been treated as potential subjects of negotiation for preferential trade agreements.

Australia has sought to liberalise trade and investment through Free Trade Agreements (FTAs) and will honour its commitments under those agreements. The commitments include negotiated higher foreign investment screening thresholds for certain investors. All proposed investments will, however, continue to be screened consistently, regardless of the country of investor. (Treasury 2021, p. 4)

This raises questions as to how well the framework is geared to protect against potential fraud or national-security issues. As a result of trade negotiations, screening thresholds are more forgiving for countries with which Australia has implemented trade agreements.

FDI flows into Australia bring a range of important benefits for productivity. Screening frameworks thus should be designed to promote both national economic and security objectives. Undue compliance costs for investors may have the effect of chilling investment at the margin, for little gain. The use of application fees as a tax base poses such a risk, in part due to the size of the fee for lower and middle investment levels, and in part because it is rendered at the point of *application* rather than against profits.

Australia should continue to pursue improvements to the taxation of FDI, through both the reduction of tax avoidance, and by participating in global efforts on international tax, such as the recent OCED agreement on minimum tax rates (OECD 2022). Such agreements will help to create global consensus on the taxation of new forms of trade and FDI, rather than contribute to protectionist sentiment.



Recommendation direction

The FDI review processes should avoid undue chilling effects on investment

While the Australian Government should ensure its framework for FDI review is effective in targeting potential fraud and strategic risks, its design should be cognisant of the potential chilling effects on investment. Application fees for the FDI review processes should not be used as a tax base.

2.5 Facilitating trade in services

As noted above, some of the gains from trade and investment are directly observable in the short-term — increased competition and innovation can improve market efficiency. Trade competition can also change how resources are allocated across the economy. Indeed, trade liberalisation has contributed to the formation of Australia's service-based and resource-exporting economy.

Trade in services will be increasingly important for Australia's productivity growth for two reasons: the majority of Australia's output (by value) lies in the services sector; and that global trade in services is likely to increase in scale (both in import and exports) (box 2.3).

Box 2.3 – Types of trade in services

Mode 1: Cross border supply

This occurs when a service is supplied from one country to another, but only the service crosses the border (i.e. neither the supplier nor the consumer moves). Examples of cross border supply include: an Australian company contracting an Indian company to provide call centre services (service debit); an Australian company providing legal advice over the phone to a company overseas (service credit).

Mode 2: Consumption abroad

This mode of supply occurs when the consumer moves across a border to access services (i.e. the supplier does not move). Examples of consumption abroad include: an American tourist consuming travel services (accommodation, food and entertainment) while they are visiting Australia (service credit); an Australian who travels to the United Kingdom to complete a university degree (service debit).

Mode 3: Commercial presence

Commercial presence requires the service supplier to set up operations in another country to provide services there. In this mode only the supplier moves from their resident country, establishing an on-the-ground presence in the consumers' market as a foreign affiliate. Examples of commercial presence include: an Australian university establishing a campus in Asia (service credit); a Chinese hotel chain opening a resort within Australia (service debit). (Mode three is not included in ABS international trade in services statistics.)

Mode 4: Presence of natural persons

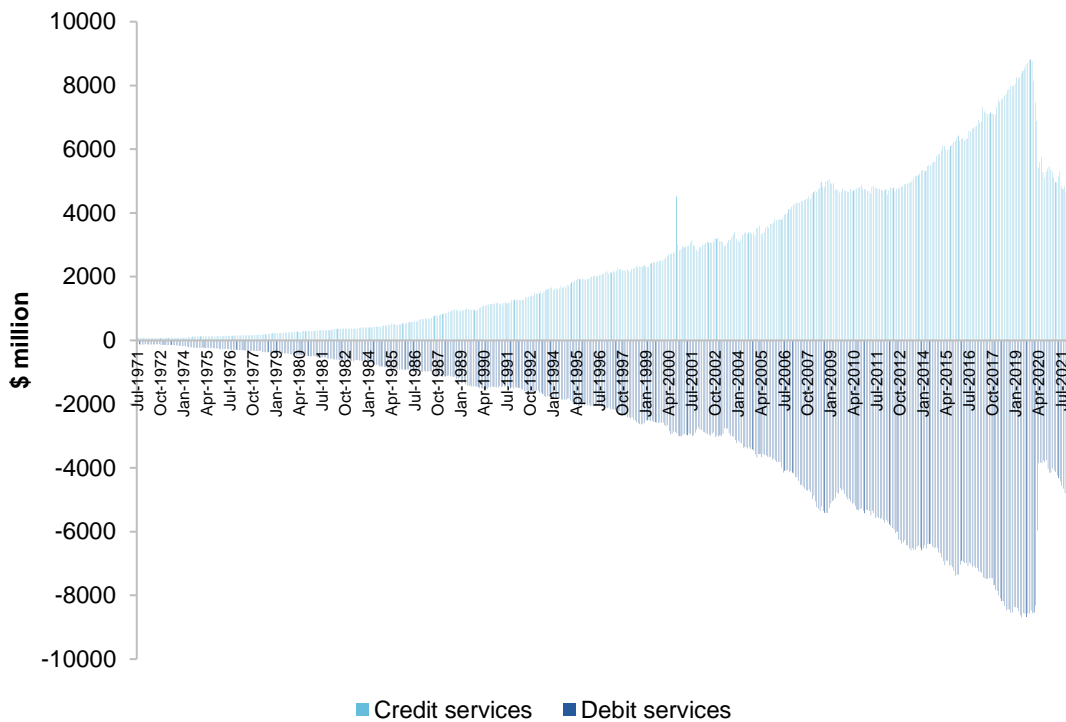
In mode four the services supplier moves temporarily from one country to another to deliver services. Examples of presence of natural persons include: an employee of an Australian software company flying to Fiji to deliver training (service credit); an architect from an UK-based firm working in New South Wales to provide consulting services for a new development in Sydney (service debit).

Source: ABS (2021b).

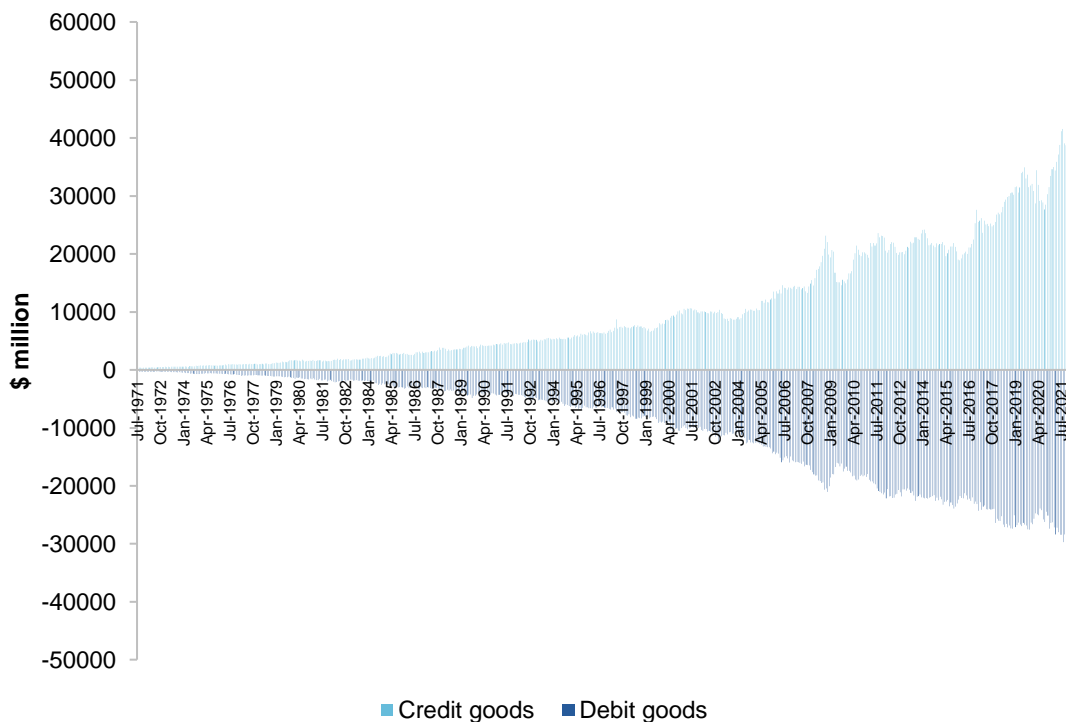
A number of global trends and developments led to strong growth in services trade prior to 2020. The long-term increase in incomes in developing nations have also increased accessibility of international travel and demand for sophisticated services (e.g. tertiary education). More recently, the spread of faster internet connectivity has allowed services to be delivered remotely that would not have been possible a decade ago. The COVID-19 pandemic supercharged the utilisation of remote working technology and normalisation of cross-border supply of a greater number of services.

At the same time, the response to COVID-19 had a strongly negative effect on Australia's two main service exports — education (primarily to on-shore international students) and tourism. And while international borders have reopened, travel patterns for study and tourism have not returned to pre-COVID levels. As a result, Australia's service exports have recovered less strongly than its trade in goods (figure 2.10) and less strongly than other advanced countries (figure 2.11).

Figure 2.10 – COVID-19 had different effects on trade in goods and services
Credits and debits in services trade



Credits and debits in goods trade



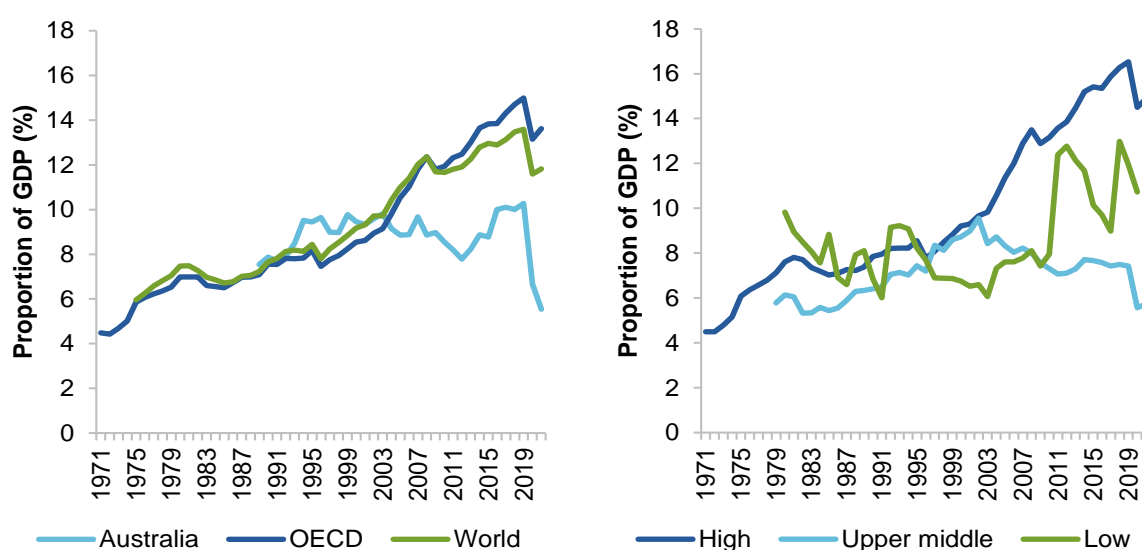
Source: ABS (*International Trade in Goods and Services*. Australia, Cat. No.5368.0)

This suggests that while opportunities for trade in services are likely to grow post-COVID (including for Australia's major service exports) harnessing these opportunities may require some adaptation. This has already been the experience of Australia's education exports, which underwent a pivot towards 'cross border supply' to supplement its reliance on 'consumption abroad'. The onus rests largely on businesses to adapt to these new circumstances, including by investing in new technological solutions.

For governments, facilitating trade in services entails different complications than for trade in goods. One role for governments is to ensure open trade policy settings. Another involves reform across the regulatory landscape in order to make trade in services more practical, and to make Australia a more attractive market for trade.

Figure 2.11 – Trade in services as a proportion of GDP

Trade in services by national grouping; trade in services by national income



Source: World Bank (2022b).

How restrictive are current policy settings?

The OECD found that the global regulatory environment became more restrictive in 2020 across all services sectors covered by the Services Trade Restrictiveness Index (STRI), despite governments lowering barriers to digital trade in 2020.²³ While Australia has not been immune to this trend, Australia's regulatory landscape is less restrictive on trade in services than most comparable countries (box 2.5).

To this end, there has been mixed progress in terms of multilateral agreements on services trade. There has been little to no progress in establishing a Trade in Services Agreement (TiSA) and no new rounds of negotiations have taken place since 2016 (DFAT n.d.).²⁴ However, some progress has been made on digital services trade, mainly by including e-commerce provisions in 14 of Australia's trade agreements, as well as the Digital Economy agreement with Singapore.

²³ The OECD's methodology for estimating regulatory restrictiveness to trade in services involves several simplifying assumptions and proxies. The qualitative assessment of each country is based largely on binary (yes/no) questions, with thresholds applied in some cases.

²⁴ Twenty-seven WTO members (including Australia, and representing 70 per cent of global trade in services) initiated negotiations for the Trade in Services Agreement in March 2013 (DFAT n.d.; US Government n.d.). The Agreement was intended to reduce barriers to international trade in services (DFAT n.d.) and deal with modern trade concerns such as cross-border data flows (US Government n.d.).

Box 2.5 – The OECD Services Trade Restrictiveness Index

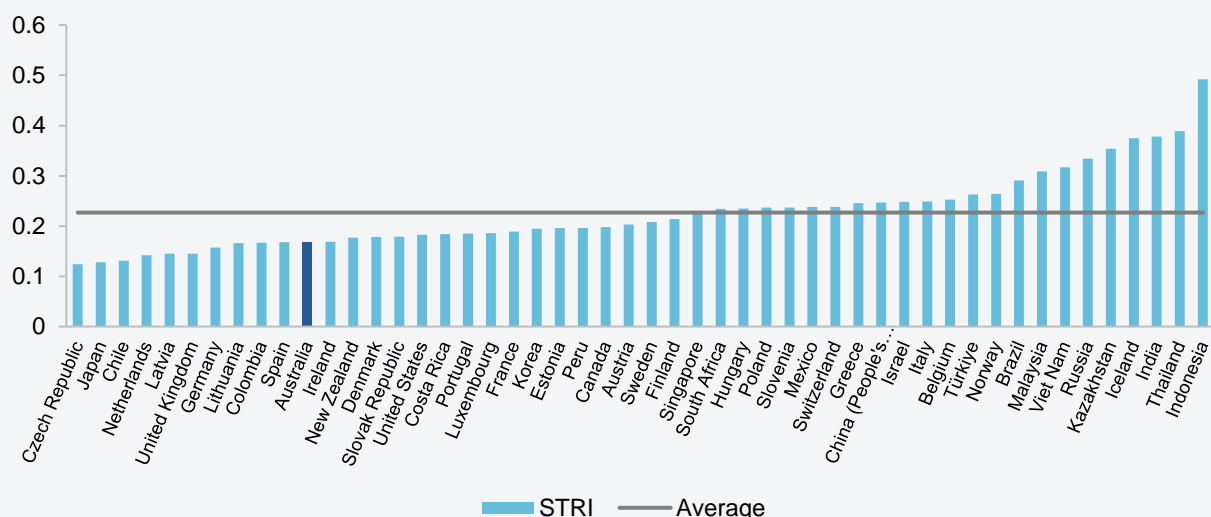
The OECD STRI collects information on services trade restrictions across 19 major services sectors. The project has two distinct but complementary instruments: a services trade regulatory database and a services trade restrictiveness index. These instruments provide a rich source of information for trade policy makers, trade negotiators and researchers, and an instrument for impact assessment of trade liberalisation. The STRI further allows individual countries to benchmark their services market regulations against the global best practice, identify outlier restrictions and current bottlenecks.

The regulatory database contains laws and regulations collected from 45 countries: the 36 OECD Member economies, Russia and key partners (Brazil, China, India, Indonesia, Malaysia and South Africa), as well as countries having accession discussions with the OECD. Based on the qualitative information in the database, composite indices quantify the identified restrictions across five standard policy categories, with values between zero and one. Complete openness to trade and investment gives a score of zero, while being completely closed to foreign services providers yields a score of one. Some factors considered in the STRI include:

- foreign equity restrictions (e.g. limits on foreign equity share)
- statutory monopolies
- duration of stay for temporary services suppliers
- public procurement practices
- visa processing times
- time, cost, and number of procedures required to register a company
- requirements for nationality for a full licence; or requirements to redo their training.

Australia is less restrictive than most comparable nations

Index 1 = Maximum restriction



Source: OECD (2022).

A range of policy levers facilitate trade in services

The Australian Government outlined their interest in boosting services exports beyond education and tourism in the 2017 Foreign Policy White Paper. The Australian Government subsequently outlined the Services Exports Action Plan (SEAP), which aims to promote open trade in services, including through ‘ease of movement of people, capital, services and data across borders’ (DFAT 2021a) (box 2.6). While in some cases, the Australian Government can only address these barriers by representing Australia’s interests in international fora (such as via the WTO and trade agreements), several aspects of the Australian regulatory environment are likely to contribute to the facilitation of service imports and the attractiveness of Australian service exports.

The OECD’s STRI provides a useful taxonomy of regulations that affect the relative openness of policy settings to services trade — many of which are discussed elsewhere in this report.

Tax and compliance costs, including the costs associated with procedures required to register or unwind a company, are among several fundamental aspects of business regulation that have a direct influence on investment (chapter 1), but have not been examined in full in this report.

- Foreign equity restrictions apply in several countries, often involving caps on equity holdings for foreign nationals. As discussed above, the more prescient issues facing FDI inflows to Australia involve costs and compliance costs at the border. Application fees in particular should be set with (tax) efficiency in mind.
- Occupational licensing is an important safeguard for quality of service in many occupations, particularly where information asymmetries can prevent consumers and clients from choosing appropriate suppliers, and particularly where health and safety risks are present. However, a misalignment of licensing regimes between Australia and other countries, or rigidities in licence recognition between jurisdictions, can prevent qualified suppliers from providing services within the Australian market.
- Temporary migration can make the delivery of services difficult in practice — not only in terms of policy settings, but their administration. Services supplied via a commercial presence may require temporary migration. Decisions are likely to be affected by the allowed duration of stay for particular visas, as well as the processing times, compliance costs, and uncertainty associated with visa applications (discussed in a forthcoming interim report).

With regard to migration, the skilled worker visa subclasses are likely to be of particular relevance trade in services. However, trade in services may also benefit from the migration of entrepreneurs. This would include highly skilled workers who operate their own businesses — fulfilling supply contracts for Australian clients as opposed to being employed by Australian businesses. The differences between these types of suppliers is merely contractual, and should have access to equivalent arrangements in the migration system.

The Commission has previously pointed out significant issues with the design of Significant and Premium Investor Visas. They do not effectively target forms of investment that are otherwise lacking, and are subject to relatively lax requirements compared to other permanent migration visas (potentially leading to poorer migration outcomes or fraud). There are good arguments for abolishing these visas as they currently stand. However, there would be value in devising new visas to better target entrepreneurs involved trade in services.



Finding 2.2

Global trade in services will be a significant development for Australia

As an advanced service-based economy, Australia has potential to benefit from the global increase in trade in services. But maximising the opportunities will require consideration of not only trade policy, but also tax settings, occupational licensing, and migration settings.

Box 2.6 – Australia’s Services Exports Action Plan

The Department of Foreign Affairs and Trade (DFAT) were given \$1.5 million to ‘develop an industry-led initiative to address barriers to Australia’s services exports and boost our services competitiveness’ (DFAT 2021a, p. 17). The plan identified five macro-level outcomes that reflect the interests of Australia’s services sector:

- free and open international trade in services
- best practice systems and rules across Australia
- world class skills and talent
- cutting edge and internationalised services in Australia
- information-driven policies and business strategies.

The action plan contains 72 recommendations, of which, the Australian Government has agreed to, agreed-in-principle or noted 64 and not agreed to 8.

What was not agreed in the Australian Government’s initial response?

- Commission an independent review of Australia’s skilled visa regime.
- Lift the restrictions on skilled migration to include people over the age of 50 to improve Australian services firms’ access to qualified personnel. (Age limits only apply to permanent migration).
- The Australian Prudential Regulation Authority (APRA) should review prudential, licensing and capital requirements for Australian financial services exporters, with a view to ensuring regulatory arrangements do not unfairly prejudice the ability of these firms to establish an offshore commercial presence.
- The Australian Government should expand the Australian Securities and Investment Commission (ASIC) mandate, requiring it to consider the effect of decisions on the international competitiveness of Australian financial services firms offshore.
- Ensure Australia has ready access to the best tech talent. In addition to recommendation 5A, one option could be to expand the New Colombo Plan to facilitate technology-focused learning exchanges with USA.
- With input from the financial services sector, DFAT should review the extent to which information from Treasury, ASIC and APRA is captured in the FTA Portal, with a view to providing more comprehensive and consolidated information for financial services exporters.
- The Government should extend grant limits and raise the revenue threshold of the Export Markets Development Grant (EMDG) scheme to support established firms entre new and challenging markets overseas.
- Establish a regulatory sandbox that allows health services firms to offer low-risk health services and digital tools to controlled markets, providing an early market test for safety, efficacy, economics and enabling pre-market surveillance for regulators

Source: DFAT (2021a).

3. Managing the climate transition

Key points

- ✱ **Climate change looms large over Australia's near-to-long term productivity performance. Its potential physical impacts, and the policy steps taken to limit them, will affect productivity growth.**
 - Climate change is expected to directly impact productivity in agriculture, fisheries, tourism, and in those sectors that rely on physical labour in heat exposed environments.
 - Alongside these expected physical impacts, policy efforts to contain the costs of climate change, either by reducing emissions or by adapting to a changing climate, will come with their own costs.
 - Policy responses by the world's major economies risk impacting demand for key Australian exports.
- ✱ **The pursuit of least cost mitigation and adaptation policies could help minimise climate-related risks to Australian productivity growth.**
- ✱ **Broad-based explicit carbon pricing mechanisms generally promote least-cost abatement across an economy. However, Australia has implemented a suite of alternative policies that impose a range of implicit carbon prices on the economy, some much higher than likely under explicit carbon pricing.**
- ✱ **Depending on its design, a reformed Safeguard Mechanism can help transition Australia towards a less costly, and potentially more equitable, approach to emissions reduction policy.**
 - The broader the range of emissions sources it applies to, and the greater the transferability of emissions rights between sources, the lower the overall cost of Australian emissions reductions.
 - These gains will also depend on the credibility of offsets recognised by the Safeguard Mechanism.
- ✱ **Policy coordination between the Commonwealth and other levels of government will be important during the transition. Proponents of additional mitigation policies should communicate and demonstrate how they are complementary to a reformed Safeguard Mechanism. The implicit carbon price of additional measures should be independently estimated and made public.**
- ✱ **Australia will have to prepare for additional climate change, regardless of the speed of emissions abatement over coming decades. An efficient adaptation policy should focus on three tasks:**
 - helping individuals, households and business to make informed adaptation decisions
 - avoiding policy settings that directly or indirectly constrain those adaptation decisions
 - avoiding locking in development pathways that lead to higher future adaptation costs.

Climate change will loom large over Australia's productivity performance over coming decades. Its physical impacts, and the international and domestic policy steps taken to limit them, will affect productivity growth. The physical impacts of climate change stand to be profound (section 3.1) and will directly constrain productivity growth in sectors that are important to Australia, including agriculture, fisheries, tourism, and sectors that rely on physical labour in heat-exposed settings (box 3.1).

Alongside these impacts, policy efforts to contain the costs of climate change, either by reducing emissions or by adapting to a changing climate, will also affect productivity growth. Some individual climate policy measures may prove to have a long-run positive impact on productivity, such as a distributed renewable electricity grid being less exposed to disruptive international energy price volatility, and reducing the broader environmental and social costs of production will come with its own benefits. However, the latter are not directly included in conventional measures of productivity, and to the extent that emissions abatement efforts increase the direct costs of production, they will weigh on measured productivity.

Nevertheless, the productivity costs of climate policy will likely be lower than the productivity costs of unmitigated climate change. The pursuit of least cost mitigation and adaptation policy will increase the likelihood of that being the case. In this way, the productivity impacts of higher direct input costs can be viewed as the price of reducing the chance of even greater climate-related productivity costs in the future. Global emissions abatement policy should be viewed as a global cost-minimisation exercise, and sound domestic climate policy should be viewed as Australia's contribution to that exercise. Having committed to a 2050 net zero emissions target, and an interim target of 43 per cent below 2005 emissions levels by 2030, policy makers should seek to minimise the economic costs of that contribution by taking a principles-based least-cost approach to emissions reductions (section 3.3). Australia should also promote multilateral oversight of the contributions of other nations. Minimising the cost of climate change more broadly will also require taking a principles-based least-cost approach to adaptation policy (section 3.2).



Finding 3.1

Sound climate policy is part of Australia's contribution to global efforts to contain the long-run costs of climate change

Having committed to a 2050 Net Zero Emissions Target, and an interim target of 43 per cent below 2005 emissions levels by 2030, the economic costs of that contribution to global abatement would be minimised by taking a least-cost approach to emissions reductions. This would be complemented by multilateral oversight of the contributions of other nations.

3.1 Physical impacts

The average temperature of the Earth has increased by 1.1 degrees Celsius since the industrial revolution. This warming has flowed from an increase in the stock of heat trapping greenhouse gases in the atmosphere, from around 280 parts per million of CO₂ prior to the industrial revolution, to 417 parts per million of CO₂ in 2021.

The increase in atmospheric greenhouse gases has come from: the release of geological stores of carbon due to coal, oil, and natural gas combustion; the release of terrestrial stores of carbon (forests, soil, peat) from deforestation for agriculture and human settlements, and the increased production of methane from the agriculture-related increase in ruminant livestock populations; and the anaerobic decomposition of waste.

It is important to distinguish between annual emissions (flows) and the stock of greenhouse gases in the atmosphere. The lag between a given increase in the stock of greenhouse gases in the atmosphere and the subsequent increase in the average global temperature means that, even if the world achieved net zero emissions tomorrow, an additional 0.3–1.7 degrees of global warming is estimated to be already ‘locked in’ (Zhou et al. 2021). As a result, Australia will have to prepare for at least some degree of additional warming, regardless of the speed of global emissions abatement over coming decades. That is, global emissions abatement will be necessary to avoid the worst effects of global warming, but it won’t avoid warming entirely.

This ‘locked-in’ warming is expected to continue to drive structural shifts in the Earth’s natural resource systems, which will reduce the availability of some resources, increase the availability of others, and alter their distribution between and within countries. For example, rising temperatures are projected to:

- reduce the availability of land as the melting of land-based ice and the thermal expansion of liquid water drive sea-level rise
- alter the geographical distribution of rainfall, with some regions experiencing increased rainfall while others experience decreased rainfall
- alter the temporal distribution of rainfall, with potentially higher peaks in rainfall at particular points in time, and lower rainfall at other periods of time
- exceed habitable ranges for some plant and animal species, threatening the viability and productivity of some crops, and the broader ecosystems that agriculture relies upon
- increase the geographical range of pests and diseases that can harm agricultural production and productivity;
- increase the frequency of days that experience temperature and humidity levels that are hazardous to human health (‘wet bulb days’)
- increase the geographical range of tropical diseases, and threaten to release pathogens frozen in tundra, to the detriment of human and animal health
- increase the frequency and severity of bush and forest fires, and
- weaken global ocean currents, which combined with increased ocean acidification and deoxygenation, is projected to threaten the viability of some marine species.

Some of these physical impacts have already affected Australia and are projected to continue doing so (box 3.1).

Box 3.1 – Physical climate impacts on key Australian industries

Climate impacts that will be particularly important for Australia include a reduction in agricultural productivity in some regions, as temperature and humidity levels move beyond habitable ranges for some crops. For example, (Ortiz-Bobea et al. 2021) estimate that global warming has already decreased global agricultural productivity by 21 per cent since 1961, relative to what would otherwise be the case. (Hochman, Gobbett and Horan 2017) estimate that climate change has reduced Australian wheat yields by around 27 per cent since 1990, and (Hughes et al. 2022) estimate that climate change over the last twenty years has reduced average Australian farm profits by 23 per cent.

For Australian fisheries, ocean deoxygenation, increases in ocean temperature, and increased ocean acidification are likely to push marine environments beyond the habitable range for some species, weakening broader ecosystems in the process. (CSIRO 2021) estimates that 70 per cent of key species in Australian fisheries are moderately to highly sensitive to climate change over coming decades.

Ongoing warming also risks degrading Australia’s stock of physical capital. (Mallon et al. 2019) assessed the degree of climate risk (riverine flooding, coastal inundation, bushfire, subsidence, and wind risk)

Box 3.1 – Physical climate impacts on key Australian industries

facing 15 million addresses in 544 Australian local government areas between 2020 and 2100, based on topography, biomass coverage, meteorological patterns, and climate projections out to 2100. The authors classified 383,300 addresses as high-risk properties, project that number to increase to 735,654 by 2100 and warn that ongoing development ... 'in high hazard areas or continued use of inadequate building standards ... will substantially increase this number.'

Perhaps the most direct way in which Australians will experience the physical impacts of climate change is simply through a rise in average daily temperatures, and an associated increase in the number of 'extreme heat' days over the course of the year. The number of extreme heat days that occur each year (days where the average daily temperature is in the warmest 1 per cent of days for each month, measured over the period 1910 to 2019) has grown from 1 in 1910 to more than 40 in 2019, and is projected to continue rising as global warming continues (CSIRO 2020, p.4). Public awareness of the phenomenon of 'wet bulb days', where temperature and humidity levels exceed the threshold beyond which the human body can cool itself, will grow over the decades ahead. Sectors that have been identified as being particularly exposed to rising temperatures include those reliant on:

- outdoor workers in construction, agriculture, gardening and landscaping, emergency services, and professional sports
- indoor workers exposed to heat-radiating equipment such as manufacturing, laundries, and professional kitchens (Humphrys et al. 2020).

3.2 Adaptation policy

Within this shifting environment, an adaptation policy that maintains and promotes productivity should focus on three distinct tasks: helping individuals, households, and businesses make informed adaptation decisions; avoiding policy settings that inadvertently discourage those adaptation decisions; and avoiding policy decisions that lock in higher future adaptation costs.

The vast majority of adaptation-related decisions will be made by individuals, households, and businesses in the natural course of their future planning. Individuals are the primary decision makers about which sectors they will work in, households are the primary decision makers about which regions they will live in, and businesses constantly exercise judgement about the likely course of consumer preferences and future business environments when choosing where to position themselves within the economy. This will continue to be the case as our climate changes.

Helping to inform adaptation decisions

As a trusted provider of information, and important funder of research, governments are well placed to help inform household and business level adaptation decisions. This is already occurring in a number of helpful ways. The CSIRO and the Bureau of Meteorology publish a biennial State of the Climate Report which tracks Australian climate developments and provides updated climate projections every two years. This resource is included in the Climate Change in Australia website which acts as a single source for a wide range of national and regional climate projection information and tools designed to help individuals, households, businesses, and governments plan for the decades ahead.

Some State governments have also put in place adaptation plans which provide information on likely climate impacts for individual sectors. Ensuring that detailed climate change projections are readily available to the private sector can support diverse and targeted approaches to the dissemination of climate impact information, such as smartphone applications that provide site specific climate projections for farmers, fisheries managers, and town planners.

There might exist a *prima facie* case for compulsory disclosure of climate risks, particularly where competing interests preclude the voluntary provision of such information. A potential candidate is the pre-sale disclosure of climate exposures facing individual properties. This would help potential buyers of a property know whether existing climate projections placed a property at risk of climate-related impacts, such as coastal inundation, riverine flooding, subsidence, destructive winds, and bushfire. Such information already exists, can be provided cost-effectively, and stands to help home and commercial property buyers make more informed investment decisions. However, the risk of subsequent reductions in the values of particularly exposed properties might preclude voluntary disclosure by existing owners. Compulsory disclosure would limit the degree to which government becomes insurer of last resort for particularly exposed properties, first by highlighting particularly exposed properties, and second by potentially helping private insurance companies to more accurately price climate risk (box 3.2).

Box 3.2 – Private insurance markets and climate change

Australian natural disaster-related insurance claims rose notably between 2005 and 2022, increasing from a yearly average of \$1.5 billion to \$3 billion in real terms over the period. Some researchers have partly attributed this rise to the early effects of climate change. A continuation of this trend would see the value of insurance claims quadruple in real terms between 2022 and 2050 (Reinhard and Lefebvre 2022, p. 19).

The Insurance Council of Australia recently stated that “at present no region in Australia is uninsurable, however worsening extreme weather events are driving up premiums in parts of the country most exposed to extreme weather risk and rendering insurance unaffordable for some” (ICA 2022). While rising premiums are undesirable for individual households and businesses, relative changes in insurance premiums stand to play an important systemic role in helping households and businesses understand the climate risks they face.

That is, a household or a business might not have an appreciation of the climate risks facing a particular activity, but to the extent the relevant insurance products are available to them, relatively high insurance premiums may help bring those risks to their attention. Moreover, while households and businesses might not have a full appreciation of the physical climate risks they face, they will be able to identify when high insurance premiums render a proposed activity unviable, or reduces its commercial feasibility more generally.

Increasingly detailed climate projections will be important in helping insurers accurately price climate risks over the years ahead. An inability to accurately price physical climate risks may lead private insurers to stop offering insurance products on particular activities in particular regions altogether, being unable to judge whether they are taking on an acceptable level of risk.

The retreat of private insurers from particular regions or activities will weigh on productivity growth, by removing one of the mechanisms by which people are able to assess and manage risk, and will leave governments vulnerable to becoming insurers of last resort for any under-insured activity that remains.

Avoiding policies that discourage private adaptation decisions

Policy settings that constrain or distort the transition away from more climate-exposed activities towards less climate-exposed activities will increase adaptation costs over time. Such constraints can be direct or indirect. Direct constraints prevent individuals and businesses from transitioning into new activities. For example: unduly restrictive occupational licensing can constrain the movement of labour between different occupations and sectors; ‘just-transition’ inspired enterprise agreements can constrain business transitions towards alternative product markets and foreign investment constraints can limit the pursuit of new opportunities, while protecting incumbent industries that fail to pursue them.

Indirect constraints can include industry assistance and transfer system settings that impose high effective marginal tax rates on movement between activities. It was partly on these grounds that the Commission previously recommended reforming Australia’s approach to drought assistance (PC 2009).

Economy-wide policy settings, such as household income assistance provided through the transfer system, are generally preferable to sector-specific transitional assistance. Nevertheless, calls for sector specific assistance are likely to emerge where climate-affected industries comprise a large proportion of a local or regional economy. In such scenarios, policy makers should guard against providing enduring assistance to increasingly unviable activities and regions. Doing so risks impeding adaptation-related transitions away from those activities and regions, raising long-run adaptation costs, and weighing on productivity growth in the process. Assistance that safeguards productivity is generally neutral across sectors — allowing individuals, households, and businesses to make their own judgements about which sectors, and regions, they are best placed to transition towards.

Avoid infrastructure investments that risk increasing long-run adaptation costs

Similarly, public investments aimed at sheltering incumbent businesses and population centres from climate impacts, such as building sea walls to defend towns against coastal inundation; investments in irrigation infrastructure to defend agricultural regions from shifting rainfall patterns; and building or raising dam walls to defend businesses and households from riverine flooding, can risk locking in higher future adaptation costs. Such responses are less likely to pass rigorous cost-benefit assessments in at least four scenarios:

- **The investment is likely to be insufficient to defend against all relevant climate impacts** — this could occur when an industry faces multiple climate-related challenges, but infrastructure investment is only capable of addressing one of them. For example, investment in increased water supply might help address growing water availability concerns in some regions, but it may prove ultimately ineffective if temperature rises in these regions, and an increase in the geographical range of pests and disease, push the region beyond the habitable range of key crops.
- **The cost of that investment negates or undermines the comparative advantage of an industry** — when infrastructure investments are capable of addressing all climate-related challenges but the costs of doing so negate or undermine the comparative advantage that the industry once enjoyed.
- **The infrastructure investment inadvertently encourages excessive risk taking** — building infrastructure to defend an existing area from climate impacts can encourage excessive risk taking in the area, potentially negating the overall value of the investment. This might be the case where the building of dams, or the raising of existing dam walls, to defend a valley from flooding encourages further residential and commercial development in that valley, raising the expected future cost of remaining flood risk.
- **Building new facilities and population centres in other areas would be more cost-effective** — when the infrastructure investments required to defend existing capital exceed the cost of rebuilding in an area less-

prone to climate risks. For example, it might be that the costs of rebuilding part of a town on higher ground (including the transitional and social costs associated with the relocation) are less than the cost of building a system of sea walls to defend an existing coastal town from rising sea levels. Rigorous cost-benefit analyses that consider the broad range of costs and benefits (including heritage, social, and environmental values) of defending existing centres relative to relocating those centres, can help inform these decisions.

Scarce capital should continue to be allocated to its most productive use when making adaptation-related investment decisions. While maintaining existing infrastructure can often be preferable to greenfield infrastructure construction, the automatic prioritisation of defending existing (sunk cost) investments in climate-exposed areas, over rebuilding infrastructure in less climate-exposed areas, will likely drive capital misallocation over time, weighing on productivity growth, and raising long-run adaptation costs.



Finding 3.2

Assistance that is neutral between sectors and avoids the automatic defence of sunk-cost investments

Transitional assistance for businesses and individuals facing hardship in climate-exposed sectors will be generally supportive of ongoing productivity growth if it is neutral as to which industries and regions that recipients choose to transition into. This would support households and businesses to make their own judgements about which sectors and regions they are best placed to transition into.

Scarce capital should continue to be allocated to its most productive use when making adaptation-related investment decisions. Automatic prioritisation of defending defence of sunk costs investments in climate-exposed areas, over rebuilding infrastructure in less climate-exposed areas, would likely drive capital misallocation over time, weighing on productivity growth, and raising long-run adaptation costs. Analysis of the broad costs and benefits of either option can help inform decision making.

Appropriate risk allocation and the potential for moral hazard will be important considerations for new development in areas vulnerable to rising sea levels, riverine flooding, bushfire, and extreme weather events. Some of these risks will impact communities periodically, such as riverine flooding, bushfires, and extreme weather events. Others will be more permanent, such as rising sea levels. Whether new developments should be allowed to go ahead in those areas particularly exposed to future climate impacts is ultimately a question of ‘acceptable risk.’ While markets will play a key role in allocating risk efficiently, questions of acceptable risk, and the social desirability of alternative risk mitigation measures, are often a collective choice, moderated through the usual democratic processes.

However, a move towards cost-reflective pricing of developments in such areas could help to avoid inadvertently placing businesses and households in harms way. For example, incorporating the cost of risk reduction measures (eg. sea walls) in the cost of new developments on coastal plains vulnerable to sea level rise would help to reduce moral hazard issues, whereby planning authorities make riskier decisions than they otherwise would when they do not face risk management costs. It could also help optimise risk management within the development as a whole and ensure that remaining climate risks were borne knowingly. The approval of defensive infrastructure should be subject to broader social acceptance of its external costs, such as loss of amenity for neighbouring communities, or reduced accessibility to public lands.

Imposing developer levies to fund climate risk reduction measures is one way of moving new developments towards cost reflective pricing. Similarly, ensuring that the cost of emergency responses services, like fire services in bushfire prone area, are incorporated into local council rates would support cost-reflective pricing.

Nevertheless, even once available risk mitigation measures are implemented, the risk of climate impacts will remain. While such risks are best managed through private insurance markets, it is plausible that private insurers will progressively retreat from these markets as climate risks increasingly manifest over time (box 3.2). To ensure that governments do not inadvertently and unnecessarily become insurers of last resort, additional developer levies could be used to finance local funds, designed to cover future shortfalls in private insurance coverage.

Optimal cost allocation for community relocations

There will likely be cases where least-cost adaptation policy supports the defence of existing developments. However, the desirability of relocating particularly climate-exposed communities will warrant consideration over coming years. As a general principle, those levels of government responsible for the initial approval of these developments should be the levels of government responsible for the costs of their relocation. This will generally be state and local governments. Deviations from this principle, such as calls for the Commonwealth government to fund future community relocations in situations where the Commonwealth did not have policy responsibility for the establishment of those communities, risks creating moral hazard issues in state and local government planning systems. Calls for Commonwealth financial assistance to State governments are often justified on the grounds of the greater financial capacity of the Commonwealth. However, questions of appropriate cost allocation are best resolved by consideration of responsibility for the policy area in question, not which level of government has the greatest access to financial resources. Moreover, such claims often overlook the various tax bases available to other levels of government, their ability to access public debt markets, and existing Commonwealth transfers.



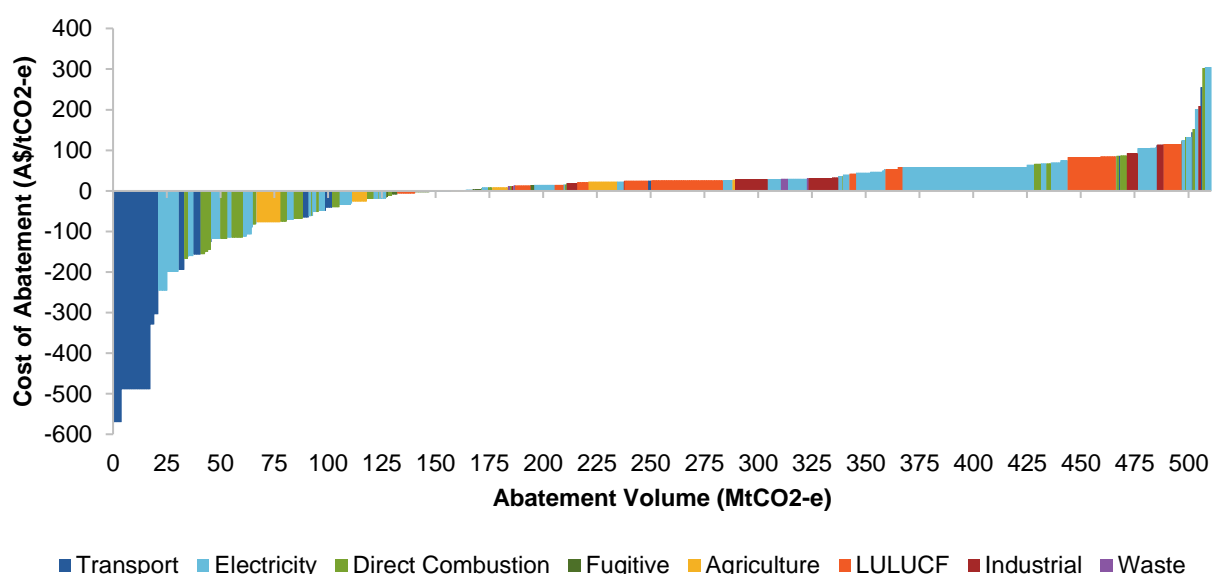
Finding 3.3

Transferring the cost of climate-risk reduction measures for specific developments to the broader community can encourage excessive risk-taking

Incorporating climate risk reduction and response costs into the costs of commercial and residential developments could help planning authorities avoid excessive risk taking. It could also help ensure that remaining risks were borne knowingly.

3.3 Efficient emissions reductions

The Australian government has set a 2050 net zero emissions target, along with an interim target of 43 per cent below 2005 emissions levels by 2030. These targets constitute Australia's Nationally Determined Contribution to the Paris Accord, the global treaty that seeks to limit global warming to 1.5 degrees by the end of the century. The question facing policy makers is how to best achieve these targets. A least-cost emissions reduction policy will increase the likelihood that emissions reductions prove a net positive for Australian productivity growth, relative to a world of avoidable climate change. Pursuing a least-cost approach to emissions abatement will require the pursuit of abatement efforts broadly in line with Australia's marginal cost of abatement curve — starting with low (or even negative) cost abatement options before pursuing higher cost options in later years (figure 3.1).

Figure 3.1 – Australian marginal cost of abatement curve, by 2030

Source: Reputex (2019).

Leaving higher cost abatement options to the later years of Australia's decarbonisation journey will give time for technological developments to lower the long end of the emissions abatement cost curve, reducing the cost of currently high-cost abatement options before they are required to be pursued. However, even with ongoing technological development it might be that some long-run domestic abatement costs remain higher than offsets generated by 'negative emissions' technologies (box 3.3), the use of which will allow for the achievement of net zero emissions even while some gross domestic emission sources remain. The credibility of such attempts to achieve Australia's 2050 net zero target will depend on the credibility of offsets that are allowed to be used, which will ultimately turn on the perceived additionality, measurability and permanence of those offsets, characteristics further discussed in 'Promoting the integrity of ACCU offsets' below.

Because many of these abatement opportunities will be best identified and pursued by households and businesses, those closest to their own consumption preferences and production processes, it will be important that Australian climate policy produces enduring abatement incentives across a wide range of sectors. The broader the range of sectors brought to the national abatement task, the greater the number of lower cost abatement options, and the lower the abatement burden on individual sectors. Carbon pricing mechanisms that establish a consistent unit price for emissions are generally accepted to be the most efficient means of generating least-cost abatement across an economy.

Australia's political experience with explicit carbon pricing has encouraged Commonwealth and State governments to propose and implement a suite of alternative approaches — renewable energy targets, feed-in tariffs, energy efficiency trading schemes, public funding of sectoral abatement projects, and tax concessions for electric vehicles and domestically produced biofuels.

Box 3.3 – Offsets in a net zero world

Offsets can help businesses, and countries, to achieve ‘net zero’ emissions even when they find it too costly to eliminate all gross emissions sources. For example, an individual mining business could achieve net zero emissions by reducing their gross emissions as much as is cost effective (by, say, 70 per cent) and then paying another business, say a commercial property fund, to install enough solar panels to ‘offset’ the remaining 30 per cent of the mining company’s gross emissions.

However, this example would not be possible in a country that was operating at net zero emissions. In a net zero emissions country, both the mining company and the commercial property fund would need to achieve net zero emissions, leaving the commercial property fund unable to produce the offset. The mining company could notionally find an overseas commercial property fund to produce an offset, but this option would be similarly unavailable if the world as a whole was operating at net zero.

In a net zero world the only projects generating offsets would be ‘negative emissions’ projects, capable of drawing down carbon dioxide from the atmosphere. There exist a range of natural processes, such as reforestation and soil carbon projects, that are capable of drawing-down carbon dioxide from the atmosphere and storing carbon in biomass and mineralised matter.

There also exist industrial draw-down processes, such as ‘direct air capture’ (DAC) technologies. DAC involves removing carbon dioxide from the air, typically using industrial fans to concentrate airflow and then using a solvent or other separation method. Once carbon dioxide has been captured, it can be notionally stored in geological formations deep underground. There are several types of geological formation amenable to storage, including:

- saline formations deep below freshwater aquifers
- depleted oil and natural gas reservoirs
- coal seams that are uneconomic to extract from
- igneous basalt formations, with concentrations of magnesium and calcium
- organic-rich shales with similar properties to coal.

Storage is typically made permanent by either a ‘cap rock’ layer that covers the reservoir or saline formation to prevent leakage, or by relying on chemical reactions between the carbon dioxide and basalt, coal or shale, to mineralise or absorb the carbon and permanently lock it in the stratum.

While often proposed as an emissions reduction option, these draw-down technologies have also been identified as a key technology required beyond 2050 — to reduce excess stocks of greenhouse gases in the atmosphere, and thereby reduce the likelihood of the worst effects of climate change (IEA 2020; Johansson et al. 2020, pp. 1–2; van Vuuren et al. 2013, pp. 15–17). Using these technologies to achieve reductions in atmospheric concentrations of greenhouse gases will require that at least some portion of draw-down projects are not used as offsets. If used as offsets, the atmospheric carbon dioxide that was drawn-down would simply be replaced by the emissions that they are offsetting.

Prior to achieving net zero emissions, there will remain a role for a broader range of offsets, not just negative emissions offsets. The credibility of these offsets will depend on their measurability, permanence and additionality (discussed further in ‘Promoting the integrity of ACCC offsets’ further below).



Finding 3.4

An efficient abatement path prioritises least cost abatement options before higher cost abatement options are pursued

Setting a long-run emissions target does not mean that all emissions sources need to be reduced at the same time. Pursuing low-cost abatement options before proceeding to higher cost options provides time for innovation to reduce the cost of those higher cost options before they need to be pursued. Broad-based emissions pricing schemes can be an efficient way of ordering abatement actions in this way.

However, all of these measures indirectly impose implicit carbon prices on the Australian economy, many higher than would be expected to be delivered via an emissions trading scheme. This can result from a 'charismatic abatement' problem where more government support is provided to more 'visible', but higher cost, abatement technologies than the less visible, but more cost-effective, options likely elicited by an emissions trading scheme (box 3.4). This charismatic abatement problem might help explain the high levels of government support provided to home solar panel installation during the late 2000's, and the high levels of government support being provided to electric vehicles today, despite these being some of the higher cost abatement options at the time of the policy.

Box 3.4 Indirect carbon prices in Australia, selected policies

Australia's political experience with explicit carbon pricing has encouraged Commonwealth, State and Territory Governments to implement a range of alternative policies to address emissions. These alternative policies impose a wide range of indirect carbon prices on the Australian economy, some many times higher than what would be expected to emerge from economy wide explicit carbon pricing.

Australian emissions reduction policy measures

Level of Government	Policy	\$ per tonne of CO ₂ -e ^a
Commonwealth	Renewable energy target — Small-scale technology certificates	\$57–209 ^c
	Renewable energy target — Large-scale generation certificates	\$60–220 ^c
	Emissions Reduction Fund (ACCUs)	
	— Average fixed-delivery price ^d	\$12–59 ^f
	— Spot price ^e	\$29–144 ^f
	Discounted excise for E10 ^g	\$128–274 ^h
	Discounted excise for B20 ^g	\$135–152 ^h
New South Wales	Energy savings certificates ⁱ	\$41 (\$32–59)
	\$3000 EV subsidy and stamp duty exemption	\$217–9470 ^b
Victoria	Victorian energy efficiency certificates ^j	\$69.25
	\$3000 EV subsidy and registration discount	\$203–6999 ^b

Box 3.4 Indirect carbon prices in Australia, selected policies

Queensland	\$3000 EV subsidy and stamp duty discount	\$165–7205 ^b
Australian Capital Territory	EV stamp duty exemption	\$83–3608 ^b
Northern Territory	EV stamp duty discount and registration discount	\$92–3,837 ^b
Tasmania	EV stamp duty exemption	\$95–4117 ^b
South Australia	\$3000 EV subsidy and registration exemption for three years	\$239–10 406 ^b
Western Australia	\$3500 EV subsidy	\$165–7205 ^b

a. Estimates have been rounded to the nearest dollar. **b.** For simplicity, this estimate reflects fiscal costs per tonne of abatement, not broader economic cost per tonne of abatement. The latter would also incorporate the impact of reduced taxation on the economy. Further discussion of the estimation methodology is provided in Appendix A. The high *level* of estimates for demand-side EV policies reflects their low near-term abatement benefits, with the emissions intensity of the electricity grid being only marginally lower than that of petrol. The notable *range* in the EV-related shadow prices reflects the plausible range of additionality and bring-forward assumptions ahead of assumed widespread adoption of EVs by 2035. **c.** The range presented reflects three different emissions intensity factors as well as additionality ranging from 50–100 per cent (appendix A) **d.** The most relevant ACCU price for the Emissions Reduction Fund — the biggest buyer of ACCUs — is the average fixed delivery contract price, which is \$11.70. **e.** The spot ACCU price might be more relevant for offset sellers and private buyers, and was equal to \$28.75 on 5 September 2022. **f.** The upper bound estimate accounts for additionality concerns relating to common emissions reduction methods. Macintosh, Butler and Evans (2022) suggest that up to 80 per cent of credits issued under three of the ERF's most popular methods (which account for about 75 per cent of total credits issued) do not represent genuine emissions cuts that would not have happened otherwise. **g.** The discounted rate of excise only applies to domestically produced ethanol and biodiesel. **h.** Lower bound estimate considers only scope 1 greenhouse gas emissions. Upper bound estimate considers lifecycle emissions and is consistent with PC (2011a). The excise rates used are those that were in place prior to the reduction that took place on 30 March 2022. **i.** The certificate price used is the penalty rate, which should represent an upper bound, though the spot price sometimes exceeds the penalty rate. A range is calculated using the emissions intensity of Australian coal generation as a lower bound, the average emissions intensity of electricity generation in NSW in 2019–20 as a central estimate and the emissions intensity of gas generation as an upper bound. **j.** The price listed is the spot price, which is likely higher than the price involved in long-term contracts.

Source: Chalmers (2022b); Demand Manager (2022) NSW Government (2022); DELWP (2021); Queensland Government (2022a, 2022b, 2022c) ACT Government (2022a, 2022b, 2022c); DIPL (2021; 2022); TCCO (2021); Department of Treasury and Finance (2022); Department for Energy and Mining (2022); Government of South Australia (2021); DWER (2021); Department of Transport (2022); Fisk (2021).

In addition, a less visible approach to climate policy risks exposing Australian industry to additional carbon pricing overseas. This possibility is apparent in the emerging design of the European Union's (EU's) Carbon Border Adjustment Mechanism (CBAM) which is planned to be progressively implemented between 2023 and 2026. The EU CBAM aims to impose carbon prices on imports of particular goods that are broadly comparable to those faced by EU producers. The stated intent of the policy is to level the playing field between domestic and foreign producers competing with one another in the EU market, taking into consideration carbon prices already paid by foreign producers in home countries.

However, at present it appears that the EU might only recognise direct carbon prices faced by foreign producers, not the indirect carbon prices currently imposed on Australia's economy by our suite of climate change policies. While the impact of the EU CBAM on Australia is likely to be limited, those impacts will grow if it applies to a wider range of imports over time, and if the EU example is followed by other major economies. In this way, Australia's current approach to climate policy risks exposing our economy to a double cost — first through a range of indirect carbon prices that are likely higher than available alternatives, and second through the subsequent imposition of direct carbon prices on some Australian exports.

Nevertheless, the current suite of domestic policies, along with the longer standing emissions abatement policies of the major economies, have started to shape Australia's future decarbonisation path. The uptake of renewable generation is projected to rapidly decarbonise our electricity system over the next decade, in turn supporting the decarbonisation of transport through electric vehicle uptake, and potentially supporting the decarbonisation of some parts of heavy industry and heavy transport through the production of 'green hydrogen.' (box 3.6). Remaining 'harder-to-abate' sectors might be offset through the uptake of negative emissions technologies, though ongoing technological developments and shifting consumer preferences might ultimately negate the need.

Potential interactions between the decarbonisation of the electricity grid, ground transport and heavy industry might prove self-reinforcing. For example, a decarbonising electricity sector will likely support the uptake of electric vehicles, and increased electric vehicle uptake will produce a growing stock of used EV batteries that could be used to build the grid scale storage capacity required by a renewable electricity grid. Similarly, a decarbonising electricity grid could support the growth 'green hydrogen' (with associated emissions abatement opportunities for heavy industry and heavy transport), which might itself support the decarbonisation of the electricity grid by providing an additional source of electricity storage.

Many technological developments are being driven by international policy settings, which will naturally accrue to net technology importers like Australia. Nevertheless, domestic policy settings will be important in driving domestic application of these technologies where individuals, households, and businesses judge them most suitable. Moreover, domestic policy settings that produce enduring abatement incentives are likely to become particularly important as the global move away from fossil fuels leads to long-run structural declines in the price of coal, oil, and gas, which might otherwise encourage their increased use in Australia, at the expense of longer run emissions reduction objectives.

In the absence of an emissions trading scheme, enhancements to the Safeguard Mechanism, and associated offset mechanism might also help promote least cost abatement across a broad range of emissions sectors. Were these adjustments to be made, the ongoing policy value of additional sectoral policy interventions should be re-examined.

Box 3.5 – Why market pricing mechanisms deliver lower cost abatement

All policy interventions aimed at generating emissions abatement impose carbon prices on the economy. However, in many instances, these prices are hidden (so-called ‘shadow’ or ‘implicit’ carbon prices) and apply only to a narrow set of actions. The narrow coverage of many interventions allows other emissions source to expand, reducing their overall effectiveness. Moreover, piecemeal interventions that target particular sources of emissions, or that promote the application of particular technologies lead to a greater range of abatement ‘prices’ across the economy, driving higher cost abatement than is necessary to achieve near term emissions reduction goals. Piecemeal interventions can also overlap with other piecemeal measures, unnecessarily increasing the economy-wide cost of abatement in the process.

The application of a consistent carbon price across a broad range of sectors, whether implemented by carbon taxes or cap-and-trade schemes, reduces the economy-wide cost of abatement (or enables greater abatement for the same total cost) for several reasons. First, by allowing the concentration of abatement efforts in the most cost-effective options available and thereby transferring remaining emissions rights to those sectors that generate the greatest value-add from their use. Secondly, the application of a consistent price across a broad range of sectors reduces the scope for avoidance or ‘leakage’ into what would otherwise be uncovered sectors. More generally, an explicit price is also more observable and can be more readily factored into production and investment decisions.

Because businesses can be expected to pass on these increased costs to the consumers of their goods and services, emissions trading schemes provide a means of internalising the externalities associated with consumer choices. This move to more cost-reflective pricing will likely drive consumers towards less emissions-intensive goods and services, on price grounds alone, further reducing the emission-intensity of economies with broad-coverage emissions trading schemes.

Linking a domestic emissions trading scheme with that of other countries, either by allowing for the transfer of emissions permits between the two countries or by allowing the importation of offsets from other countries, can establish the international price of permits as the upper bound for domestic permit prices. Doing so further lowers domestic abatement costs to the extent that the permits are credible, and that the international price is generally lower than the domestic permit price.

Box 3.6 – Projected abatement technology uptake in Australia

The current suite of domestic policies, along with the longer-standing emissions abatement policies of the major economies, have started to shape Australia's future decarbonisation path. The uptake of renewable generation is projected to rapidly decarbonise our electricity system over the next decade in turn supporting the decarbonisation of transport through electric vehicle uptake. The combination is critical for Australia to reach its 2030 target as electricity generation and transport make up slightly more than half of our emissions.

Projected and targeted abatement technology uptake by sector

Sector	Projection
Electricity Generation	Renewables and storage will account for 86% of Australia's energy in 2030-31, 95% in 2040-41 and 97% in 2050-51, with the remainder made up of peaking gas and liquids.
Transport (Electric Vehicles)	A 100 per cent ZEV sales ambition or target by 2035 has been announced in one quarter of the global car and van market, including in the European Union, the United Kingdom, Canada, Norway, Chile, Singapore, Iceland, California ^a and New York. On top of this, China, Japan and Israel have electrification targets for 2035 that allow for ZEVs and hybrid EVs.

a. Another 16 States tend to follow California when setting their auto emissions standards (Davenport, Friedman and Plumer 2022).

Source: AEMO (2022b); IEA (2022).

Australia's ERF and Safeguard Mechanism

The Emissions Reduction Fund (ERF) was designed to allow the Australian government to purchase emissions abatement from emissions abatement projects in Australia. Those that can deliver abatement from a range of eligible abatement methods earn Australian Carbon Credit Units (ACCUs) which can then be purchased by those looking for abatement. The biggest buyer of ACCUs is currently the Australian Government. However, a growing source of demand is from facilities captured by the Safeguard Mechanism (SM) that are generating emissions in excess of their associated 'benchmarks.'

These benchmarks are maximum emissions thresholds placed on greenhouse gas producing facilities captured by the Safeguard Mechanism, established as a way of ensuring that emissions abatement purchased by the ERF did not simply lead to an increase in emissions elsewhere in the economy. Subject to a few caveats, if the gross emissions of facilities covered by the Safeguard Mechanism exceed their emissions benchmarks, they must purchase enough ACCU offsets to bring their net emissions back down to their benchmark.

The Safeguard Mechanism does not have pre-defined sectoral coverage per se, it applies to facilities that produce 100 000 tonnes of CO₂-e per annum which happen to span a number of sectors. Facilities covered by the Safeguard Mechanism currently span mining, oil and gas, manufacturing, construction, waste, and some transport sub-sectors (large rail companies and domestic airlines).

The electricity sector is notionally covered by the Safeguard Mechanism. However, it is treated differently than other sectors. While facilities in other sectors are captured by the Safeguard Mechanism once they emit

100,000 tonnes or more of CO₂-e per annum, the electricity sector is included as a sector as a whole, facing a sector wide benchmark of 198 million tonnes of CO₂-e per annum. That is, the individual electricity generators that comprise the sector do not currently face facility level benchmarks. Under its current design, it is only once the sector wide benchmark is breached that the Safeguard Mechanism will impose facility level benchmarks on individual power stations.

The benchmarks that apply to these facilities can be set in several ways. Those facilities that were in operation between 2009-10 and 2013-14 had their baselines set with respect to their historical emissions — specifically, the highest level of their emissions intensities between 2009-10 and 2013-14. Facilities built after this time can have their benchmarks calculated through a number of alternative methods.²⁵ They are emissions intensity benchmarks, not total emissions benchmarks, meaning that aggregate emissions can continue to rise under the Safeguard Mechanism. Most of these benchmarks are currently non-binding, being above that currently emitted by the facility or sector. The most notable example is the electricity sector, the benchmark for which is currently above its aggregate emissions.²⁶

Moreover, a number of flexible mechanisms exist that limit the degree to which the benchmarks are binding in any given year, including allowing facilities to average out their emissions over several years, allowing for exemption from baselines in the case of ‘exceptional circumstances’, and, in some cases, allowing facilities to apply for new baselines if their existing baselines are exceeded. The Safeguard Mechanism does not prevent new facilities from being built in these sectors.

These features of the Safeguard Mechanism mean that overall emissions can increase in sectors covered by the SM. Indeed, since the beginning of the SM, emissions from covered sectors have grown by 7 per cent from 2005 levels, and have been projected to be 17 per cent higher than 2005 levels by 2030 (Reputex 2021). As the central policy tool for emissions abatement policy, ensuring that the Safeguard Mechanism’s emissions intensity baselines remain consistent with Australia’s abatement goals will require ongoing adjustments to SM benchmarks over time.

Reform options for Australia’s Safeguard Mechanism

Reforms to Australia’s Safeguard Mechanism could help move Australia towards a more least-cost approach to achieving its 2030 and 2050 emissions abatement goals, helping to safeguard productivity growth in the process. Broadening its application across a greater range of facilities and allowing for the generation of sub-benchmark credits would increase the efficiency of the scheme. Moving towards aggregate emissions benchmarks, from the current system of emissions intensity benchmarks, would reduce the complexity of the scheme, helping participants to anticipate the likely path of benchmarks in the future.

Emissions intensity benchmarks or aggregate emissions benchmarks?

The SM’s current use of emissions intensity benchmarks notionally has a lower economic impact than aggregate emissions benchmarks, in so far as it allows captured facilities to increase their production without exceeding their benchmarks and precludes facilities from using production cuts to stay below their benchmarks. By doing so, an emissions intensity benchmark minimises the overall impacts of emissions constraints on production levels, thereby lowering the economic impacts of emissions constraints.

²⁵ Alternative approaches for new, or significant expanded, facilities include a sector specific ‘best practice’ benchmark baseline. These benchmarks are time-limited, expiring once sufficient time has passed to establish a historical baseline.

²⁶ This need not mean that the Safeguard Mechanism is not factoring into long term investment decisions in the sector, which likely factors in the potential for the sectors benchmark to become binding over the life of the asset.

However, the value of these features diminishes once a country decides to pursue aggregate emissions reduction goals. Given that Australia has a nationwide emissions reduction target, the ability for covered sectors to increase their overall emissions becomes a shortcoming of the system, imposing greater abatement burdens on uncovered sectors, and likely raising economy-wide abatement costs in the process. Precluding the use of facility output reductions to meet compliance obligations, such as a corporate group increasing production in low emissions facilities and decreasing production in high emissions facilities, also increases economy-wide abatement costs.

In addition, using emissions intensive benchmarks to target an aggregate emissions reduction target could complicate medium-to-long term investment planning. While an individual facility may know that Australia has a 2030 and a 2050 emissions reduction target, it may be less clear about what that means for the facility's emissions intensity benchmark over coming decades. Facility owners would not only need to form a view on what those aggregate emissions reduction pathways would mean for facility level benchmarks but would have to make long-run output estimates to assess what abatement options they would need to pursue in order to meet those future benchmarks. They would have to do this over a period in which consumption and production patterns will likely be changing as we enter a world of carbon constraints.

The opaque relationship between aggregate emissions reduction targets and periodic facility level emissions intensity benchmarks might also have knock on effects for the offset market, with offset producers in non-covered sectors being less clear on the likely volume of future offset demand as they approach a benchmark recalibration, potentially introducing structural drivers of periodic volatility in the offset market. This opacity might also be ripe for special pleading by sectional interests at benchmark recalibration points.

The shortcomings of emissions intensity baselines have been recognised for some time now. The 2008 Garnaut Review noted that a system with emissions intensity benchmarks 'introduced a high and unavoidable degree of arbitrariness' into the design of emissions reduction policy and would 'raise transaction costs and encourage rent-seeking behaviour' (Garnaut 2008).

Transitioning the SM to operate on the basis of aggregate emissions benchmarks would help to reduce these issues. It would increase the transparency and predictability of periodic adjustments to Safeguard Mechanism benchmarks, providing a somewhat clearer road ahead for SM facilities, abatement technology providers, offset producers in non-covered sectors, and investors more generally. The move to aggregate emissions benchmarks would also reduce the administrative burden of the system by avoiding the need to report production levels alongside emissions levels and removing the need for facilities to provide third party audited production projections for new and significantly expanded facilities.

Increased transparency around the periodic resetting of facility benchmarks would also promote integrity and public confidence in the process. By not precluding the use of facility level output reductions as a means of abatement it would encourage groups with multiple facilities to optimise production across their facilities, lowering overall abatement costs in the process.

Should crediting of sub-benchmark abatement be allowed (discussed further below), an aggregate emissions benchmark could also act as a transitional assistance mechanism for covered facilities. This is because an aggregate emissions benchmark would allow facilities to achieve sub-benchmark emissions by reducing output, regardless of the reason for that reduction of output. If a facility was closed down, and the associated sub-benchmark abatement was eligible to generate credits, the sale of those credits could provide a form of exit payment for the owners of the closed facility.

Should sub-benchmark abatement be creditable?

Under the current design of the Safeguard Mechanism captured facilities need only prevent their emissions from rising beyond their baseline, either by pursuing internal abatement options, or by purchasing sufficient ACCU offsets — offsets generated by emissions reduction projects recognised by the Clean Energy Regulator. This presents something of an asymmetry in that facilities are required to purchase ACCUs for any emissions that exceed their benchmark but cannot earn credits for any emissions abatement below their benchmark. Providing symmetry in the Safeguard Mechanism would increase the efficiency of abatement by increasing the pool of commercially viable abatement opportunities and allowing the transfer of economy-wide abatement burdens to the least-cost abatement options within the SM, likely reducing economy-wide abatement costs, and safeguarding productivity growth in the process.

As set out above, if sub-benchmark crediting were coupled with an aggregate emissions benchmark it could also provide some degree of automatic transitional assistance for facilities that choose to markedly reduce their production in the presence of carbon constraints. The resulting reduction in emissions would generate credits that could be sold to facilities operating beyond their emissions benchmark. This feature would not be present in the case of an emissions intensity benchmark, given that output reductions cannot impact the emissions intensity of a facilities output. Neither would it be present in the case of an aggregate emissions benchmark that did not allow sub-benchmark crediting.

These observations should not be taken as presenting a public policy case for industry assistance to SM facilities, but a simple drawing out of foreseeable interactions between possible SM design features. Future carbon constraints have been part of Australian policy discourse for several decades, and emissions abatement policy has been in place for much of this time. The case for transitional assistance is strongest when industries are acutely impacted by unforeseen developments, and where those impacts risk producing broader costs for society. Entry into long foreshadowed and progressively implemented carbon constraints does not appear to have these features.

Covered sectors

The sectoral coverage of the Safeguard Mechanism is currently limited by its treatment of the electricity sector and its omission of much of the transport sector. Broadening the coverage of the SM would move Australia towards a more least-cost approach to emissions reductions.

Electricity sector

The electricity sector is notionally included in the Safeguard Mechanism. However, it is treated differently than other sectors. While facilities in other sectors are captured by the Safeguard Mechanism once they emit 100,000 tonnes or more of CO₂-e per annum, the electricity sector is included as a sector as a whole, facing a sector wide benchmark of 198 million tonnes of CO₂-e per annum. That is, the individual electricity generators that comprise the sector do not currently face facility level benchmarks. Under its current design, it is only once the sector-wide benchmark is breached that the Safeguard Mechanism will impose facility level benchmarks on individual power stations. However, the steady decarbonisation of the electricity sector underway may preclude the sector wide benchmark from being breached.

The current treatment of the electricity sector has been justified on the basis that ‘the electricity sector behaves more like a single entity, where the output produced is centrally coordinated to meet demand in real time’ (Clean Energy Regulator 2022c). However, this characterisation overlooks the notable difference in emissions intensities of the electricity generators that compete with one another in Australia’s electricity market. Failing to account for these emissions differentials within the SM reduces the extent to which low

emissions electricity sources can compete with high emissions electricity sources, relative to what would otherwise be the case.

Reducing the electricity sectors benchmark so as to bring forward the SM coverage of individual electricity generators would move Australia towards a more least cost abatement path. It would do so by bringing a greater pool of potential abatement options to the SM's overall abatement task. These benefits would be compounded by allowing for sub-benchmark crediting which would support greater emissions abatement by those facilities that are readily able to do so, and less emissions abatement by sectors that are less able to do so. Finally, the incorporation of the electricity sector into the SM would reduce the policy case for additional sectoral interventions that can add to the cost of Australian emissions reductions.

There could exist concern that bringing forward the inclusion of individual electricity generators in the SM will reduce the abatement burdens placed on covered industrial facilities. However, given that the SM imposes benchmarks on all captured facilities, and that these benchmarks are proposed to be calibrated to Australia's national emissions reduction goals, there is no reason to expect this to automatically occur. That is, industrial facilities will continue to face their own individual benchmarks if electricity generators are included or excluded from the SM. Moreover, given that Australia has set itself the goal of achieving net zero emissions by 2050, within one lifecycle of a 30-year industrial facility, the abatement incentives facing industrial facilities will ultimately be determined by the credibility of Australia's 2050 net zero emissions target.

Transport sector

The SM currently applies to some elements of the transport sector, such as large rail companies and domestic airlines. This exclusion reflects the SM's focus on direct Scope 1 emissions of facilities that produce more than 100 000 tonnes of CO₂-e per annum. Because it is individual cars, buses, and trucks that produce Scope 1 emissions in the ground transport sector, all of which individually fall below the 100 000 tonne threshold, the ground transport sector is effectively uncovered by the Safeguard Mechanism.

Yet transport emissions are a substantial, and growing, source of Australian emissions, growing from less than 10 per cent of Australian emissions in 1990 to 18.6 per cent in 2021. All else equal, expanding the Safeguard Mechanism to include the transport sector, by imputing all downstream Scope 1 emissions from vehicles to upstream fuel wholesalers, would reduce the economy-wide cost of emissions abatement.

Bringing forward the inclusion of individual electricity generators in the SM would also introduce a transport technology asymmetry to the SM — being imposed on the electricity used to power electric vehicles, but not the liquid fuels used to power conventional internal combustion engine vehicles. In addition, the extension of the SM to fuel wholesalers would further reduce the policy case for the high indirect carbon price measures aimed at promoting electric vehicle uptake (box 3.3).

Facility thresholds

Reducing emissions thresholds would capture a greater number of facilities and increase the proportion of emissions covered by the scheme. Under the 100 000 tonne facility thresholds, the SM covered 212 individual facilities that collectively accounted for around 27 per cent of Australia's annual greenhouse gas emissions in 2020-21. Including the grid-connected electricity sector, covered by the SM at a sectoral level, would increase this proportion to around 57 per cent of national emissions.

Reducing the facility threshold from 100 000 to 25 000 tonnes of CO₂-e would increase the proportion of national emissions covered by the SM to around 60 per cent. Arguments against the reduction of thresholds might note the diminishing returns to increased coverage, noting that a move to a 25 000 tonne facility threshold could add more than 300 additional facilities to the SM while only increasing covered emissions by around 3 percentage points.

However, the optimal number of covered facilities would likely not be determined by the ratio of emissions coverage to facility coverage, but by comparing the marginal social benefit of bringing more facilities to the national abatement task to the marginal social cost of covering those additional facilities. Lowering facility thresholds would share Australia's overall abatement task between a greater number of facilities. It could also forestall any future migration of domestic production towards smaller, less efficient facilities, as carbon constraints become increasingly binding. The additional compliance burden of moving to a 25 000 tonne facility threshold would be limited, given that these facilities are already required to report their emissions through the National Greenhouse and Energy Reporting scheme.

Emissions intensive trade-exposed industries

Concerns about 'carbon leakage' are commonly raised in response to domestic climate policy proposals. The threat of carbon leakage is said to emerge when domestic climate policy places domestic producers at a competitive disadvantage to foreign producers that do not face comparable carbon constraints in their home countries. In this situation, those concerned about the prospect of carbon leakage argue that the imposition of domestic carbon constraints could lead to domestic producers losing market share to foreign producers that don't face carbon constraints, with associated emissions simply being transferred to (or 'leaking' into) those countries, with no ultimate benefit to global emissions. Carbon leakage concerns are most pronounced for emissions intensive businesses that face international competition, so called Emissions Intensive Trade Exposed Industries (EITEIs).

Common responses to carbon leakage concerns have been to make EITEIs at least partly exempt from domestic climate policy. In countries with emissions trading schemes this commonly takes the form of providing a percentage of emissions permits required by EITEIs for free. Carbon Border Tariffs (CBTs) are an alternative approach to addressing carbon leakage concerns, not by protecting domestic producers from domestic climate policy, but by making foreign producers also subject to domestic climate policy, through the levying of import tariffs that are broadly equivalent to the carbon costs faced by domestic producers. While a range of countries have expressed some degree of openness to the CBTs, the most advanced proposal is the European Union's Carbon Border Adjustment Mechanism (CBAM) which is planned to begin operation from 1 January 2023 (reporting obligations) and 1 January 2026 (payment obligations).

However, there are questions about the extent to which carbon leakage will occur, given that production location decisions are based on a range of factors, and given that more of the world's nations have adopted carbon constraints. Perhaps more fundamentally, if the world's major economies are to meet their net zero emissions targets, EITEIs will need to collectively contribute to emissions abatement. Failing to impose carbon constraints on EITEIs will simply transfer the cost of emissions abatement to other sections of the economy, and to taxpayers if government is left to purchase a greater number of offsets to achieve national net zero targets. Any special treatment of EITEIs under the Safeguard Mechanism should weigh the risks of carbon leakage against the costs of transferring additional abatement burdens to non-EITEI producers.

Moreover, it should be noted that Australia's Safeguard Mechanism is effectively a 100 per cent free emissions permit allocation system for all sub-benchmark emissions. The Safeguard Mechanism caps facility emissions and requires those facilities to either pursue internal abatement options or purchase offsets to bring emissions down below the relevant benchmark. Facilities do not need to pay for any emissions below this benchmark. This treatment is provided to all captured facilities regardless of whether they are considered EITEIs or not.

Over time, Australian EITEIs will need to pay for a growing proportion of their carbon emissions as benchmarks are progressively reduced in line with Australia's nation-wide emissions reduction goals.

However, this is broadly the same treatment as is commonly applied to EITEIs captured by emissions trading schemes, with the percentage of free permits provided to EITEIs progressively falling over time.

For example, under Australia's Carbon Pricing Mechanism (CPM), which operated between 1 July 2012 and 1 July 2014, EITEIs were divided into two categories, highly emissions intensive trade exposed, and moderately emissions intensive trade exposed. At the start of the scheme the former received 94.5 per cent of permits up to the relevant benchmark for free, while the latter received 66 per cent of permits up to the relevant benchmark for free. Both rates of free permit allocation were scheduled to fall by 1.3 per cent per annum (Talberg and Swoboda 2013).

Were the CPM still in place today, the 1.3 per cent annual reductions in free permits would have placed 2022-23 free permit allocations at 81.5 per cent of average industry emissions for high EITEIs, and 53 per cent of average industry emissions for moderate EITEIs. In addition, the 'relevant benchmark' under the CPM was not the facility-specific historical highpoint, as is the case under Australia's Safeguard Mechanism, but the average emissions intensity of the sector. This approach helped ensure that those facilities that have previously invested in emissions abatement technologies and processes were not placed at a competitive disadvantage for having done so. It also ensured that some abatement incentives were placed on below average facilities in the sector.

The EU emissions trading scheme (ETS) distinguishes between 'highly exposed' EITEIs and 'less exposed' EITEIs (European Commission nd). The former currently receive 100 per cent of permits up to their relevant benchmark for free, and the latter receive 30 per cent of permits up to their relevant benchmark for free. However, the 'relevant benchmark' under the EU ETS is not the facility-specific historical highpoint, as is the case under Australia's Safeguard Mechanism, but the average emissions intensity of the sectors best performing 10 per cent (least emissions intensive) facilities (IEA 2020). Similar to the CPM, this approach helps ensure that those facilities that have previously invested in emissions abatement technologies and processes are not placed at a competitive disadvantage for having done so, while also ensuring that some abatement incentives are placed on the less efficient facilities in the sector. However, by choosing the average emissions of the best performing 10 per cent of the sector, these effects were greater than that elicited by the CPM's average sectoral emissions intensity benchmark.

It follows that the Safeguard Mechanism's current system of providing 100 per cent free emissions up to facility benchmarks is more generous than the EITEIs provisions of both the EU emissions trading scheme and Australia's former Carbon Pricing Mechanism.

Finally, providing special treatment to EITEIs is unlikely to protect Australian EITEIs from carbon prices in markets that impose carbon border tariffs. For example, the EU's planned CBAM appears set to only recognise explicit carbon prices borne by foreign producers in their home market. Given that those exports captured by the CBAM are likely to face carbon prices once landed in the EU, there is policy merit in considering measures that ensure this revenue is collected by the Australian government, not the EU. If a carbon price will be imposed on Australian exports to the EU in any case, the welfare of the Australian community will be best served by the Australian government being the one to collect the associated revenue.

Given these features, the policy case for additional EITEI protections under the Safeguard Mechanism is unclear. Notable levels of public investment in abatement technologies that may prove crucial for abatement by Australian EITEIs (discussed further below) further diminishes the case.

**Finding 3.5****The public policy case for special treatment of Emissions Intensive Trade Exposed Industries (EITEIs) under the Safeguard Mechanism is not clear**

Fears of ‘carbon-leakage’ commonly lead to EITEIs receiving some proportion of their emissions permits for free in countries with emissions trading schemes. However, the Safeguard Mechanism is already a 100 per cent free permit system in so far as covered facilities are not required to pay for any emissions underneath their benchmark. Any special treatment of EITEIs under the Safeguard Mechanism should weigh the risks of carbon leakage against the additional costs of transferring additional abatement burdens to non-EITEI facilities and their consumers.

Promoting the integrity of ACCU offsets

The Clean Energy Regulator currently allows 37 abatement activities to generate ACCUs. However, around 75 per cent of ACCUs generated under the program have been estimated to be generated through three methodologies. These are principally carbon sequestration related projects undertaken by landowners — ‘avoided deforestation’ and ‘human-induced regeneration of native forests’ — and the combustion of methane from landfills.

The degree to which the SM credibly delivers on Australia’s emissions reduction commitments will depend on the integrity of these offsets. The degree to which these methodologies deliver actual emissions abatement has been questioned, with some observers detailing what they regard as systemic flaws in the ACCU generation process (Macintosh 2022; Macintosh et al. 2022b, 2022a; Macintosh, Butler and Ansell 2022). The authors have argued that the three methodologies most commonly used to generate ACCUs ‘do not represent real and additional abatement’ (Fearon 2022).

The Independent Review of ACCUs — currently being led by Former Chief Scientist Ian Chubb and due to report in late 2022 — should consider, amongst other things, the degree to which existing ACCU generation methodologies satisfy at least three characteristics of credible offset generation- additionality, measurability, and permanence:

- **Additionality** — an offset project is not additional if the project would have gone ahead without the ACCU revenue, either because it was a commercially viable project in the absence of ACCU revenue, or because it was required by existing laws and regulations.
- **Measurable** — an offset project is measurable if its associated abatement can be reliably measured. If the offset project generates a wide range of potential abatement outcomes, then its value cannot be reliably measured, and the risk of over-crediting will emerge.
- **Permanence** — an offset project is permanent if its emissions abatement cannot be reversed at a future point in time. Permanence concerns are particularly relevant for carbon sequestration projects in forests, vegetation and soil. Carbon stored in forests, vegetation and soils can be released in the case of fire, disease, and changes in rainfall patterns. If the carbon sequestered in trees, vegetation, and soil are subsequently released at some point in the future then the project has not offset emissions, it has simply delayed the release of those emissions for a potentially short period of time. Make-good provisions, requiring that any release of sequestered emissions is subsequently re-sequestered, would help to reduce permanence concerns.



Finding 3.6

Reforms could move Australia toward a lower cost approach to abatement with reduced adverse impacts on productivity

Australia's current suite of implicit carbon prices is an inefficient approach to climate policy. The Australian experience with carbon pricing has resulted in a suite of alternative policies that impose a wide range of indirect carbon prices on the economy. Reforming Australia's Safeguard Mechanism to broaden its application across the economy and allow transferability of emissions between emissions sources could allow Australia to transition away from higher cost measures.

Recognising offsets that are not additional, measurable, and permanent, will weigh on the effectiveness of the Safeguard Mechanism, and increase the cost of emissions abatement in Australia.

Distributional considerations

The absence of economy-wide abatement policies places pressure on policy makers to implement sectoral and sub-sectoral policies such as subsidies for home solar panel installation, subsidies for low emissions technology deployment by industry, and tax concessions for electric vehicles. These measures are not only more costly than economy-wide alternatives, but they can also raise several distributional concerns. First by imposing higher overall abatement costs on Australia, which will fall disproportionately on different sections of the community; and second, by selectively benefiting some sections of the community more than others.

For example, subsidies for household solar panel installation tend to enjoy their greatest uptake rates by higher income households, and electric vehicle support channelled through the tax system can disproportionately benefit higher income households if the chosen tax setting is disproportionately relevant to higher income households.

By contrast, distributional considerations associated with economy-wide carbon pricing measures tend to flow from a recognition that businesses will likely pass on their carbon costs to consumers, and that lower income households are disproportionately exposed to these higher costs due to the higher proportion of income that they spend on consumption. These regressivity concerns may diminish once the higher emissions intensity of high-income household consumption patterns are accounted for, and once regressivity estimates are measured over the lifecycle rather than at a given point in time.²⁷

Nevertheless, the fact that the Safeguard Mechanism does not price sub-benchmark emissions allowances should help to mitigate such concerns. While falling benchmarks will progressively impose greater abatement goals on captured facilities, all sub-benchmark emissions will continue to be unpriced. Moreover, the key household assistance measure implemented following the introduction of the Carbon Pricing Mechanism on 1 July 2012, the tripling of the tax-free threshold from \$6000 to \$18 200 remains in place today, despite the CPM ceasing operation on 1 July 2014.

Complementary measures

Once a national emissions reduction target is in place, and an economy-wide emissions abatement policy is implemented to achieve it, the public policy case for additional sectoral interventions would rely on those

²⁷ Given that incomes tend to rise and fall over the course of an individual's life, assessing the regressivity of a particular policy change at a given point in time can generate a higher regressivity estimate than when total lifetime income and total lifetime income are taken into consideration.

additional interventions being ‘complementary measures’, that either address non-price barriers to abatement, or that deliver broader non-carbon abatement social benefits. For example, were the Safeguard Mechanism to be more readily binding on the electricity generation sector the ongoing need for the Renewable Energy Target would be brought into question, unless it could be shown that it addressed non-price barriers to renewable energy uptake or drove non-carbon social benefits.

Similarly, were an amended Safeguard Mechanism to be extended to the transport sector, or covered by a broadly comparable mechanism, the policy case for demand-side support measures for electric vehicles would be further diminished. Similarly, was SM coverage of individual electricity generators brought forward, the policy case for additional interventions such as renewable energy targets or the incorporation of emissions-based adjustments into the design of a future capacity mechanism (box 3.7), would be diminished, unless it was shown that these measures generated non-price barriers to renewable energy uptake or delivered broader, non-carbon related, benefits to Australia.

This would also be true for the range of State and Territory measures that are currently in place. Once a national emissions abatement target is established, and an economy-wide abatement policy is implemented to achieve it, these measures will impose a range of indirect carbon prices on the Australian economy, for little or no apparent benefit to the national emissions abatement task. While such State measures may be publicly justified on the grounds that they will allow States to capture a desired share of the new industries and the ‘green jobs’ associated with them, such motivations are likely to render such measures a form of industry assistance that will likely add to Australian abatement costs for little actual gain (box 3.7).

Given the potential for such policy interactions, it will be important that Australian governments (Commonwealth, State, and local) take a coordinated approach to policy development. A good practice approach to policy development would include stipulating whether new and existing policies are intended to be complementary measures, or additional emissions abatement measures in sectors not covered by the Safeguard Mechanism. The expected indirect carbon price of the policy measure should be estimated by an independent body and made public.

Capacity mechanism

Growing renewable energy uptake has raised questions about the future reliability of the electricity grid, given the intermittence challenges of individual wind and solar installations. This has led some to emphasise the importance of electricity grid ‘firming’ as the electricity grid is steadily decarbonised. To this end, the Energy Security Board has proposed the introduction of a ‘capacity mechanism’ in Australian electricity markets. The capacity mechanism would pay electricity suppliers to have their generation capacity available during certain periods, helping to bring supply and demand into greater alignment at each point in time.

Capacity payments would be made in advance of that capacity being required and would be in addition to the price of the electricity itself. In this way it can be considered as a kind of retainer system, paying generators to pledge to provide capacity during periods of electricity market volatility. These capacity payments would be passed on to network providers or retailers, and ultimately passed on to end user households and businesses. The capacity mechanism might also include large electricity users, given their potential ability to reduce electricity demand to bring electricity supply and demand into greater alignment during periods of market volatility.

A capacity mechanism would mark a move away from Australia’s current system of largely allowing price movements to bring supply and demand into alignment. While wholesale electricity prices are capped in the NEM, that cap is relatively high by international standards (ESB 2022, p. 11). The higher that prices are allowed to rise in the wholesale market, the greater the likelihood of electricity generators being purpose built to only generate electricity during unusually high price periods, either due to unusually high levels of electricity demand, or due to unexpected disruptions to electricity supply. Similarly, the higher that prices are

allowed to rise, the greater the likelihood that large energy users would make the investments required to notably reduce electricity demand during high price periods.

The inclusion of individual electricity generators in the Safeguard Mechanism would go some way to allaying fears that a capacity mechanism would disproportionately favour coal and gas fired electricity generators, which would transfer a greater abatement burden onto other sectors of the economy, likely raising economy-wide abatement costs in the process. A technology neutral approach to any future capacity mechanism, allowing large batteries, baseload renewable electricity options, and large energy users to bid into the capacity market might further allay such concerns.

It is unclear to what extent a capacity mechanism will increase electricity costs in Australia, given that capacity prices would be passed on to households and businesses. It is also unclear to what extent policy makers may choose to reduce wholesale electricity price caps following the introduction of a capacity mechanism, given that high price caps can be viewed as a policy substitute to capacity mechanisms. Reducing price caps might help to contain the costs of a capacity mechanism, but that might also increase the grid stabilisation task asked of the capacity mechanism.

The magnitude of the ongoing costs to businesses and households of a capacity mechanism should be considered against the costs of potential grid disruption events in the future. Estimates of the ongoing costs to businesses and households of a capacity mechanism, as well as the estimated costs of grid disruption events that will be avoided by a capacity mechanism should be made public as part of the capacity mechanism design process.



Finding 3.7

Policy coordination between the Commonwealth and the States will increase the efficiency of Australian emissions abatement

Maximising the efficiency of Australian emissions abatement requires that Commonwealth, State, and local governments take a coordinated approach to policy development. Good practice would include stipulating whether existing or proposed policies are ‘complementary measures’ or whether they are intended to drive abatement in facilities and sectors not covered by the Safeguard Mechanism. The expected implicit carbon price of these policy measures should be independently estimated and made public.

Box 3.7 – ‘Green jobs’ and industry policy under an emissions cap

Once national emissions reduction targets are in place, economy-wide policy settings to achieve those goals are implemented, and the credibility of any associated offset regime is ensured, the value of additional State-based measures will depend on the extent to which they are complementary measures — either addressing non-price barriers to abatement or delivering non-carbon abatement benefits.

States and Territories pursuing individual abatement policies that do not satisfy these conditions would not make additional contributions to national decarbonisation but would simply alter the distribution of that national abatement between the States and Territories — driving increased abatement in their own states and simultaneously freeing up emissions space for other states and territories to use — likely at greater overall cost. Doing so would constitute a form of State-based industry policy, directing resources to abatement industries in that State or Territory, for no benefit to the overall emissions abatement task.

Box 3.7 – ‘Green jobs’ and industry policy under an emissions cap

Such industry policy might be communicated as supporting ‘green jobs’ or ‘clean energy jobs’ in that State or Territory but the value of doing so would be of questionable value for several reasons. First, in a full employment economy pursuing sectoral jobs targets does not lead to additional overall employment, it simply reallocates workers from one industry to another, likely at the expense of the comparative advantage of those workers, weighing on productivity in the process.

More generally, once an economy is pursuing a national emissions reduction target the notion of ‘green jobs’ begins to lose meaning. Firstly, because lower emissions intensity jobs simply free up emissions for others to use, and secondly because some emissions intensive activities will be required to pursue longer run emissions reductions e.g. coking coal, iron ore, bauxite, and rare earths extraction and processing are all currently required for the deployment of renewable energy and battery technology.

Whether a country should be regarded as a ‘green’ economy or a ‘clean energy’ economy is more meaningfully judged by the overall emissions intensity of the economy, not the emissions intensity of the individual jobs and industries that comprise it.

Public support for research and development

There will exist an ongoing role for government support of research and development, particularly in frontier technologies where market failures are most relevant. Such support should be explicit, transparent, and subjected to rigorous cost benefit analysis. Moreover, in the process of supporting frontier technologies, it is important that governments have a mechanism to ‘move on’ once it becomes clear that a particular frontier technology is unlikely to meaningfully reduce long-term abatement costs, at least on a timeline that is relevant to climate policy. Sunk costs should not determine whether funding continues. Mechanisms to prompt a ‘moving on’ from such technologies include making further funding conditional on the meeting of pre-defined progress thresholds and introducing formal institutional arrangements, such as sunset clauses, to allow reconsideration and rigorous assessment of the costs and benefits of additional funding.

Such an approach might prove useful for the hydrogen sector, which has received substantial investments from both Commonwealth and State Governments, and CCS technologies which have received the highest amount of public support to date (box 3.8). The efficiency of investment into CCS technologies that has already taken place has been questioned by research institutions and public commentators (Browne and Swann 2017; Macdonald-Smith 2022a, 2022b; Turnbull 2017). However, irrespective of whether CCS makes a meaningful contribution to the pre-2050 abatement task, it may be important for the post-2050 ‘draw-down’ of excess atmospheric stocks of greenhouse gases (IEA 2021; IPCC 2022; Macdonald-Smith 2021).

Box 3.8 – Public R&D support for abatement technologies

Government can play an important role in supporting research and development into new technologies when market failures constrain private activity. This role is strongest in the case of frontier technologies, where market failures are most pronounced. To date, Commonwealth and State Government investment has provided support for a range of emissions abatement technologies, including carbon capture and storage, and more recently, hydrogen.

Australian climate technology support

Level of Government	Technology	Value of assistance
Commonwealth	Hydrogen fuel	\$1 billion in direct Australian Government assistance (excluding CCS). ^a
	Future fuels and vehicles	\$2.1 billion ^b
	Large-scale energy storage	\$100 million ^c
	Ultra low-cost solar	Up to \$40 million ^d
	Carbon capture and storage	Between 2003 and 2017, the Government committed over \$3.5 billion to CCS and over \$1.3 billion was distributed. ^e More recently, the Government has invested over \$300 million to fund carbon capture, use and storage (CCS) projects and advance technologies, including establishing CCUS hubs near industrial areas. ^a
	Soil carbon	\$1.6 million ^f
New South Wales	Hydrogen fuel	\$70 million ^a
Victoria	Hydrogen fuel	\$10 million ^a
Tasmania	Hydrogen fuel	\$0.2 million ^a
Western Australia	Hydrogen fuel	\$47.5 million ^a

a. DISER (2021i, pp. 24, 34, 37, 40, 44) b. DISER (2021f, p. 10) c. ARENA (2022, pp. 3–4) d. ARENA (2022b). e. Browne and Swann (2017). f. Taylor (2022).

A. Indirect carbon price estimates

This appendix details the methodology used to estimate the indirect carbon prices reported in chapter 3. We use the term indirect carbon prices to refer to the fiscal cost of the policy per tonne of CO₂-e abatement. Our estimates can be thought of as similar to the indirect abatement subsidies estimated by the Commission previously (PC 2011). The indirect carbon prices listed in the chapter and detailed here are not meant to be exhaustive. There are many policies for which an indirect carbon price has not been estimated.

A.1 State and Territory EV policies

The States and Territories have a range of policies designed to incentivise the uptake of EVs (table A.1). We have estimated indirect carbon prices for three types of policies — upfront subsidies or rebates, stamp duty exemptions or discounts and registration exemptions or discounts. The cost of each policy per EV has been aggregated by State because the policies are complementary rather than exclusive. That is, buyers making use of one policy can also make use of the others. Partially offsetting policies, such as Victoria's road user charge on electric vehicles were not incorporated into the analysis.

Table A.1 – State and Territory EV support policies

State or Territory	Upfront subsidy or rebate	Stamp duty discount/exemption	Registration discount/exemption
New South Wales	\$3000	\$1600	-
Victoria	\$3000	-	\$100 per year
Queensland	\$3000	\$500	-
Western Australia	\$3500	-	-
South Australia	\$3000	-	\$685 per year for three years
Tasmania	-	\$2000	-
Australian Capital Territory	-	\$1600	\$152.80 over two years
Northern Territory	-	\$1500	\$91 per year for five years

Source: NSW Government (2022); DELWP (2021); Queensland Government (2022a, 2022b, 2022c) ACT Government (2022a, 2022b, 2022c); DIPL (2021; 2022); TCCO (2021); Department of Treasury and Finance (2022); Department for Energy and Mining (2022); Government of South Australia (2021); DWER (2021); Department of Transport (2022); Fisk (2021).

Emissions abatement

Emissions abatement resulting from these policies can be measured as the difference between emissions produced by extra EVs that are purchased because of these policies and the average emissions of the vehicles that they replace. Emissions produced by EVs refer to the emissions associated with generating the electricity required to charge the EV. In practice, some recharging stations are powered solely by renewable

energy (for example, Chargefox's ultra-rapid chargers). But this is not universally the case, and not all homes where EVs will be charged are powered solely by renewable energy. The scenario where grid emissions are zero, equivalent to all EVs being charged by renewable energy, is considered later. Emissions from cars powered by internal combustion engines come from burning fuel. The parameter value used in our estimate is the combined average emissions intensity of new passenger vehicles and new light commercial vehicles in 2019. Lifecycle emissions, that is, those involved in the manufacturing of vehicles, are not considered for either EVs or non-EVs. To estimate the amount of abatement, the following parameters and assumptions were used (table A.2).

Table A.2 – Assumptions underpinning the emissions abated estimate

Parameter	Description	Assumed value	Source
<i>km</i>	Average kilometres driven per year	12 100 km	ABS 2020
<i>EVefficiency</i>	Electricity consumption per kilometre	151 Wh/km	EV Database 2022
<i>ICEefficiency</i>	Emissions per kilometre	180.5 g/km	NTC 2020
<i>EF</i>	Emissions factor	See table A.3	
<i>A</i>	Additionality ^a	10–100%	
<i>BF</i>	Bring forward ^b	4–13 years	

a. Additionality refers to the proportion of abatement — in this case the proportion of EVs — that would not have occurred in the absence of the policy. **b.** Bring forward refers to the difference between when the car is acquired with the policy in place and when it would have been acquired in the absence of the policy.

The equation for calculating the amount of emissions abatement is as follows:

$$\text{Emissions Abatement} = \sum_{t=1}^{BF} (ICEefficiency - EVefficiency \times EF_t) \times km \times A$$

Underpinning the emissions abatement estimate is an assumption about how the emissions intensity of the electricity grid evolves over coming years. Our modelling used the development path AEMO viewed as most likely, *Progressive Change least-cost DP with actionable Marinus Link, and staged VNI West and HumeLink* (AEMO 2022b). This development path is used to calculate the share of electricity generation coming from renewable and non-renewable sources. In turn, these shares are used in a simple linear regression to estimate the emissions factor for each year until 2035-36:

$$\widehat{EF}_t = \widehat{\beta}_1 \text{ShareNonRenewables}_t$$

The emissions factor associated with consumption of purchased electricity or loss of electricity from the grid is forecast to fall from 0.73 in 2019-20 to 0.08 in 2035-36 (table A.3). This effectively assumes that each State and Territory follows the same emissions reduction path within the electricity sector. While this is unlikely to be the case, changing this assumption would have only small effects for each State and Territory. The upper bound for emissions abatement assumes that the policy achieves 100 per cent additionality. The lower bound assumes 10 per cent additionality.

Table A.3 – Forecasted average emissions factors
Kilograms of CO₂-e per kilowatt hour

Year	Emissions factor
2019-20	0.73
2020-21	0.71
2021-22	0.67
2022-23	0.62
2023-24	0.57
2024-25	0.49
2025-26	0.44
2026-27	0.40
2027-28	0.33
2028-29	0.26
2029-30	0.20
2030-31	0.17
2031-32	0.17
2032-33	0.13
2033-34	0.09
2034-35	0.09
2035-36	0.08

Source: Commission estimates using DISER (2021b); AEMO (2022).

The indirect carbon price associated with the policy was estimated on a per-unit basis and calculated according to the following formula:

$$\text{Implicit Carbon Price} = \frac{\text{Tax Foregone} + \text{Budget Expenditure}}{\text{Emissions Abated}}$$

This estimate can be converted into a broader shadow price, reflecting the broader economic impacts of the policy, arising from the change in net taxation on the economy, and associated product market distortions. However, for simplicity and transparency we have simply estimated the fiscal cost per tonne of abatement.

The indirect carbon price associated with each State and Territory's policy is high compared to other abatement measures (chapter 3). The high upper bound on these estimates reflects the assumed limited additionality of demand side EV policy measures. Given that EV uptake is predominantly limited on the supply side, demand side measures are likely to have limited impact. The limited near-term emissions savings from switching from liquid fossil fuels to the electricity grid also plays a role (table A.4).

Table A.4 – Indirect carbon prices for State and Territory EV support policies

State or Territory	Cost over 4 years	Cost over 13 years	Indirect carbon price (\$/tonne CO ₂ -e)
New South Wales	\$4600	\$4600	\$217–9470
Victoria	\$3400	\$4300	\$203–6999
Queensland	\$3500	\$3500	\$165–7205
Western Australia	\$3500	\$3500	\$165–7205
South Australia	\$5055	\$5055	\$239–10406
Tasmania	\$2000	\$2000	\$95–4117
Australian Capital Territory	\$1752.8	\$1752.8	\$83–3608
Northern Territory	\$1864	\$1955	\$92.4–3837

Source: Commission estimates.

A.2 Fuel excise discounts

Domestically produced ethanol and biodiesel attract discounted rates of excise duty and composite fuels made using ethanol and biodiesel have a lower emissions intensity (table A.5).

Table A.5 – Excise rates and emissions intensities for fuels

	Excise rate ^a	Scope 1 emissions intensity (kg/CO ₂ -e/litre)	Lifecycle emissions intensity (kg/CO ₂ -e/litre)
Petrol	0.442	2.38	3.02
Ethanol	0.145	0.06	1.94 ^b
E10	0.412	2.15	2.91
Diesel	0.442	2.72	2.92
Biodiesel	0.088	0.09	0.60
B20	0.371	2.19	2.46

a. Discounted excise rates apply only to domestically produced ethanol and biodiesel. **b.** Lifecycle emissions intensity estimates for ethanol were calculated using a weighted average of lifecycle emissions of wheat, sorghum and molasses because an estimate for the lifecycle emissions intensity of barley, which accounts for nine per cent of ethanol production in Australia, was not available.

Source: Commission estimates based on DISER (2021b); PC (2011a); PC (2022d); USDA (2020).

The indirect carbon price associated with the discounted rates of excise duty can be estimated as follows:

$$\frac{EX_p - EX_e}{EM_p - EM_e} \times 1000$$

$$\frac{EX_d - EX_b}{EM_d - EM_b} \times 1000$$

where:

- EX_p indicates the excise rate for petrol

- EX_e indicates the excise rate for ethanol
- EX_d indicates the excise rate for diesel
- EX_b indicates the excise rate for biodiesel
- EM_p indicates the emissions intensity for petrol
- EM_e indicates the emissions intensity for ethanol
- EM_d indicates the emissions intensity for diesel
- EM_b indicates the emissions intensity for biodiesel.

The scope 1 emissions intensity was used to estimate a lower bound, while the lifecycle emissions intensity was used to estimate an upper bound. The estimated indirect carbon price for E10 is \$127.91–273.66 and for B20 is \$134.55–152.02 (table A.6).

Table A.6 – Indirect carbon prices for biofuels

	Indirect price (scope 1 emissions)	Indirect price (lifecycle emissions)
E10	127.92	273.65
B20	134.55	152.02

Source: Commission estimates.

A.3 Renewable energy target

The renewable energy target (RET) has two components, the large-scale renewable energy target, backed by large-scale generation certificates (LGCs) and the small-scale renewable energy scheme, backed by small-scale technology certificates (STCs). The RET aimed to achieve 33 000 gigawatt hours of additional electricity from large-scale renewable sources by 2020 — equivalent to 20 per cent of energy supply. That target was reached in September 2019 and is now being maintained through until 2030.

This section estimates the indirect prices associated with the RET up until 2020. The period after 2020 is not considered because — with the target having already been met — it is unlikely that new generation could be considered additional. The Commission (2011a) has previously estimated the indirect price — or indirect abatement subsidy — associated with both the LGC and STC schemes.

Large-scale generation certificates

The Commission (2011a) estimated the indirect carbon price associated with LGCs using both the ‘spot’ price (\$37.03 at the time) and the long-term contract price. The long-term contract price was not readily available and hence was estimated as the price needed to induce wind generation to enter the market (\$60).

Since then the economics of electricity generation have changed, with renewables now having a lower levelised cost of energy than coal (Bleich and Guimaraes 2016, p. 6). This finding is also true domestically, with each of CSIRO’s GenCost reports identifying renewables as the lowest cost ‘new build’ (Graham et al. 2018, 2020, 2021, 2022). Consequently, we have adjusted our methodology and only estimated indirect carbon prices based on the ‘spot’ price. As of 5 September 2022 the price of an LGC was \$59.50 (Northmore Gordon 2022).

The Commission (2011a) used three emissions intensity factors to estimate a range of indirect prices. The average emissions intensity of the grid (0.92) was used for the central estimate, while the weighted-average emissions intensity factor for coal generation (1.00) was used for the lower bound estimate and the emissions intensity factor for gas generation (0.54) was used for the upper bound estimate.

Currently, the average emissions intensity factor of the non-renewable component of the grid is 0.87. The weighted-average emissions intensity factor of coal generation is 0.99 and the emissions intensity factor for gas is 0.54. The emissions intensity factor of the non-renewable component has decreased because gas makes up a larger share than it did in 2011. The emissions intensity factor of coal generation has decreased because black coal makes up a larger share of coal production relative to brown coal than in 2011.

The indirect carbon prices are calculated using the following formula:

$$\frac{LGC \text{ Price}}{Emissions \text{ Factor}}$$

The central estimate is \$68 per tonne of CO₂-e, with a range of \$60–110.

Additionality

The Commission (2011a) took the view that all LGCs were additional — that is, the renewable energy generation would not have occurred in the absence of the policy — because, at the time, the cost of renewable energy generation was far greater than non-renewable generation. That is no longer the case. The cost of renewables has fallen faster and further than expected and as of 2016 was less than the cost of fossil fuel generation (Bleich and Guimaraes 2016, p. 6; Graham et al. 2018, 2020, 2021, 2022). Hence, it is likely that not all renewable energy generation installed after 2016 was additional. That is, some of the generation installed would likely have been installed even in the absence of LGCs.

In 2016, approximately 17 500 gigawatt-hours of renewable energy that counted towards the large-scale component of the RET was generated — 53 per cent of the 2020 target (CEC 2017). Taking the extreme view that none of the generation installed after 2016 was additional, we can calculate a lower bound estimate of additionality. If the additionality of LGCs was only 50 per cent, the estimated indirect carbon price would rise by 100 per cent to \$136, with a range of \$120–220.

Small-scale technology certificates

STCs differ to LGCs in that certificates accounting for 15 years worth of abatement (fewer years if the technology was installed post-2016) were created upfront and those certificates could be sold to retailers immediately. This policy can be thought of as a capital subsidy. The subsidy equivalent has been estimated as equal to what it would have cost a private actor to fund investment in the technology in the absence of the policy. To estimate an indirect carbon price it is best to think in annual terms, hence the cost of the policy has been transformed into equivalent annual cost terms. This conversion relies on the following formula:

$$\frac{STC_t \times P_t^{STC}}{1 - (1 + \delta)^{-n}}$$

where:

- STC_t refers to the number of certificates issued in year t
- P_t^{STC} refers to the price of STCs in year t
- δ refers to the discount factor
- n refers to the economic life of the asset.

The Commission (2011a) used three discount factors (three per cent, seven per cent and eleven per cent) as well as varying the emissions intensity of the electricity replaced (as described above) to estimate a range for the indirect carbon price. We have adopted the same approach and used the 2015 STC data to inform our estimates (table A.7).

Table A.7 – STC indirect prices

Discount rate	Lower bound	Central estimate	Upper bound
3%	\$41	\$46	\$75
7%	\$57	\$65	\$105
11%	\$76	\$86	\$139

Source: Commission estimates based on Clean Energy Regulator (2022b, 2022a); PC (2011a); Northmore Gordon (2022).

The generation eligible for STCs was not wholly additional because of overlaps with State and Territory feed-in-tariffs. The State and Territory policies affected the indirect carbon price of solar photovoltaic generation specifically (PC 2011a, p. 83). This issue has not been addressed in these estimates.

Of all STCs created between 2011 and 2020, 43 per cent were issued after 2016. Hence, and to be consistent with our LGC estimates, we have used an additionality parameter of 50 per cent to provide a lower bound for the indirect price associated with STCs. Doing so increases the estimated indirect carbon price by 100 per cent. That is, the central estimate using a seven per cent discount rate is \$129, with a range of \$114–209.

A.4 NSW Energy Savings Scheme

The NSW energy savings scheme requires certain entities to obtain and surrender energy savings certificates (ESC). Certificates represent one notional megawatt hour (MWh) (Kean 2022). Accredited certificate providers receive certificates in accordance with the following formula:

$$\begin{aligned} \text{Number of certificates} &= \sum (\text{electricity savings} \times \text{electricity conversion factor} \\ &\quad + \text{gas savings} \times \text{gas certificate conversion factor}) \end{aligned}$$

The indirect price estimated reflects electricity savings only. It is calculated as the penalty rate, which reflects the upper bound for covered entities, divided by the emissions intensity factor and multiplied by the electricity conversion factor (1.06) to transform the price into dollars per tonne of CO₂-e.

$$\text{Indirect Carbon Price} = \frac{\text{Penalty Rate}}{\text{Emissions Factor}} \times \text{Electricity Conversion Factor}$$

Similar to previous estimates, our estimates consider only scope two emissions and three intensity factors were used to estimate a range of indirect carbon prices: the average emissions intensity of electricity generation in NSW, which represented a central estimate and then the emissions intensity of coal generation (an upper bound) and the emissions intensity of gas generation (a lower bound). The emissions intensity factor for coal generation is 0.99 and resulted in an indirect price of \$32 per tonne. The average emissions intensity factor for electricity generation in NSW in 2019-20 was 0.78 and equated to an indirect price of \$41 per tonne (DISER 2021b). The average emissions intensity factor for gas production is 0.54 and equated to an indirect price of \$59 per tonne.

Victoria has a similar system where certain entities are required to purchase Victorian energy efficiency certificates (VEECs). VEECs are measured in tonnes of CO₂-e, hence, no transformation is required. As of the 5th of September, one VEEC cost \$69 in the spot market (Northmore Gordon 2022). It is possible that the long-term contract price is lower than the 'spot' price.

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