Australian Government

Productivity Commission

Public Infrastructure

Productivity Commission Inquiry Report

Volume 2

No. 71, 27 May 2014

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ISSN 1447-1329
ISBN 978-1-74037-485-9 (Volume 1)
ISBN 978-1-74037-486-6 (Volume 2)

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An appropriate citation for this paper is:

Productivity Commission 2014, *Public Infrastructure*, Inquiry Report No. 71, Canberra.

The Productivity Commission

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

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

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27 May 2014

The Hon Joe Hockey MP
Treasurer
Parliament House
CANBERRA ACT 2600

Dear Treasurer

In accordance with Section 11 of the *Productivity Commission Act 1998*, we have pleasure in submitting to you the Commission's final report into Public Infrastructure.

Yours sincerely

Peter Harris AO	Dr Warren Mundy	Paul Lindwall
Presiding Commissioner	Commissioner	Associate Commissioner

Terms of reference

Public Infrastructure: Provision, Funding, Financing and Costs

I, Joseph Benedict Hockey, Treasurer, pursuant to Parts 2 and 3 of the *Productivity Commission Act 1998*, hereby request that the Productivity Commission (Commission) undertake an inquiry into ways to encourage private financing and funding for major infrastructure projects, including issues relating to the high cost and the long lead times associated with these projects.

Through this inquiry, the Commission is to conduct a broad ranging investigation into costs, competitiveness and productivity in the provision of nationally significant economic infrastructure and examine ways to: reduce infrastructure construction costs; address any barriers to private sector financing, including assessing the role and efficacy of alternative infrastructure funding and financing mechanisms, and recommending mechanisms and operating principles that may be applied to overcome these barriers; and, without limiting the generality of this reference, outline options to reduce construction costs.

Background

Efficient public infrastructure plays a key role in a competitive and productive economy and the ongoing funding and financing of infrastructure development in Australia is therefore of critical importance.

The capacity of government to meet expectations for improved infrastructure services is always limited, and the use of financing options involving the private sector can reduce the call on government resources, allowing scarce public funds to be targeted in a more effective manner.

While alternative financing and funding models offer opportunities to reduce the immediate call on governments, it should be noted that the application of new models is not a panacea. Ultimately infrastructure can only be funded through taxation, borrowings or direct user charges. There are difficult trade-offs to consider given increasing demand and competing priorities.

Scope of the inquiry

In reporting on funding and financing and the scope for reducing costs for public infrastructure projects, the Commission is to analyse and develop findings on the following:

1. How infrastructure is currently funded and financed in Australia, including by the Commonwealth, the States and the private sector.

2. The rationale, role and objectives of alternative funding and financing mechanisms, including:

    a. the full range of costs and benefits of different models

    b. the issues and costs associated with the allocation of project risks, availability of finance, contracting arrangements and delivery models for construction projects

    c. the disincentives to private sector investment

    d. broad principles for the use of these funding and financing mechanisms

    e. the roles of the Australian Government, the States and Territories, Local Government and the Private Sector in the implementation of these mechanisms, and the relationship between each of the parties

    f. creation of revenue streams to attract private sector finance; for example, through user charging, availability payments etc.

3. Consider the financial risks to the Commonwealth posed by alternative funding and financing mechanisms, as well as their possible impact on the Budget and fiscal consolidation goals.

4. Examine the cost structure of major infrastructure projects in Australia, including where infrastructure project costs have increased considerably, compared with other countries.

5. Provide advice on ways to improve decision-making and implementation processes to facilitate a reduction in the cost of public infrastructure projects, including in relation to:

    a. measures to improve flexibility and reduce complexity, costs and time for all parties

b. access to the market for domestic and international constructors, including barriers to entry, and what effect this has on construction costs

c. 'greenfield' infrastructure projects.

6. Comment on other relevant policy measures, including any non-legislative approaches, which would help ensure effective delivery of infrastructure services over both the short and long term.

Process

In undertaking this inquiry, the Commission should take into account the work being led by the National Commission of Audit to examine the scope for efficiency and productivity improvements across all areas of Commonwealth expenditure.

The Commission is to undertake an appropriate public consultation process including holding hearings and inviting public submissions. It will consult with the State and Territory Governments in undertaking this inquiry.

The Commission should release a draft report in March 2014.

The final report should be provided within six months of the receipt of these terms of reference.

The Government will consider the Commission's recommendations, and the Government's response will be announced as soon as possible after the receipt of the Commission's final report.

J. B. HOCKEY
Treasurer

[Received 13 November 2013]

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The Commission's report is in two volumes. **This volume 2 contains chapters 9 to 16 and appendices A to J and volume 2 references.** Volume 1 contains the Overview, recommendations and findings, chapters 1 to 8 and volume 1 references. Below is the table of contents for both volumes.

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Acknowledgments

The Commission is grateful to everyone who has given freely of their time to discuss with it the very wide range of matters canvassed in the terms of references, especially those appearing at the roundtable, hearings and providing written submissions.

The Commissioners would like to express their appreciation to the staff who worked on the inquiry, led by Ralph Lattimore and John Salerian and included Rick Baker, Melissa Edwards, Carole Gardner, Jared Greenville, Anthony Housego, Ellie Jepsen, Alex Maevsky, Ana Markulev, Ian Moran, Greg Murtough, Tom Nankivell, Bonnie Nguyen, Hudan Nuch, Chris Perks, Joshua Runciman, Carl Toohey, Elise Whalan and Kirsten Wren.

Abbreviations and explanations

Abbreviations

ABCC	Australian Building and Construction Commission
ABS	Australian Bureau of Statistics
ADI	Authorised Deposit-Taking Institutions
ALC	Australian Logistics Council
APAC	Australian Pacific Airports Corporation
APRA	Australian Prudential Regulation Authority
ARTC	Australian Rail Track Corporation
ATO	Australian Taxation Office
BIM	Building Information Modelling
BIT	Building Industry Taskforce
BITRE	Bureau of Infrastructure, Transport and Regional Economics
BOO	Build-Own-Operate
BOOT	Build-Own-Operate-Transfer
COAG	Council of Australian Governments
CRRP	COAG Road Reform Plan
CSO	Community Service Obligation
DBFM	Designs, Builds, Finances and Maintains
DBFO	Designs, Builds, Finances and Operates
FWBC	Fair Work Building and Construction
GDP	Gross domestic product
GFC	Global Financial Crisis
GNSS	Global Navigation Satellite System
GTE	Government trading enterprise
HVCI	Heavy Vehicle Charging and Investment

IA	Infrastructure Australia
IAC	Industries Assistance Commission
IAP	Intelligent Access Program
IBTO	Infrastructure Borrowings Tax Offset
IC	Industry Commission
IDA	Infrastructure Debt Authority
IE	Independent Economics
IGA	Intergovernmental Agreement on Federal Financial Relations
IFWG	Infrastructure Finance Working Group
IPART	Independent Pricing and Regulatory Tribunal
IR	Industrial relations
IRR	Internal rate of return
LRMC	Long-run marginal cost
LTNZ	Land Transport New Zealand
MFP	Multifactor Productivity
MRA	Metropolitan Redevelopment Authority
NICS	National Infrastructure Construction Schedule
NPP	National Partnership Payment
NPV	Net present value
NTC	National Transport Commission
OECD	Organisation for Economic Co-operation and Development
PAYGO	Pay-as-you-go
PC	Productivity Commission
PFI	Private Finance Initiative
PPP	Public private partnership
PSC	Public Sector Comparator
RAB	Regulated Asset Base
RBA	Reserve Bank of Australia
RUC	Road user charge
SCOTI	Standing Council on Transport and Infrastructure

SDP	Sydney Desalination Plant
SPP	Specific Purpose Payment
SPV	special purpose vehicle
SRMC	Short-run marginal cost
TCA	Transport Certification Australia
TIF	Tax increment financing
TIFIA	Transportation Infrastructure Finance and Innovation Act (US)
TOR	Terms of reference
WHS	Work health and safety

Explanations

Billion	The convention used for a billion is a thousand million (10^9).
Findings	*Findings in the body of the report are paragraphs highlighted using italics, as this is.*
Recommendations	***Recommendations in the body of the report are highlighted using bold italics, as this is.***

9 Cost drivers, trends and benchmarks

Key points

- Infrastructure costs in Australia appear high, but significant uncertainty applies to many published comparisons.
- There is a compelling need for more and better major project data to be publicly available and for greater coordination of such data. Improved data would assist buyers of construction services (including governments) and may provide a broader guide to all market players on efficient costs of construction. It could reduce transactions and other costs. It would also enable the community to be well informed on the likely cost impacts of proposed higher standards including any 'gold plating'.
- Evidence is suggestive of recent significant (but cyclical) increases in the costs of constructing major public infrastructure in Australia.
  - The cyclical element is connected to broader movements in economic conditions.
  - Recent increases in fuel and labour costs have also driven up infrastructure costs.
  - Some evidence points to the high costs of land in brownfields/urban locations as a further factor pushing up costs for many projects in Australia.
  - It is also likely that increasing costs connected to design and environmental requirements have played a part, but available data are insufficiently detailed to establish the extent of this effect.
- Benchmarking information in Australia is disappointingly limited, although some valuable sectoral work has been done, particularly in the areas of road, rail and airport terminals.
  - This deficiency must be addressed in a future structure for infrastructure decisionmaking as a whole.
  - The present lack of detailed cost benchmarks limits its use in controlling costs, in the manner now adopted in the UK.
  - Available benchmarking results do illustrate the key roles that the choice of construction method and project scope have in driving costs.
- Comparisons of the costs of major project construction, both within Australia and elsewhere, are subject to several methodological and practical problems, but a new model – Citibloc – is interesting.
  - The main problems include output measurement, allowance for climatic and geographical factors, and, in the international case, exchange rate movements.
  - The bespoke nature of many major projects makes comparisons of 'like for like' particularly difficult.
  - Some cost differentials between Australia and other countries also result from broader factors, such as the country's stage of economic development and standards of living. While notable, these may be the result of desirable differences between Australia and other countries and in any case are exogenous.

The Commission's terms of reference ask it to examine the cost structure of major infrastructure projects in Australia, and to consider if infrastructure costs have increased considerably compared with other countries. This chapter looks at these issues, and analyses the recent performance of the Australian construction industry with regard to cost, focusing on infrastructure construction where feasible. Productivity performance, which is also a key contributor to time and cost outcomes, is considered in greater detail in chapter 10.

The analysis takes place with a backdrop of competing claims about the industry's recent performance (box 9.1). Some commentators have argued that recent cost performance has been poor by international standards, and that Australia has become a 'high cost, low productivity' location for major project construction (see, for example, Chandler 2013b, p. 1 and BCA 2012, p. 12). Other commentators have an opposing view, and argue that recent Australian performance with regard to cost is on a par, or better than, comparable countries (see, for example, Best 2012, p. 1).

Due to the lack of consolidated data on many aspects of infrastructure construction cost, the Commission has drawn on a broad range of evidence in assessing these claims, including: aggregate data on the main input cost elements within construction; benchmarking data, including sectoral and international cost benchmarks; regulatory benchmarks; performance indicators correlated with cost (such as data on project delays, reworks and variations); and case studies. While each of these elements considered in isolation provides an incomplete picture of cost trends, when considered together, they can provide a more comprehensive view of recent trends in construction costs.

The main focus of the chapter is on cost trends. However levels of cost are discussed where relevant (as indicators, for example, of prevailing levels of efficiency or inefficiency). This is particularly the case in section 8.4 which discusses cost benchmarking.

The Commission is also proposing new systems that would systematically improve data collection and provide substantially greater opportunities for benchmarking and cost comparison.

Box 9.1 Differing views from participants on costs and international comparisons

The Department of Infrastructure and Regional Development (sub. 64, p. 25):

> Infrastructure projects in Australia are considered to be costly relative to other comparative countries. Based on road and rail projects funded through the Infrastructure Investment Programme, key factors in cost growth in recent times have been:
>
> - the cost of capital; and
> - land acquisition, particularly in regard to meeting environmental requirements. For example, the required biodiversity offsets are approximately four times the size of the land purchased for the infrastructure itself.

Austrade (sub. 74, p. 13):

> … a European company (with operations in over 20 countries and that is undertaking work in Australia currently) advised Austrade in 2013 that Australian bid costs are double the second most expensive country they operate in.

The Queensland Government (sub. DR203, p 43):

> The primary cost driver of overall infrastructure cost increases in Queensland, over the past several years, has been the mining construction boom. Future drivers are expected to include growth in the energy sector, particularly in the Liquefied Natural Gas industry.

The Minerals Council of Australia (sub. 70, p. 5):

> … whereas a few years ago Australia could build iron ore and coal projects as cheaply as our competitors, now iron ore projects are 30 per cent more expensive than the global average, while for thermal coal the figure is 66 per cent. Labour costs are rising faster than the national average and are amongst the highest in the world. Energy and transport costs are also much higher in Australia than in competitor countries.

Lend Lease (sub. 46, p. 20):

> While the resources boom has seen the costs of physical capital soar in recent years (construction and mining equipment sales rose by 23% in 2011), intermediate costs have increased at a significantly higher rate than wages and salaries in the construction sector. For example, Lend Lease Engineering in NSW experienced oil prices rises of approximately 200% in the decade to 2013; asphalt by 110% and concrete by 63% in the same period.

Engineers Australia (sub. 26, p. 1):

> So little information [on infrastructure costs] is available that it has been accepted at face value in many quarters. However, when carefully examined, this information is seen to be flawed and the directions it points to are unreliable. Choosing similar but different data sources leads to an entirely different story. Engineers Australia cautions against undue reliance on cost data that has not been subjected to rigorous scrutiny, that cannot be replicated or that is not available from official sources.

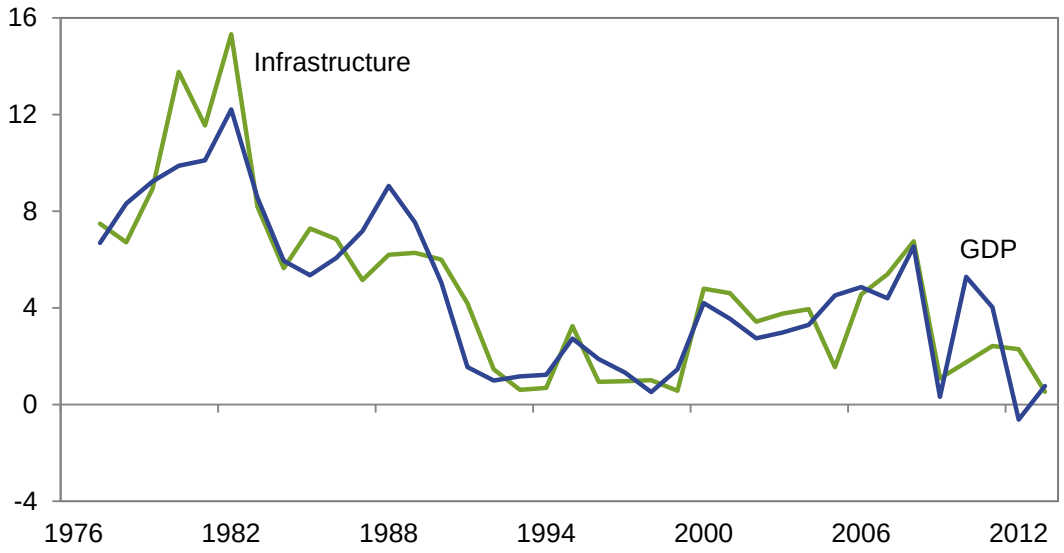
The Australian Constructors Association (sub. DR169, p. 5):

> Australia's construction costs rose rapidly and notably compared to other costs in the past decade … Construction wages relative to all sectors also grew notably as major project investment activity in Australia increased.

9.1 What has been happening to aggregate construction costs?

For much of the last thirty years, infrastructure construction costs in Australia, at least as they are measured in aggregate terms, have not been out of step with general price movements in the rest of the economy. Further, in recent years, data from the ABS suggest that overall 'price' increases in infrastructure construction industry outputs do not seem to have been significant.[1] Indeed, price inflation for infrastructure outputs seems to have followed the general prices rises seen for production in the economy as a whole (figure 9.1).

Figure 9.1 **GDP and engineering construction implicit price deflators**
1976 to 2013, annual per cent changes



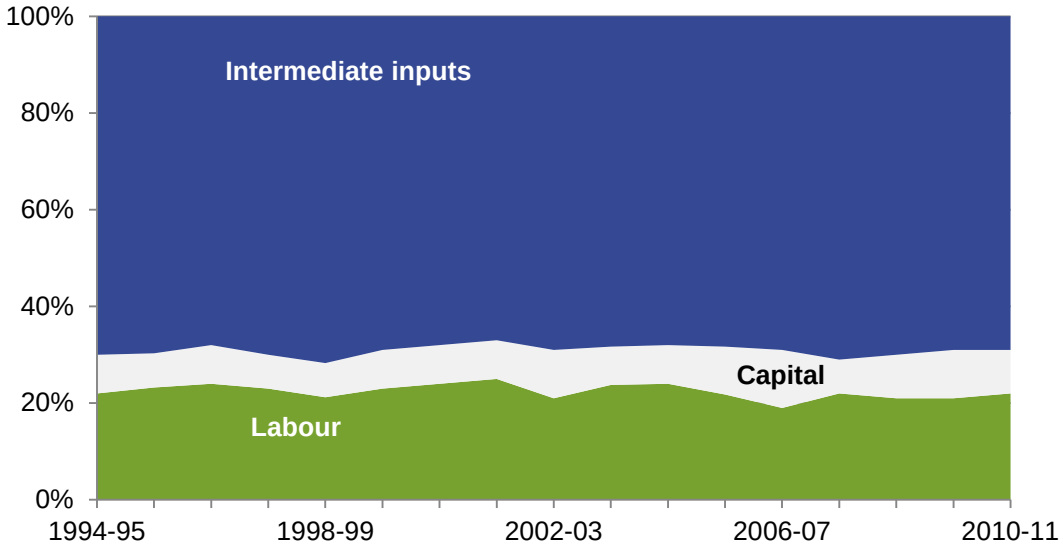
Source: ABS (*Australian National Accounts: National Income, Expenditure and Product*, Cat. no. 5206.0, table 5).

For the construction industry as a whole (which includes construction of commercial buildings and residential construction), cost shares, deriving from the relative use of labour, capital and intermediate inputs, have also remained stable over the past decade or so. Between 1994-95 and 2010-11, the cost shares of labour, capital and intermediate inputs in the construction industry have not shifted significantly (figure 9.2). However, there has been a long-run reduction in the labour cost share relative to capital, which is not so easily identifiable in figure 9.2

1 For ABS statistics, infrastructure is defined as the heavy and civil engineering sub-sector. Infrastructure prices are measured, by proxy, by the implicit price deflator for gross fixed capital formation for non-dwelling construction, new engineering construction.

because of the dominant role of intermediate inputs (appendix G). Unfortunately, data on factor costs are not separately available from the ABS for the infrastructure sector.

Figure 9.2 **Cost shares in the construction industry**
proportion of all costs, per cent, 1995-95 to 2010-11



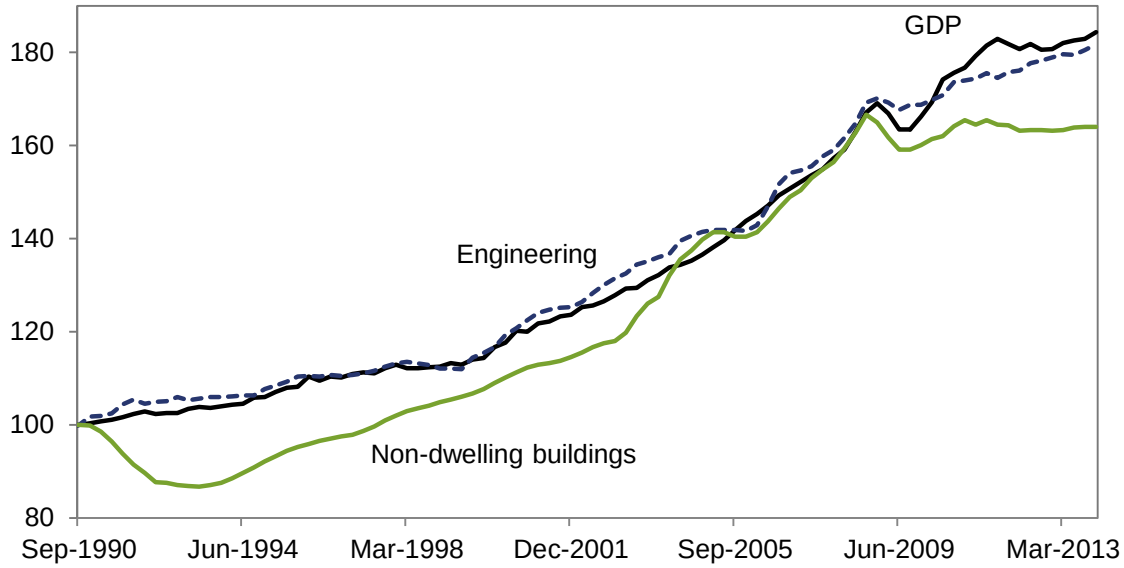
Source: ABS (*Estimates of Industry Multifactor Productivity, Australia: Detailed Productivity Estimates*, Cat. no. 5260.0.55.002, table 19).

This relatively stable aggregate picture does, however, obscure some differing trends in costs. Looking at cost data that distinguishes between various forms of infrastructure construction, several trends are apparent:

- In general, price increases have been modest in recent years.
- Different segments of the construction sector show different price trends. For example, from 2003 to 2005 price increases were very substantial for non-dwelling buildings (which include commercial buildings, but also airport terminals and social infrastructure such as jails and hospitals) (figure 9.3). But from 2008 to 2013, prices in this segment of the industry have been relatively stable.
- Costs are clearly affected by macroeconomic conditions, as shown by short run movements that coincide with the GDP deflator (figure 9.4). For example, prices dipped markedly during the GFC.
- Over the long run, construction costs appear tied to prices in the economy as a whole, and do not outpace all other industries.

Figure 9.3 **Construction cost growth rates by industry segment**

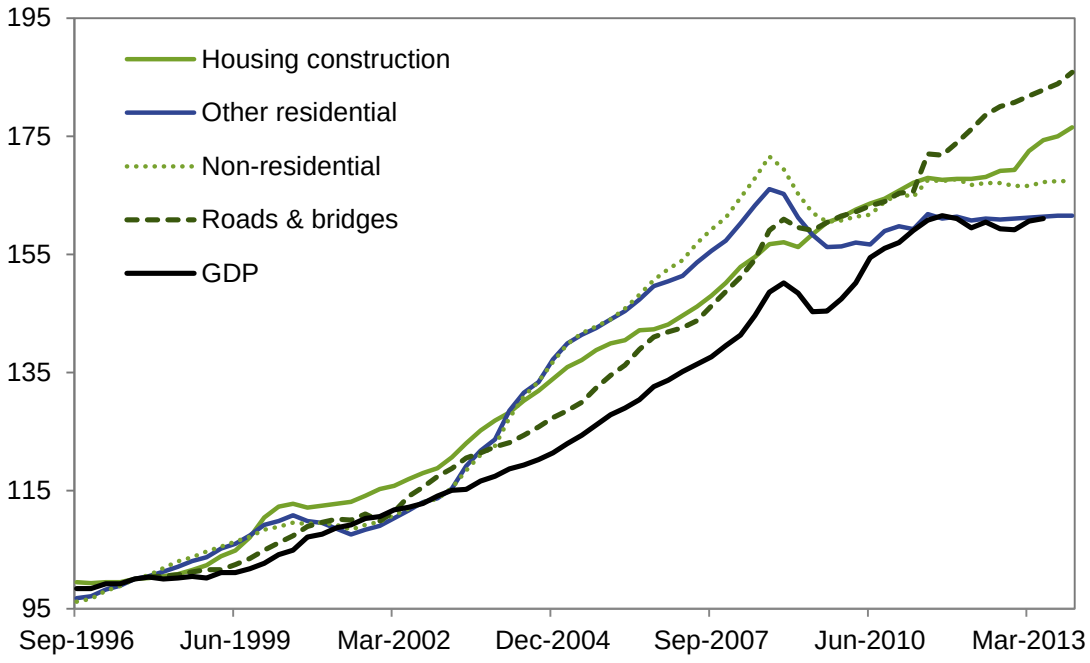
Private gross fixed capital formation prices index September 1990 to December 2013 (base September 1990 =100)



Sources: ABS (*National Accounts Gross Fixed Capital Formation IPDs,* Cat. no 5206.0); ABS (*Prices of construction,* Cat. no. 6427.0).

Figure 9.4 **Cost growth rates by type of construction activity**

Producer price index September 1996 to December 2013 (base September 1997 =100)

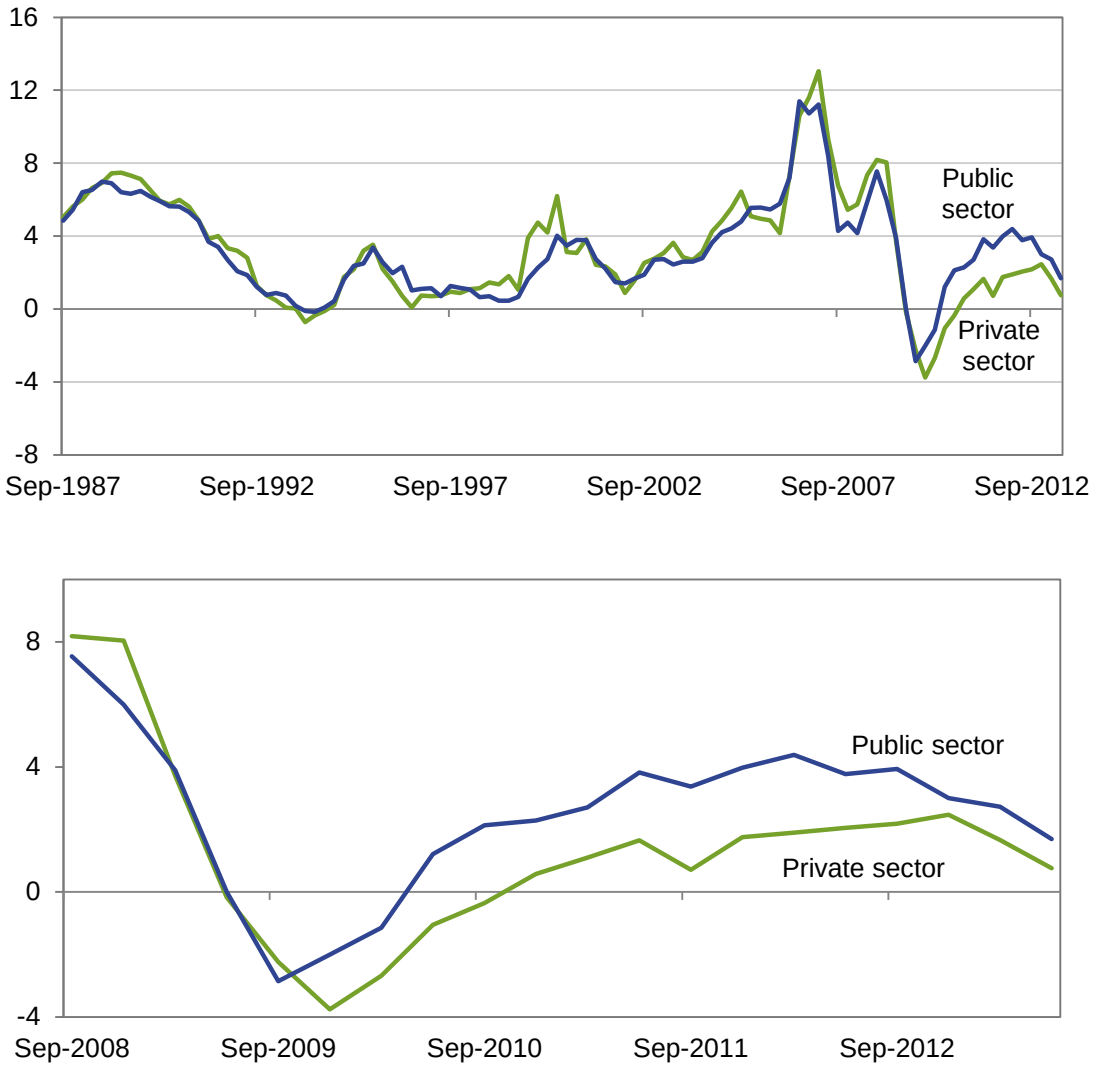


Source: ABS (*Producer Price Indexes, Australia,* Cat. no. 6427.0, table 17).

Differences are also apparent between the cost of private and public sector construction since 2009 — that is, infrastructure built for, and subsequently owned by, the public sector versus that which is built and subsequently owned by the private sector. Taking a longer perspective, however, reveals that there are significant similarities in the trends for infrastructure built for the private and public sectors (figure 9.5).

Figure 9.5 **The long and the short of it: public and private sector construction costs**

Quarterly per cent changes, September 1987 to June 2013 and September 2008 to June 2013



Sources: ABS (*Engineering Construction Activity,* Cat. no. 8762.0); Lend Lease (sub. 46, p. 28).

Finally, some significant variation in regional costs have also been observed. For example, a report by the Property Council of Australia (2012), using Rawlinson's cost data, found that:

- Brisbane appears to have a competitive cost advantage in the development of all forms of high rise construction
- construction costs across most forms of development are higher in Perth than other states
- for most forms of development, construction costs in Brisbane are relatively similar to Melbourne with a 10 per cent margin depending on the development type.

Some further aspects of regional cost variations are discussed in chapter 13.

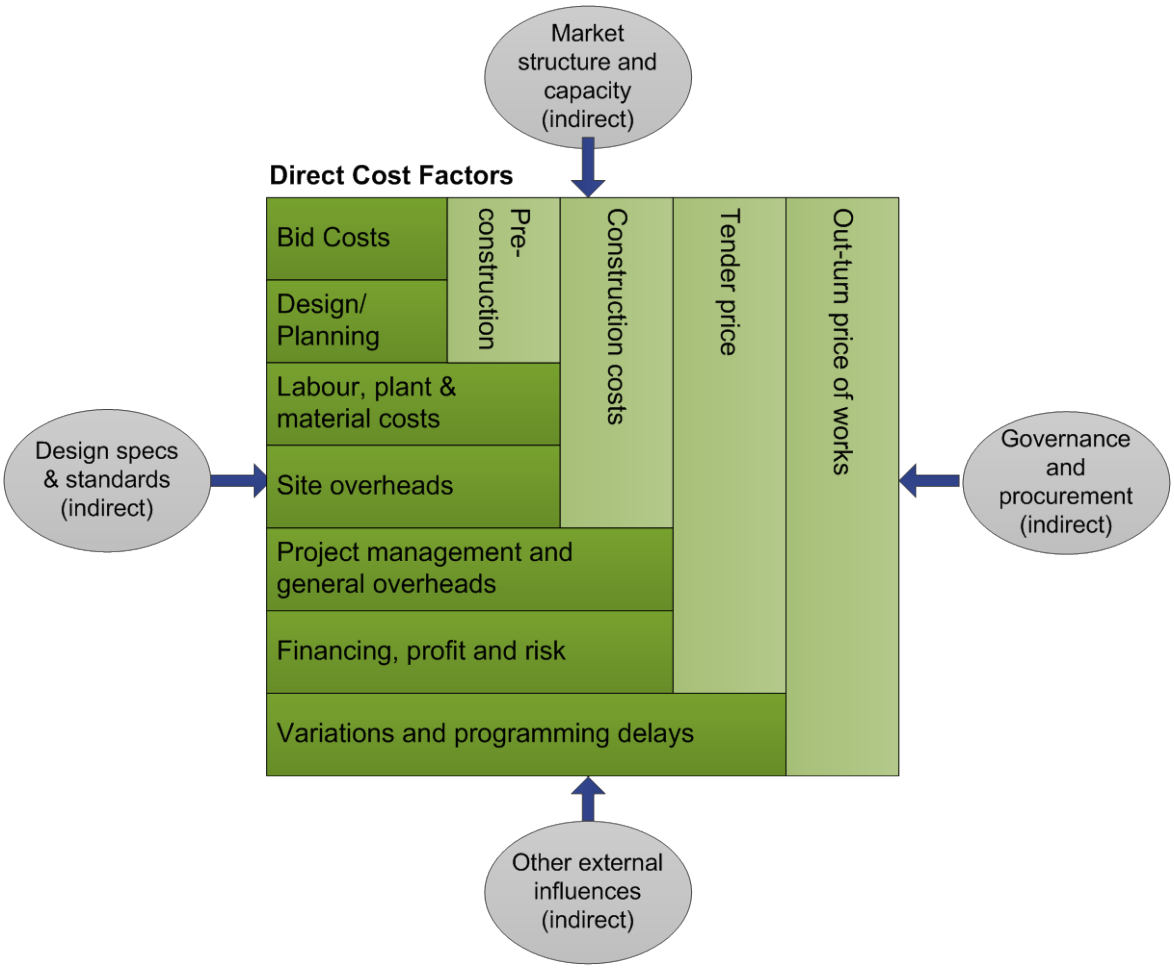
9.2 Input cost drivers and trends

Infrastructure project costs can generally be divided into those incurred prior to the construction phase (including approval, bidding and design costs); the input costs (direct and indirect) of construction; and those costs incurred following the construction phase (for example, operation and maintenance costs). Most of the focus of this chapter is on the middle phase of costs related to inputs within the actual construction phase and are detailed in figure 9.6.

Costs prior to construction

Before construction begins, a number of costs are incurred that add to the total cost of an infrastructure project. These relate to the cost in obtaining the work by the contractor (bidding costs) along with the costs associated with designing the project (some design services will still be used during the construction phase). Acquiring land on which projects are to be built is another critical ingredient.

Figure 9.6 **Main cost elements**



Source: HM Treasury (United Kingdom) 2010, p. 5.

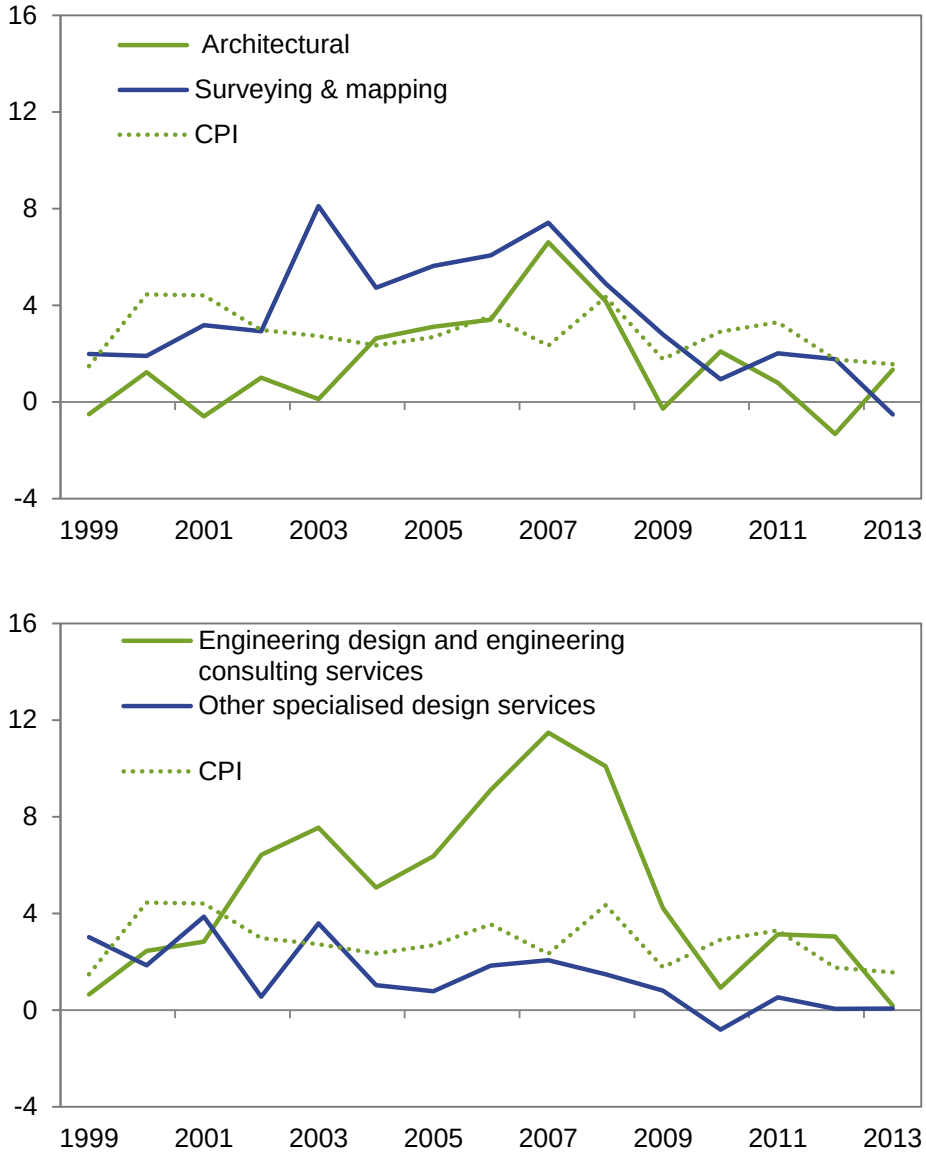
Bidding and design costs

Within the industry, there is a view that bidding and design requirements, and associated costs, have become increasingly onerous and costly in recent years. Data on price trends for services that are directly involved in design do point to a trend towards higher costs over the period 2005–10, but with some recent movement back towards levels around CPI growth (figure 9.7).

The issue of design requirements is discussed in greater detail in chapter 12.

Figure 9.7 **Prices for design-related services**

Annual per cent changes in output prices, 1999 to 2013



Source: ABS (*Producer Price Index*, Cat. no. 6427.0, Sep 2013, table 24).

Land costs

A number of submissions identified the purchase costs of land, particularly in established urban areas, as a significant further recent cost driver. For example, the Queensland Government said:

> Typically, for urban based projects land costs will account for between 5 per cent and 20 per cent of the total project costs. In rural areas, the cost of land acquisition is generally between 1 per cent and 5 per cent. New or redeveloped linear infrastructure in built up areas may incur costs at the extremes of this range. (sub. DR203, p. 36)

The Urban Development Institute of Australia stated:

> Urban land is a key direct input into infrastructure such as rail and road projects, which can require the acquisition of large corridors of land, often at a very high cost. In some cases, the cost to acquire the necessary corridors for new infrastructure is so prohibitively high that techniques such as extensive underground tunnelling must be employed, also at very high cost. (sub. 40, p. 16)

The Institute also argued that high land costs have significant flow on effects to all other inputs in construction, and have inflationary effects across the economy.

Lend Lease (sub. 46) cited examples of rail projects where differences in land costs between capital cities and remote areas have had significant effects on construction costs (figure 9.8).

The Australasian Railways Association (ARA) also argued that infrastructure projects in brownfield locations were increasingly expensive, stating:

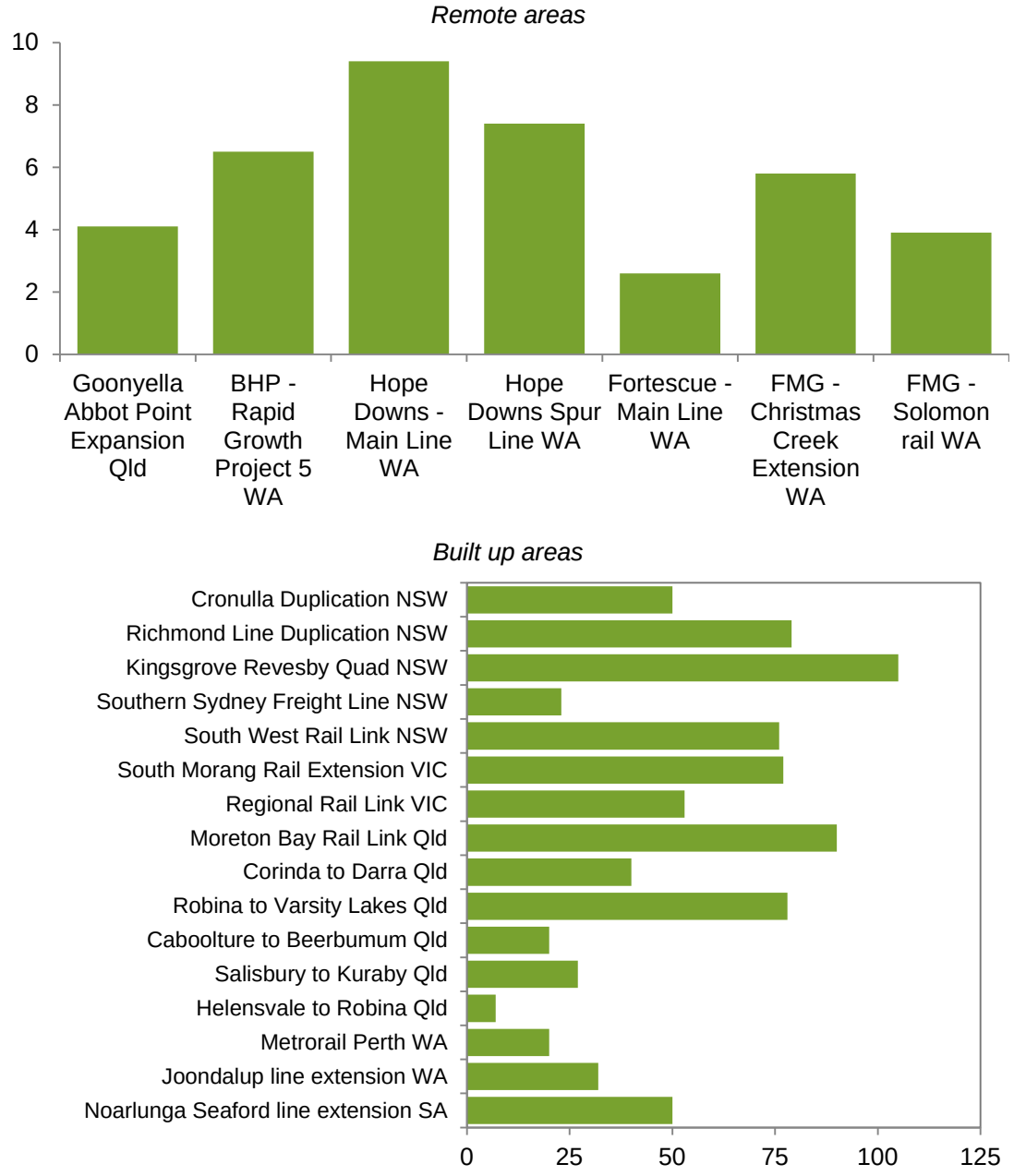
> The complexity and constraints imposed because of brownfields construction significantly reduces construction productivity compared to greenfields construction and requires significant additional design, construction and management resources, from both the contractor and the client organisations. The ARA has estimated the difference of construction costs between the two is at an average of $40 million. (sub. no. 58, p. 13)

Recent evidence confirms significant rises in land values within major capital cities (table 9.1).

In part, rising land values are an unavoidable result of Australia's highly (and increasingly) urbanised population. Related cost impacts are therefore especially apparent in infrastructure projects whose primary purpose is to service large populations within these urban areas (especially road and rail).

It is likely that land costs will also influence the choice of construction technique used to deliver infrastructure, and lead to more costly solutions such as tunnelling and viaduct construction — as seen in the construction of Sydney's North West Rail Link project. Building in highly urbanised environments also requires measures to be taken to minimise the disruption caused to the use of existing and interconnecting infrastructure. Such measures also come at some cost, such as determining when construction can take place (for example, works are conducted at night) and at what rate.

Figure 9.8 **Comparison of rail project costs in remote and built-up areas**
Cost per km, $m



Sources: Lend Lease (sub. 46, p. 22); Transport for NSW (pers. comm., 30 April 2014).

In the Commission's view, as a general principle, there is a need to ensure that resorting to very expensive techniques and projects takes place only after other alternatives are exhausted This would include detailed consideration of the enhanced use of existing infrastructure, possibly in combination with pricing instruments, and consideration of cheaper build alternatives.

Table 9.1 **Capital city land value growth rates**

1993 to 2012, annual capital growth rate, all land use categories (per cent)[a]

	Inner zone	*Middle zone*	*Outer zone*	*20-year growth average*	*20-year CPI average*
Sydney	5.31	5.34	6.42	5.69	2.63
Melbourne	8.47	7.44	8.49	8.13	2.60
Brisbane	9.53	7.86	9.22	8.87	2.84
Average	**7.77**	**6.88**	**8.04**	**7.56**	**2.69**

[a] An 'all use' category is used given the mix of land types that infrastructure can be built on.

Source: Urbis Australia (2013, p. 11).

Given such cost rises, and as identified by the Office of the National Infrastructure Coordinator (sub. DR185, attach. 1), there is also an important role for improved planning and corridor reservation policies.

RECOMMENDATION 9.1

Given high and rising land costs in urban areas, Australian governments should ensure that project selection take explicit and detailed account of available alternatives, including the enhanced use of existing infrastructure, pricing solutions and cheaper build options. Australian governments should also consider ways in which land policies can be improved in this area, given the deficiencies in the current planning of land reservation in most jurisdictions in Australia.

Construction input costs: breakdown and recent changes

As a first step in considering claims of recent construction cost increases in Australia, the Commission looked at the main elements of input costs incurred during the construction phase in Australia and recent trends in these elements. In particular, it considered[2]:

- *labour costs* — wages paid to directly employed construction workers and specialised labour (such as engineers and quantity surveyors)
- *the costs of physical capital* — equipment and other capital used in construction (such as cranes, earth moving equipment, tunnel boring machines and dredges)[3]

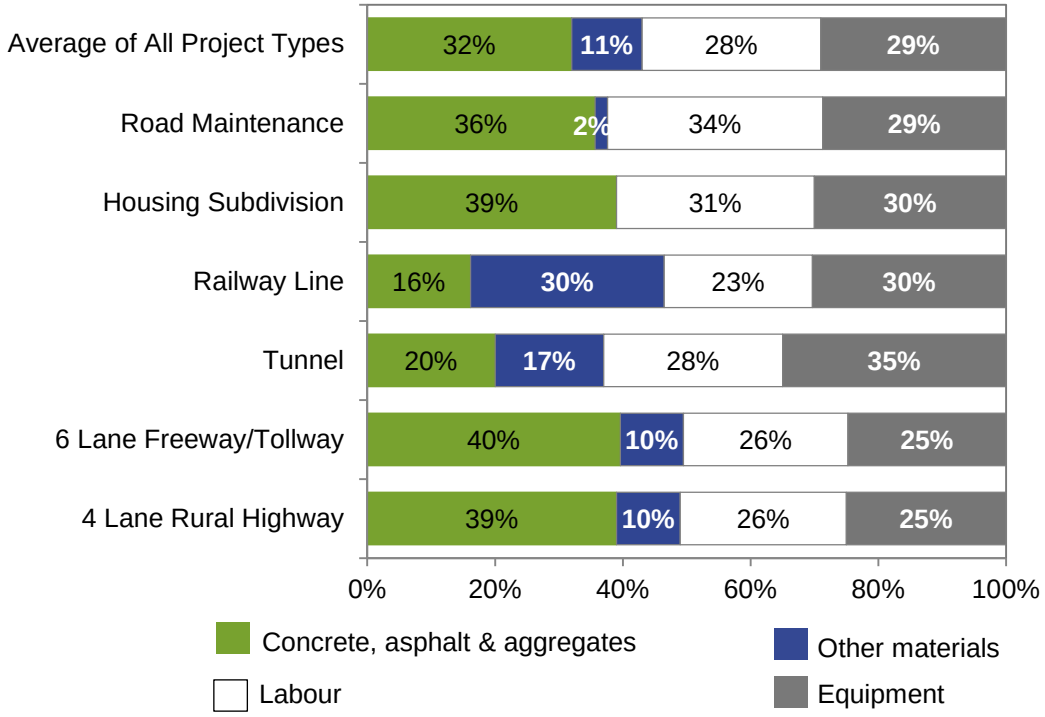
2 Costs related to financing are considered separately in chapter 5.

3 ABS measures of gross fixed capital formation are used to determine the price of physical capital. The value excludes the cost of land and repair and maintenance activity, as well as the value of any transfers of existing assets.

- *intermediate inputs* — the costs of materials purchased (such as fuel, concrete, aluminium, bitumen, steel and metal fabricated products) and services from other sectors (such as insurance and payroll services).

The relative shares of these inputs will vary with the type of construction (with figures 9.9 and table 9.2 giving some examples of indicative cost shares provided by inquiry participants).

Figure 9.9 **Estimated composition of project costs in Victoria**
Per cent of total project costs[a]



[a] Numbers may not add to 100 due to rounding errors.

Source: Cement Concrete and Aggregates Australia (sub. 17, p. 3).

Table 9.2 **Cost shares for public infrastructure projects**

	Labour costs	*Equipment and other capital*	*Materials*	*Other intermediate inputs*	*Financing costs*
	%	%	%	%	%
Roads	23	24	36	18	0
Railways	31	15	31	23	0
Ports	36	21	23	19	1
Water supply and sewerage	19	8	37	37	0
Energy	38	16	32	13	0

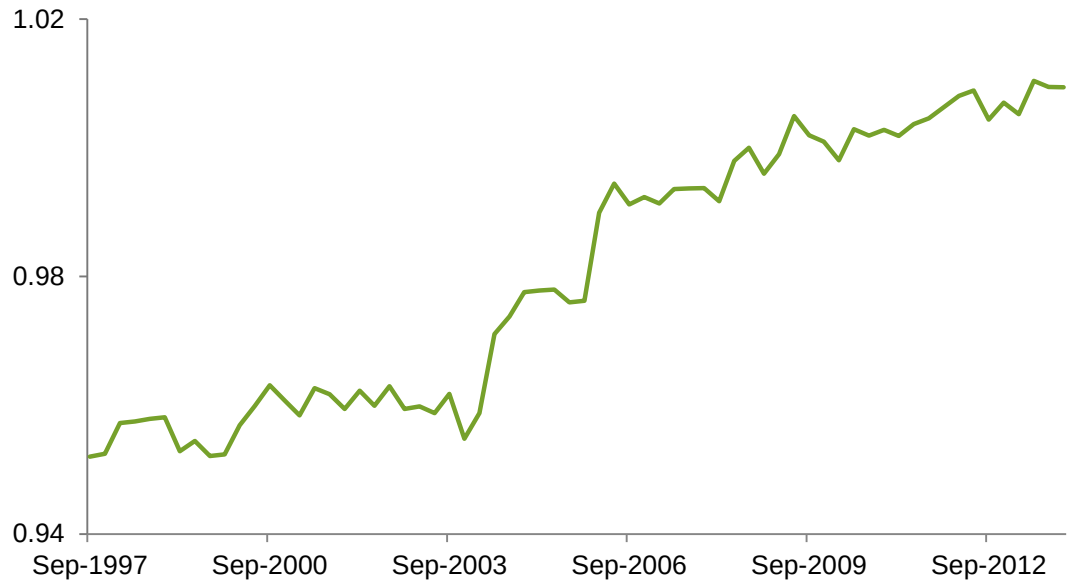
Source: Australian Constructors Association (sub. DR169, Annexure B, p. 15).

Labour costs

Several submissions to the inquiry focused on labour costs and argued that the differences between labour costs in Australia and many other countries were a significant factor in making construction more costly here.

Certainly, aggregate data on labour costs support the view of rising costs over select periods in Australia. Since 1998, labour costs have fluctuated considerably, but with periods of pronounced increases (figure 9.10). These increases have generally occurred at a faster pace than seen for other sectors of the economy. The sector level statistics are complicated by wages paid in residential and commercial building construction activities, but given labour is likely to be reasonably substitutable between the subsectors, are generally indicative of some periodic labour cost pressures in infrastructure construction activities. (Trends in labour costs are discussed in further detail in chapter 13 and appendix G.)

Figure 9.10 **Wage price relativities: construction to all industries**
Ratio of wage indexes, September 1998 to June 2013



Source: ABS (*Wage Price Index, Australia*, Cat. no. 6345.0, table 5a).

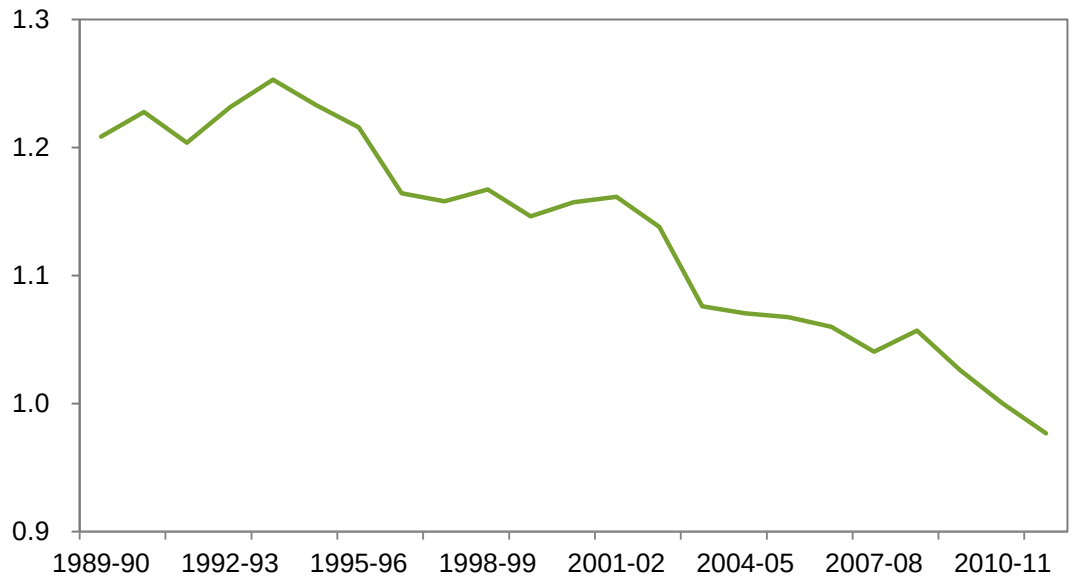
When considering labour costs there are two aspects: the wages and allowances received by the workers, and the total costs paid to employ the labour force. To the extent that these diverge, there is a gain from trade. In principle, the employer could pay lower labour costs while the employee receives higher remuneration. The data used show the changes in remuneration but do not address changes in the cost of employing a worker. Another aspect is the number of workers employed to perform a given job, which submissions have suggested has grown substantially to reflect

workplace safety, environmental and other such activities demanded by the evolving regulatory environment. This affects productivity, the subject of chapter 10.

Costs of capital

While there is some evidence of rising labour costs in infrastructure construction activities, the cost of physical capital employed in the sector does not appear to have increased (figure 9.11). Again, while data only exist at the sector level, the unit price of capital appears to have fallen consistently since the early 1990s. At the same time, the capital share of income generated in the sector has risen, but this relates to the division of the returns to the industry, not to the costs of inputs (chapter 13).

Figure 9.11 **Capital costs for the construction industry**
Price per unit of capital, 1989-90 to 2011-12, 2011-12 = 1.0[a]



[a] Derived as the ratio of gross fixed capital formation in current prices to gross fixed capital formation in chain volume measures.

Source: ABS (*Australian System of National Accounts*, Cat. no. 5204.0).

Intermediate input costs

In addition to labour and capital, material inputs make up a considerable share of total construction costs — often 30-50 per cent (figure. 9.9) and potentially higher (figure 9.2).

Fuel costs, in particular, have been cited by past Australian studies as an important cost contributor. For example, a recent study by GHD Meyrick produced for Infrastructure Australia stated:

> Trends in world oil prices and fuel prices are seemingly the main cost drivers which regularly have explained trends in Australian infrastructure costs over a sufficiently long and representative period of time. (GHD Meyrick 2011, p. 5)

Many other cost elements flow from, or are directly affected by, fuel costs, and are therefore likely to fluctuate with changes to internationally determined fuel and oil pricing. Aggregate data show that the costs of fuel and of other materials have fluctuated considerably since the early 2000s (figure 9.12).

Other intermediate inputs into the infrastructure construction industry come from other parts of the construction sector — around 30 per cent, of which construction services is the largest component. Manufacturing and professional, scientific and technical services are the next largest, accounting for 25 and 16 per cent of inputs respectively. For these non-construction inputs, prices changes are mixed. While data on individual manufacturing industry outputs are not readily available, sector prices have moved in line with the CPI (figure 9.13). For technical services (of which design is one element), price increases have generally exceeded CPI, particularly in the period between 2003 and 2012.

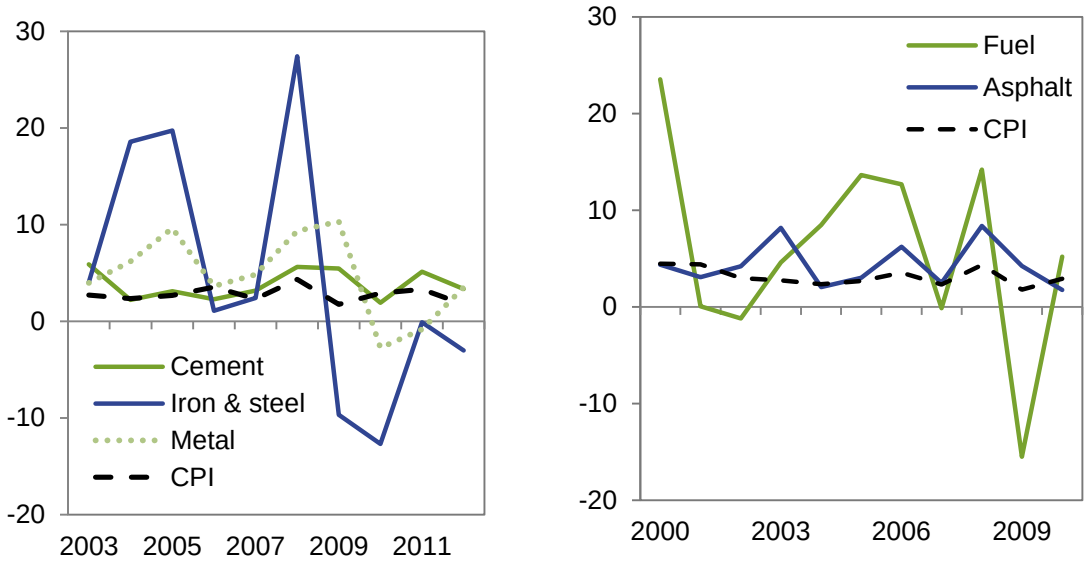
9.3 Summing up on cost movements

The main picture emerging from the above aggregate data is that several input cost elements, including fuel, labour and land costs, have risen substantially above CPI at a number of points in the last ten years. Rises are particularly apparent for these inputs across 2006–2007 (in the period immediately preceding the GFC) and again in the later period from 2010 (coinciding with the peak of the resources construction boom). These trends are partly supported by an earlier study by GHD Meyrick (2011), which is discussed in greater detail in section 9.4, and also focused mainly on aggregate statistics.

There is also some evidence, albeit less clear, of recent rises in costs related to environmental requirements. While it is difficult from available evidence to establish the exact magnitude of this increase, one proxy is the average time taken to develop a proposal to startup. In the Commission's recent inquiry into major project approval processes, the Department of Sustainability, Environment, Water, Population and Communities (now the Department of the Environment), based on a sample of 17 projects of varying type and complexity, found average approval times of 37 months (PC 2013, p. 21).

Figure 9.12 **Cost of inputs into infrastructure construction**

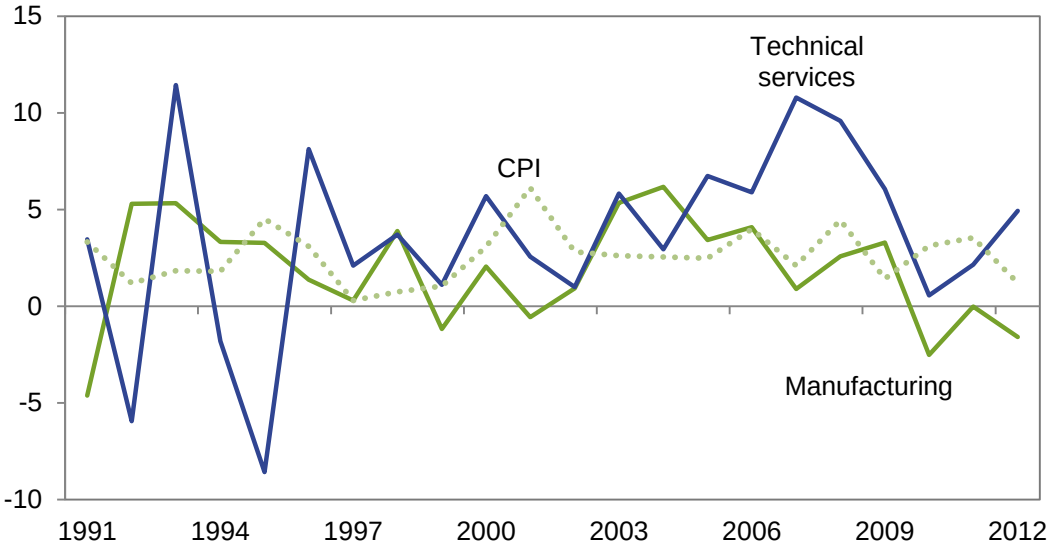
Annual per cent change



Source: ABS (*Australian System of National Accounts*, Cat. no. 6401.0).

Figure 9.13 **Annual price movement of manufacturing and technical services industry output**

Implicit price deflators, per cent change, 1991 to 2013



Sources: ABS (*Australian National Accounts: National Income, Expenditure and Product*, Cat. no. 5206.0); ABS (*Consumer Price Index, Australia*, Cat. no. 6401.0).

FINDING 9.1

Aggregate data indicate that the costs of construction inputs, particularly labour, fuel and land, have risen substantially in recent years. While such data shed little light on design, environmental and many other cost elements, other evidence suggests that there have recently been periodic increases in these elements too. Most recently, labour market conditions appear to be softening significantly in some jurisdictions, which should reduce wage pressures.

9.4 Benchmarking

In searching for further sources of information with which to assess claims of large construction cost rises, the Commission also looked at recent Australian and international benchmarking studies.

Benchmarking is a common approach used to gauge relative performance across industries and jurisdictions. It involves collecting data to construct indicators that enable comparisons of economic performance and of approaches to policy across jurisdictions. Indicators can either be quantitative (statistical or empirical) or qualitative (descriptive).

When done well, benchmarking can be a powerful analytical tool that helps to identify practices that work well and those that do not. Benchmarking to international or other local jurisdictions can help identify persistent levels of inefficiency even if there has been no trend change. It fosters accountability and can lead to improved efficiency and effectiveness by: exposing areas where improvement is needed; identifying good practice processes; setting targets for improvement; and encouraging innovation (PC 2013, p. 42).

Recent cost benchmarks in Australia and overseas

There have been a limited number of recent attempts to benchmark major project construction costs in Australia, looking mainly at costs in road, rail and airport terminal construction. Internationally, there are also a range of studies, with the United Kingdom's recent initiatives to provide publicly available benchmarking data for various construction types being a notable example of how benchmarking might be used to further inform project design and evaluation.

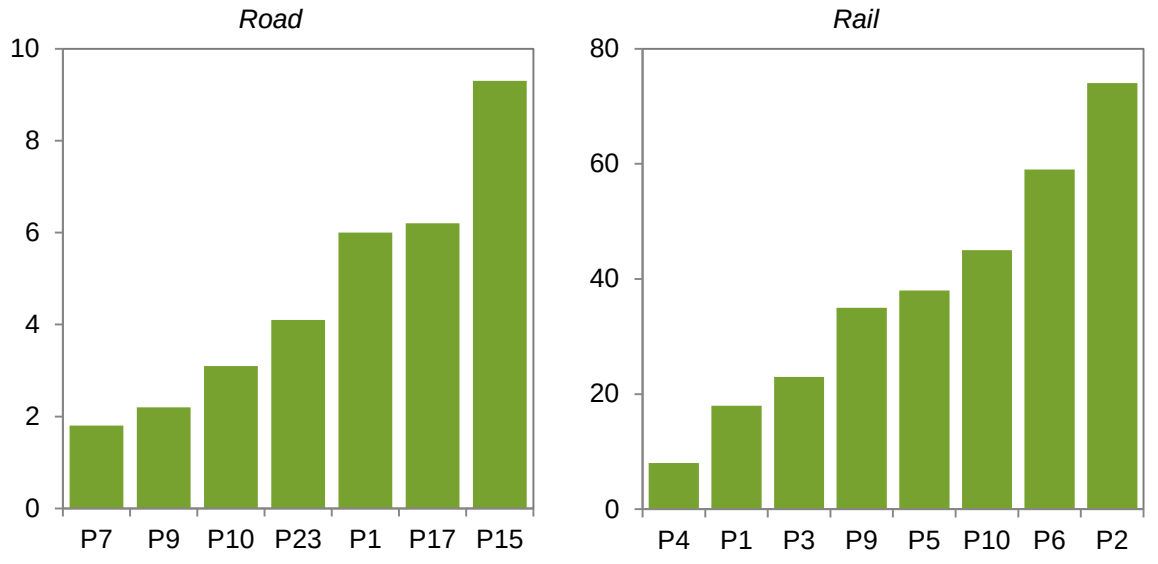
The Ernst and Young (2011) study

This Australian study (EY 2011) was produced for Transport for NSW and developed basic benchmark information for 49 road and rail projects in four jurisdictions (New South Wales, Western Australia, Victoria and Queensland). The projects selected had a total outturn cost of $50 million or over.

The main focus of the study was on client costs (that is, costs related to planning, project design, community and communication, project and program management and corporate overheads), but it also provided some basic construction cost benchmarks. In producing benchmarks an emphasis was given to determining cost per kilometre (a sample of results is shown in figure 9.14). In order to make comparisons of 'like with like' several projects were excluded, namely those:

- road projects where the tunnel, busway or bridge component were material
- rail projects involving track electrification, stabling and stationing (EY 2011, p. 56).

Figure 9.14 **Total construction cost per kilometre**
By project (p) in 2011, $m



Source: Ernst & Young (2011, pp. 56–7).

These exclusions, together with the relatively small overall sample size of the study, clearly limit the applicability of its findings, but the study may nevertheless provide some useful indicative benchmarks for basic civil land transport. These include:

- for road construction, the study found that construction costs per kilometre in New South Wales were $6 million, while for the rest of Australia (based on 5 projects) average costs per kilometre were $5 million

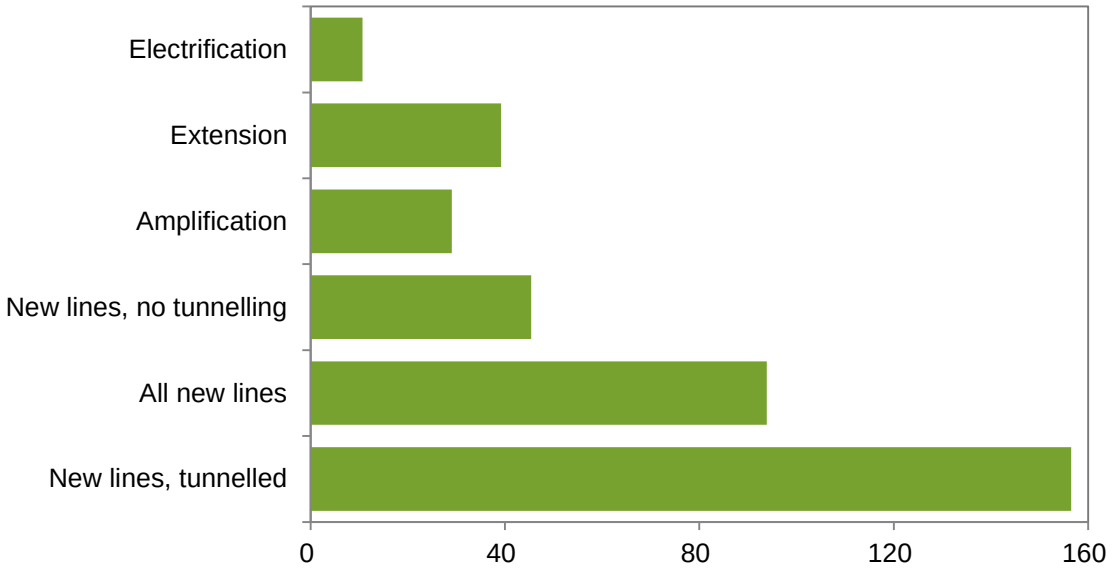
- for rail, New South Wales construction costs per kilometre of track were $48 million. The average cost per kilometre for the rest of Australia (based on 4 projects) was $27 million
- in the case of rail, the sample mixed greenfield and brownfield projects and passenger and freight projects, further limiting the extent to which results can be generalised (EY 2011, p. 7).

A more recent paper on rail projects

A further Australian paper providing some basic cost benchmarks is Martin (2012). This study looked at 28 passenger rail projects constructed over the period 2000-2012, including six light rail projects and 22 heavy rail projects.

From the total sample, five projects were selected representing construction of new heavy railway lines. These included tunnelled routes (Epping-Chatswood: $208.2 million/km; Sydney Airport: $125.1 million/km) and more conventional lines (such as Brisbane's Darra-Richlands line: $94 million/km). Including those projects involving tunnelling resulted in an average construction cost for new heavy rail lines in Australia of $93.9 million/km, and excluding the two tunnelled projects produced an average cost of $45.4 million (Martin 2012, pp. 554–5). The paper also provides rough cost benchmarks for a range of other rail construction types, including electrification, extension and amplification (figure 9.15).

Figure 9.15 **Comparative per-route kilometre costs of urban passenger rail**
Cost per km $m, 2012



Source: Martin (2012, p. 555).

While these benchmarks are also based on very small sample sizes, they nevertheless yield some interesting insights. First, they again illustrate the importance of choice of technique, particularly tunnelling, in driving up total project costs (box 9.2). Second, the results of the paper are broadly in line with key aspects of international benchmarking work on rail costs. As the author states:

> The ratio between the average per route-kilometre costs for both underground and 'at-grade' rail construction (approximately 3.5:1) is also roughly consistent with the cost ratios for new-build metro systems in Europe, the Americas and Asia as outlined in Flyvbjerg, Bruzelius and Van Wee, who claim that their study shows underground alignments cost between 4-6 times more than at-grade alignments. (Martin 2012, p. 556)

The paper does not attempt benchmarking comparisons of cost between Australia and other countries, except with regard to these rough ratios.

Box 9.2 **Choice of technique as a driver of cost in the rail sector**

The recent rail survey by Martin (2012) describes the large cost impacts that result from the decision to tunnel:

> The greatest escalation factor in the construction costs for new heavy rail projects is the decision to pursue tunnelled rights of way. The technical and geological complexity and risk of tunnelling projects greatly increases this cost …
>
> In determining an indicative per-route kilometre construction cost for new lines in tunnelled rights-of-way, the two predominantly underground rail projects, being Epping-Chatswood ($208.2 million/km) and the Sydney Airport railway ($125.1 million/km) in this study were used, in addition to a third project, the section from Perth station to The Narrows bridge which formed 'Package F' of the Perth-Mandurah line.
>
> While the vast majority of the 72-kilometre long Perth-Mandurah railway line was constructed along freeway medians and sandy scrubland south of Perth, the last few kilometres into Perth's CBD presented complex engineering challenges, including the Swan River crossing at the Narrows. The tunnelled approach to Perth station and connection to the Joondalup line ('Package F') provides another example of the high costs of tunnelling in an inner urban environment. The final cost of package F was $398.1 million (2007 dollars), or approximately 36% of the project's total construction costs. Package F encompassed 2.2 route kilometres of underground railway construction costing a total of $299.6 million/km (2012 dollars) or $136.2 million per route-kilometre …

Source: Martin (2012, pp. 555–6).

Airport terminal construction cost benchmarking

In 2012, the international construction consultancy firm Turner and Townsend produced indicative cost benchmarks on airport construction for Brisbane Airport

Corporation (sub. 90, p. 11). These compared construction costs for a hypothetical low cost terminal in Australia with those in the US and UK.

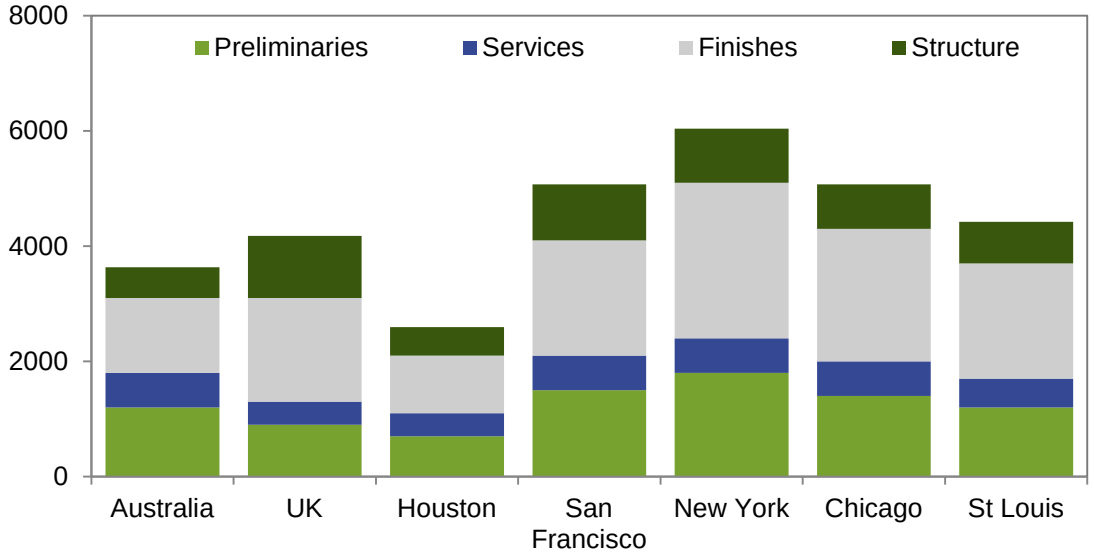
The benchmarking exercise considered construction of a 14 915 square metre airport terminal to accommodate low cost carriers, involving the following features:

- basic standard finish
- greenfields site
- current rates and no allowance for escalation or contingency
- terminal building only excluding specialist equipment, external works and airside walkway
- exchange rates 1 (GBP) = 1.55 (AUD), 1 (USD) = 0.96 (AUD).

The work found that Australian costs compared well with the UK, and with unionised regions of the US (lower costs were observed in non-unionised locations in the US such as Houston) (figure 9.16).

Figure 9.16 **Costs of benchmarked plan, US, UK and Australia**

$ rate per square metre



Source: Turner & Townsend (2012).

International cost benchmarks

Internationally, there have been efforts to implement a more comprehensive approach to project planning and appraisal involving the use of cost benchmarking data.

In the United Kingdom, for example, there has been a recent Government-wide initiative, led by Infrastructure UK, to publish comprehensive cost benchmarks across a range of sectors to guide project planners and purchasers. This has been driven by a perceived absence of consistent benchmarking information in the public domain:

> There is currently not a central collection and publication of infrastructure cost or performance benchmarks. Even where such benchmarks are collated within infrastructure sectors, there is not a consistent approach to applying cost and performance intelligence to inform future investment decisions. (HM Treasury (United Kingdom) 2013, p. 14)

The UK now publishes annual representative unit cost benchmarks from public, private and regulated infrastructure sectors. These benchmarks allow some comparison of cost changes across time to be made (see, for example, table 9.3 and figure 9.17).

Table 9.3 **UK construction cost benchmarks — Highways Agency**
Single point average

Benchmark	*2009-10*	*2010-11*	*2011-12*
Trunk road improvement – total construction cost per additional lane provided	£9.7m/km	No data	£7.2m/km
Junction improvement – total construction cost per junction or interchange	£21.0m/junction	£20.3m/junction	No data
Managed motorways – total construction cost per additional lane provided	£6.3m/km	£9.6m/km	£4.3m/km

Source: UK Cabinet Office in HM Treasury (United Kingdom) 2013, p. 15.

A need for more effective and systematic benchmarking in Australia

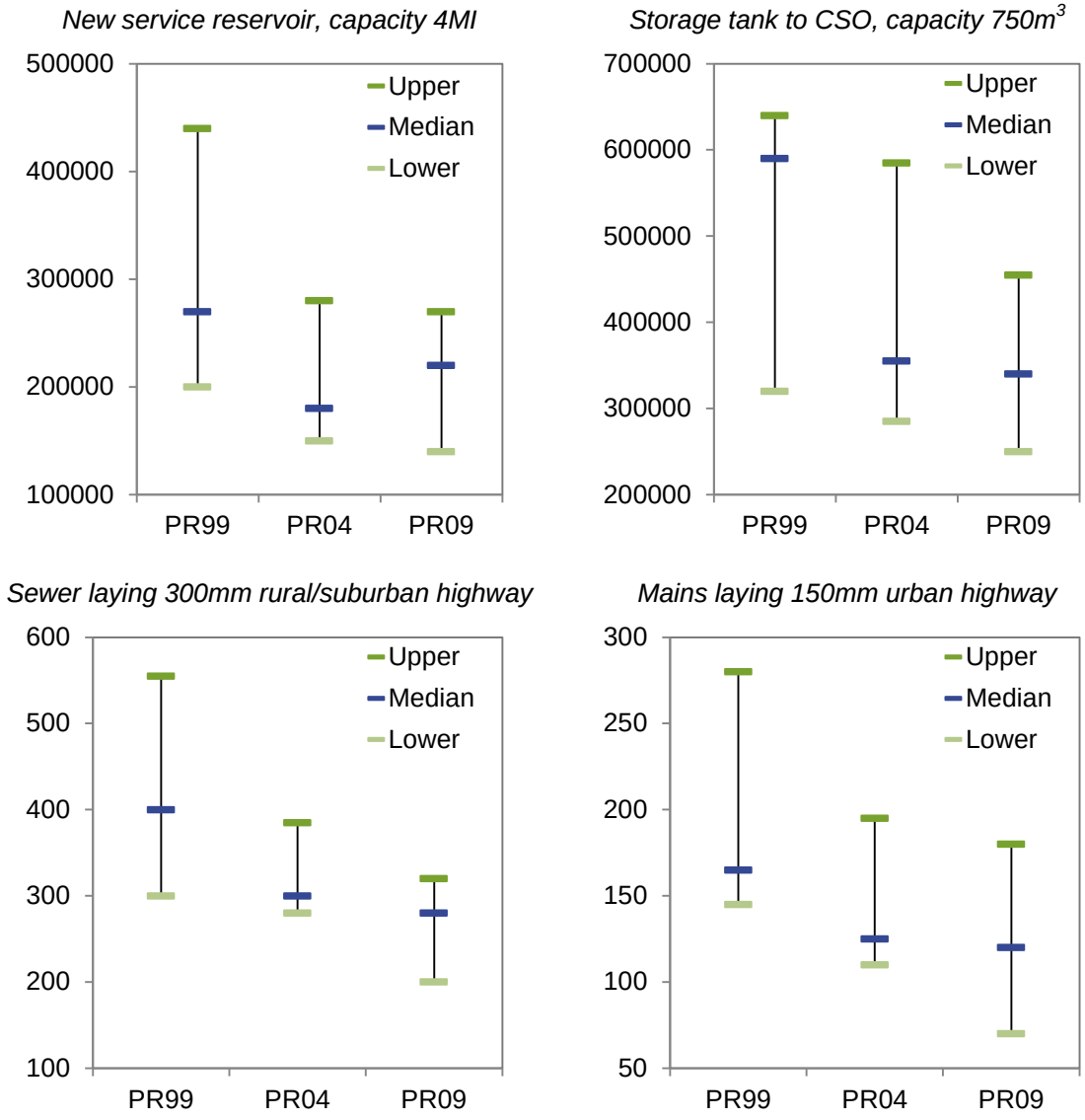
The development and use of cost and other benchmarks for infrastructure projects in Australia is disappointingly limited at present, even after a number of previous reports highlighting the issue. Existing cost benchmarks tend to be based on relatively small samples of projects, and to be based mainly on projects in single sectors (in particular road and rail construction). This means that existing cost benchmarks can only be used as rough approximations by those attempting to gauge the reasonableness of proposed costs within future project proposals. While there is some qualitative benchmarking that considers time and quality aspects, this approach is also relatively underdeveloped in Australia, and tends to be undertaken at the smaller end of the construction spectrum.

Several participants have called for a more effective and strategic approach to benchmarking and data provision in Australia. For example, Evans and Peck emphasised:

> … the need for the implementation of this fundamental tool [ie a robust historical data set] to support improved decision-making with respect to project planning and improving project productivity during delivery. (sub. DR175, p. 12)

Figure 9.17 **UK Water sector cost benchmarks**

PR99, 04 and 09, £/unit, 2011-12 prices



Source: Ofwat in HM Treasury (United Kingdom) 2013, p. 17.

They also argued that there is a need to distinguish between strategic and tactical levels of benchmarking and that, in obtaining sufficient and relevant information, it is the former category of information that should be collected:

The **strategic** level covers a range of high level outputs that provide key project metrics at a reference class basis, for example

- total costs per lane kilometre
- total costs per track kilometre
- relative cost percentages of major cost areas within the total project budget
- average expenditure per month over the construction period.

The **tactical** level covers detailed outputs that cover costs for key project inputs, for example:

- concrete, steel, asphalt prices
- labour costs
- plant costs
- productivity for activities (Evans and Peck, sub. DR175, p. 14).

Consult Australia also supported an expanded approach, and stated:

> … there is value in improving the standard of data collection and benchmarking cost and value between Australian jurisdictions, and internationally. There is particular value for clients being able to understand ahead of the tender process, an optimal value of their project. If a bid is received that is dramatically lower than the optimal value, clients should treat that with suspicion, as there is the likelihood that some risks have not been properly accounted for. (sub. DR168, p. 5)

The Australian Trucking Association argued that more publicly available data would assist both investment decisions and user charging during operation:

> … having this expenditure data publicly available would enable unit cost estimates of road maintenance and investment (e.g. by lane kilometres on a given network tier). These estimates would be developed into efficient benchmark investment and maintenance costs that could be used to inform the amount of expenditure that is recovered from heavy vehicle road users. (sub. 27, p. 6)

Geoff Holman stated that:

> … solid and reliable data on this subject is dispersed and difficult to locate. A priority must be the collection and collation of data in a unified, useful, consistent and comprehensive form. (sub. 96, p. 3)

Gerard de Valence argued for the use of benchmarks within a broader approach that employed reference class forecasting (box 9.3), stating:

> That Reference Class Forecasting or a similar process be applied to all proposed projects, and that an Australian database of public infrastructure projects be developed and maintained. All public infrastructure projects' time and cost estimates should be compared and evaluated against previous project outcomes and performance. (sub. 16, p. 2)

Box 9.3 **Reference class forecasting**

Reference class forecasting consists in taking a so-called 'outside view' on the particular project being forecasted. The outside view is established on the basis of information from a class of similar projects. The outside view does not try to forecast the specific uncertain events that will affect the particular project, but instead places the project in a statistical distribution of outcomes from this class of reference projects. Reference class forecasting requires the following three steps for the individual project:

(i) identification of a relevant reference class of past projects. The class must be broad enough to be statistically meaningful but narrow enough to be truly comparable with the specific project;

(ii) establishing a probability distribution for the selected reference class. This requires access to credible, empirical data for a sufficient number of projects within the reference class to make statistically meaningful conclusions; and

(iii) comparing the specific project with the reference class distribution, in order to establish the most likely outcome for the specific project.

Source: Flyvbjerg (2009, p. 354).

The use of project benchmarks, within a reference class forecasting framework, has also been supported by a recent Victorian Parliamentary Committee inquiry into major projects (Parliament of Victoria Public Accounts and Estimates Committee 2012, p. xx).

Given the underdeveloped state of consistent and comparable benchmarking data on major public infrastructure, one question that arises is whether more should be done to develop such information.

The Commission notes that there are already several recent government initiatives of note in this area, including:

- Infrastructure Australia's benchmarks for efficient procurement of major infrastructure (IA 2012a)
- preliminary work by the Department of Infrastructure and Regional Development on methods to benchmark infrastructure project costs (box 9.4; sub. 64, p. 26).

These are potentially quite limited in their impact, depending on the willingness of states and other parties with major projects to participate actively in benchmarking. Confidentiality restrictions, as discussed, for example, by Lend Lease (sub. 46), appear to be a serious and unnecessary impediment to benchmarking. Such restrictions should be revisited in future infrastructure planning as the creation of effective benchmarking has the capacity not just to assist tender evaluation, but also

to indicate to bidders that lower project costs are likely to lead to a more sustainable and predictable pipeline of projects.

Box 9.4 **The Department of Infrastructure and Regional Development's Project Cost Breakdown**

In mid-2012 the Department, in conjunction with state and territory road and rail agency representatives (particularly in regard to definitions), developed standard road and rail Project Cost Breakdown (PCB) structures, and since then has required proponents to include completed PCB templates with all funding submissions for infrastructure investment.

The key features of the templates are that:

- only high level data is being sought, noting that each state/territory have different reporting structures, and as such will need to "map" from their own reporting structures into the Department's structures, and seeking data at a significantly lower level would appear to be an unwarranted burden on states/territories for little utility
- each cost element is accompanied by a comprehensive definition
- the Base Estimate, Contingency and Escalation components of the project cost estimate are reported separately
- proponents are required to provide significant contextual information so as to inform useful comparison (this includes the project location and key features, and the project phase noting that as a project proceeds through its lifecycle from scoping through development and delivery and completion, the overall cost estimates will become progressively more refined and contingency representing risk, is expected to decrease).

Source: Warren Fletcher (pers. comm., 21 February 2014).

Who does what?

As outlined in the Draft Report, a number of options are feasible regarding who would collect these data. These include:

- an expansion of Infrastructure Australia's remit to cover collection and oversight of such data
- the incorporation of this function within the work of the Australasian Procurement and Construction Council Inc. (APCC)
- collection of such data by the Australian Bureau of Statistics
- the establishment of a funded group of academic institutions with expertise in this area

- performance of this function by a state-based unit (such as currently occurs in the case of Australian Gambling Statistics, which are currently collected by the Queensland Government Statistician)
- the Bureau of Infrastructure, Transport and Regional Economics being funded to develop and implement a detailed benchmarking framework.

Some criteria to be considered when assessing each option are outlined in box 9.5.

No single agency meets all these criteria. The Australian Bureau of Statistics, for example, which covers a broad range of construction activities across multiple areas (wages, input-output tables, prices, profits, and industrial disputes), is statutorily independent and has widely recognised data dissemination protocols (albeit with a strongly constrained capacity to release data collected under its Act). However, it does not have any extensive background in benchmarking data or in the detailed analysis of the construction industry. Infrastructure Australia also has some information collection capacities, but it does not currently have substantial in-house statistical or benchmarking capabilities. The Bureau of Infrastructure, Transport and Regional Economics (BITRE) is a specialist statistical and economic agency in the relevant areas and has the analytical capacities and industry and academic links that would enable it to fulfil the tasks envisaged by the Commission. Nevertheless, BITRE is part of a policy division of a department that does not have full coverage of the public infrastructure sector considered in this inquiry and is not independent, although there may be ways to achieve effective independence for the data tasks recommended by the Commission.

On balance, the Commission's view is that Infrastructure Australia should oversee public reporting of benchmarking results across Australia for major infrastructure construction projects covering transport, energy, water and social infrastructure. The performance of this function by a single agency would have the advantage of providing a single coordinator of benchmarking data collection and a single repository of such information. Infrastructure Australia would outsource the development of the benchmarking framework to agencies expert in the relevant areas. For example, BITRE would be responsible for benchmarking of transport infrastructure (the dominant type of public infrastructure). States and territory governments will have an important role to play in, and be primary beneficiaries of, such benchmarking. It will improve the information base for their infrastructure tendering, and significantly improve ex-post evaluation. The provision of data by state and territory governments should be a requirement for all projects where the Australian Government provides funding.

Box 9.5 **Criteria for who picks up the data?**

Data are a valuable asset (as the recent surge of interest in big data exemplifies). But its value depends on its fitness for purpose, accessibility and accuracy. The systematic and coordinated collection and management of data is a specialist activity. There are many tricks and traps in collecting, collating, cleaning and distributing information, including advice on its proper interpretation. So an important question is what is the best governance model and most appropriate agency for collecting and managing the data identified by the Commission as critical to good infrastructure decision making. Several important criteria are important in making that decision:

Independent decisionmaking, so that all stakeholders are confident that the right data is collected and that policy-relevant data — however inconvenient — is neither manipulated nor concealed.

Transparency — so that results are available to stakeholders in an accessible form. The default should be that parties should get access to deidentified unit record data, or if there are confidentiality issues, such unit record data still be available for widespread research and policy analysis. In respect of the data collection proposed by the Commission, confidentiality concerns are likely to be a second-order concern.

A detailed understanding of the data and of the analytical frameworks to organise them: This implies that engineers, statisticians, IT experts, economists will be required in any agency responsible for the data.

Relevance and consultation: There are strong grounds for advisory capacity for business, academic and policy experts in the construction industry, because these will be both providers and users of the data. If it is not relevant to them, it will not be relevant to anyone. Random numbers are not intrinsically interesting.

Links with comparable overseas agencies: Since an Australian data collection process would ideally also involve cooperation to develop global data bases — a kind of 'Cochrane Collaboration' for the construction industry.

Exploitation of economies of scale and scope in existing agencies. Australia already has (or has had) several agencies that have critical data information roles in the construction industry.

RECOMMENDATION 9.2

The Australian Government should fund the development and ongoing implementation of a detailed benchmarking framework for major infrastructure projects in Australia – in transport, electricity, water, gas and social infrastructure. This would substantially assist in the future planning and evaluation of projects, and is an essential factor in the much-cited pipeline of projects.

The benchmarking should include sufficient information of a strategic nature, including on costs per major unit, using a standard cost breakdown, and average expenditures over the construction period.

The provision of data to support the benchmarking framework should be a requirement attaching to all Australian Government funding for major infrastructure projects. The Australian Government should ensure data relating to its own projects are also captured. Mechanisms should also be developed to capture similar data from projects funded by other levels of government and consideration should be given to what information might be gathered from the private sector to enhance the quality of information provided by the benchmarking.

This ongoing benchmarking must be seen to be independent of both government and industry influence and also be seen as technically robust and credible. Infrastructure Australia should be responsible for packaging and publishing the benchmarking results, but should outsource the development and implementation of the benchmarking framework to agencies expert in the relevant areas, including the Bureau of Infrastructure, Transport and Regional Economics for transport projects.

9.5 International comparisons of cost

A further source of information on possible cost movements are studies and surveys of international construction costs that include Australia.

Recent Australian studies

Several recent Australian studies, employing a mix of case studies, cost benchmarks and aggregate data, have also undertaken comparisons of major project construction costs here and internationally.

The Business Council of Australia (BCA) have published two reports in recent years that have argued that:

- major project infrastructure in Australia has become significantly more costly to construct
- Australia has become a relatively more costly destination for such construction compared to other similar locations (BCA 2012, 2013).

Regarding international comparisons, the more recent BCA paper (based on Independent Project Analysis (2012)) pointed to large cost disparities for project construction between Australia and the US Gulf Coast which, it suggested, provides a roughly comparable location. This included costs that were 38 per cent higher for iron ore and coal developments; 50 per cent higher for large, complex processing

projects; and 200 per cent higher for offshore oil and gas developments (BCA 2013, p. 14).

An earlier study by Evans and Peck (2011), produced for the BCA, looked at a small sample of 23 major Australian infrastructure projects completed in the previous ten years and with capital costs of $500 million or greater. Projects came from infrastructure sectors including road, rail, ports, airports, water and information and communication technology. The main focus of the study was on the cost and time performance of these projects and, in this regard, the report found mixed performance by sector regarding time and cost overruns. The report also contained some rudimentary international comparisons, showing a relatively good performance regarding cost overruns in Australian road and rail projects (table 9.4).

Table 9.4 **Cost overrun comparisons — Australia vs. International**

Project type	*Australian benchmark*		*International benchmark*	
	No. of projects	Average cost overrun (%)	No. of projects	Average cost overrun (%)
Road	12	10	167	20.4
Rail	4	20	58	44.7

Source: Evans and Peck (2011, p. 18).

GHD Meyrick (2011) conducted a comprehensive study of infrastructure construction costs that used official data and compared costs in Australia with those in the US, UK, France and Canada. The report found that over the longer term construction costs exhibit mean-reverting behaviour, tending to drop back to trend when compared to CPI across time, despite some major episodes of falling or rising costs. It also found that observed cost trends, at least in the period up to publication in 2011, were broadly in line with those observed in the comparator countries.

In response to the Draft Report, the Australian Constructors Association also cited other recent work on the comparative international costs of tunnelling and airport construction (sub. DR169, pp. 47-52). In the Association's view, such work, despite its limitations, provides evidence that Australia exhibits a higher cost of construction in some specific types of infrastructure.

Finally, innovative work has also been undertaken by Langston (sub. DR112; Langston (2012)), which attempts to provide a more robust framework for international cost comparisons (box 9.6).

Consideration of issues

Beyond providing very broad information on possible cost differentials, international comparisons of construction costs for major project infrastructure, particularly those based on limited sample sizes or case studies, suffer from a number of quite significant problems. The bespoke nature of many major projects makes finding comparisons of 'like for like' very difficult. Factors such as climate, geography, and differing industrial relations systems may also further compound comparability issues. Converting costs into a common currency is also difficult, even with the use of purchasing power parity or alternative indices (such as the Big Mac index) to correct for exchange rate differences.

Box 9.6 The citiBLOC approach to international comparisons

One alternative for international comparisons is the development and valuation of a hypothetical basket of construction items.

The citiBLOC approach provides an example of this type of methodology (as discussed by the Centre for Comparative Construction Research, sub. DR112). It uses a basket of representative construction items, including materials (various quantities of concrete, steel, glass, plasterboard and softwood studs); labour (electricians, carpenters, painters and unskilled labour at various total hours and charge out rates); and plant (mobile crane).

Once raw cost estimates for the basket within each country are obtained, a range of methods for converting to purchasing power parity, thereby obtaining a common unit of valuation, can be used. The exercise detailed within sub. DR112, for example, compared five main PPP methods: straight currency conversion; citiBLOC PPP; a basket of labour and material unit rates provided by international construction consultants Turner and Townsend; a basket of composite work items, derived also from Turner and Townsend; and a Big Mac Index, based on the price of a McDonalds Big Mac hamburger for a number of countries (sub. DR112, pp. 8-9).

Regarding the accuracy of conversion methods, according to the Centre, analysis of coefficients of variation (CoV) show that the lowest CoVs are associated with citiBLOC PPP, followed by the composite and labour and materials measures, then the Big Mac measures. The highest CoV is for the currency measure (sub. DR112, p. 25).

Regarding costs by location, measured using citiBLOC PPP the best value locations are Kampala and Sao Paulo, while the most expensive cities are Dubai and Hong Kong. The only Australian city included in the sample was Sydney which, in terms of the citiBLOC PPP measure, performs well on cost.

Source: Centre for Comparative Construction Research, sub. no. DR112 (p. 26).

International comparisons can also abstract from a much broader range of country specific features, including (for example) the cost of living, immigration policies, or societal standards regarding such things as the environment or safety standards. While some of these may obscure, or be caused by, inefficiencies or excessive risk aversion, others may be genuine reflections of shared views on issues of national significance.

In discussing such limitations, Edkins and Winch (1999, p. 45) state that:

> Dealing with such apparently simple questions as 'who is cheapest?' and 'who is better?' is fraught with problems. Whether one measures input prices or output prices, real buildings or fictitious buildings, the problems are multiple and manifest.

In the course of its inquiry, and in concordance with this view, the Commission has also found that significant data limitations exist in regard to the cost of major projects within Australia. Current data limitations mean that sensible comparisons of similar projects across jurisdictions within Australia are, of themselves, difficult to produce in any comprehensive way.

This is not to suggest that work which attempts to quantify costs, or to create bases for comparisons of cost, are without merit. Methods such as reference class forecasting, for example, are worthy of further consideration, and explicitly require the construction of comparison indices across projects. This was also observed in a number of submissions. For example, de Valence stated in this context:

> Better use of data from previous projects in the evaluation and definition stages of new projects would be a transformative innovation in procurement management. (sub. 16, p. 5)

The use of methods, such as citiBLOC PPP, when combined with detailed qualitative analysis on the underlying causal factors for cost differences, also appear to be highly prospective.

The Commission is of the view that, where construction cost comparisons are made, they should be based wherever possible on adequate data and robust measurement methodologies.

FINDING 9.2

Comparisons of major project construction costs between Australia and other countries suffer from a range of methodological and data problems that limit their use. Recommended improvements in data availability, together with further development of reference frameworks, should assist greatly in reducing such limitations.

9.6 Concluding comments

The available evidence on major infrastructure construction costs shows that there have been some recent significant increases in input costs, particularly labour and fuel costs. Land values and bid design costs also appear to have contributed to a growing cost base.

International comparisons of costs between Australia and counterpart countries are largely inconclusive, but do not support some recent claims (such as those made in BCA 2013) of very large cost differentials. However a dedicated benchmarking collection process as proposed at recommendation 9.2 will address this shortcoming.

10 Productivity issues

Key points

- Concerns about productivity levels and growth in the construction industry are common to many countries.
- The aggregate data point to a significant increase in labour and multifactor productivity from 1994-95 to 2012-13, although most of the improvement was concentrated in relatively short busts, including most recently in 2011-12.
- By contrast, productivity growth in the 10 years preceding 1994-95 was sluggish.
- One driver of the historically weak labour productivity growth appears to be relatively low levels of capital deepening — capital investments that allow output from a given worker to increase from the use of better equipment. In contrast, capital productivity remains high.
- There is some evidence that levels of productivity and efficiency in the Australian construction sector lag behind those of some comparator countries, such as the United Kingdom.
- Other evidence, including from industry and firm level studies, and from a considerable number of submissions, point to unrealised productivity and efficiency gains in the sector.
  - These include gains via improvements in project planning, firm level operating and managerial processes; prefabrication and design; use of technology and choice of technique; labour utilisation and workplace relations; and overarching regulatory and competition policy structures.
  - In particular, innovative approaches to design and planning and the expanded use of prefabricated or precast elements were identified by many participants as having potential to promote productivity growth in the sector.
- While some of these sources of potential productivity improvement may be amenable to government policy (including through the reduction of unnecessary regulation), others are largely matters best left to the industry and their clients to address.

The productivity performance of the construction sector has rightfully been the topic of much public debate. Given the need to improve infrastructure provision in Australia, it is crucial that reforms be targeted to improve both the level of productivity in infrastructure construction and its growth rate. Related to these concerns is the more efficient use of existing infrastructure; that is, the productivity of the existing capital stock.

Concerns have been expressed regarding the apparent poor productivity performance of the industry, and its perceived lag in performance compared with a number of Australia's international peers (box 10.1). However, productivity, a measure of how well businesses use inputs to generate outputs, can be difficult to measure in service sectors such as construction where the output (completed infrastructure) can vary in quality over time and frequently lacks a market price. Further, assessments of productivity are also complicated by differences in what many conceive of as the construction sector, and how its performance is actually measured. For example, building and infrastructure design activities are captured by the ABS in a different sector, as is the offsite fabrication of many components in modern buildings and infrastructure that would have been previously built on site.

For any given level of inputs and input prices, higher productivity lowers costs. This chapter sketches a picture of the productivity performance of the Australian construction sector, focusing where possible on infrastructure construction. Given the complexities involved, this chapter examines productivity through several lenses to help provide a fuller picture of construction productivity than that captured by aggregate statistics. The chapter considers:

- the macro and micro evidence on recent productivity performance in the construction sector, together with some international comparisons (section 10.1)
- some of the main challenges faced by the sector in improving productivity, and the implications for the role of government (section 10.2). (Industrial relations issues, which are an important part of the productivity debate, are discussed in detail in chapter 13.)

10.1 Recent Australian performance

In considering productivity performance, the Commission has examined both the level of productivity (both labour productivity and multifactor productivity) and the productivity growth rate within the Australian construction industry. To the extent that the Australian construction sector operates below what is known as the productivity frontier, there is a systemic level problem with productivity. This can only be addressed by above average productivity growth to move the sector towards the productivity frontier.

Box 10.1 Some participants' views on productivity in the construction sector

David Chandler (sub. 63, p. 8):

> Most project procurement and delivery has however yet to address the need for urgent correction of the cost to productivity ratio. Costs, especially wages and salaries continue to be absorbed with little if any productivity improvement. The cost of projects being delivered across the nation is highly variable. Establishing productivity direction and measures is the first step in turning these burdens on project cost around.

Lean Construction Institute of Australia (sub. 103, p. 2):

> The greatest single challenge facing the construction sector in Australia today is a widespread loss of productivity when compared to other sectors in our economy and to the construction sectors of competing economies.

University of New South Wales (sub. 44, p. 2):

> The industry should avoid the temptation to focus on wages and industrial relations. While industrial relations is an important ingredient in the productivity debate, it is one of many … Good productivity is driven by an educated, skilled and engaged workforce, an efficient work environment, innovation, efficient procurement models and ultimately trust between industry stakeholders.

Lend Lease (sub. 46, p. 5):

> … in our view the productivity debate needs to be significantly broadened to examine a range of potential sources of productivity improvement – including prefabrication and modularisation, more interactive procurement, better use of collaborative technology platforms; further industrial relations reform; and increasing the skill and expertise of the industry.

Master Builders Australia (sub. 88, p. 3):

> While increasing our infrastructure productivity will require action across a number of policy domains, an essential element must be meaningful labour market reforms, focusing on reinforcing the rule of law in critical sectors of the building and construction industry as a means of reducing construction costs and lifting labour productivity.

Construction, Forestry, Mining and Energy Union (sub. DR174, pp. 7–8):

> … we believe that construction workers in Australia are as productive, if not more so, than construction workers in other countries … What we will not accept is a trumped up claim of a false productivity crisis created by campaigns to reduce costs at the expense of workers' wages and conditions.

Martin Loosemore (sub. DR116, p. 3):

> There is no productivity crisis as many claim. The creeping crisis is in the imbalance between wages and productivity … Wages have gone up without any commensurate increase in productivity.

The Australian Constructor's Association (sub. DR169, p. 5):

> There is some sign that construction sector productivity rose relative to other sectors from 2004 to mid-2012. However, since mid-2012 that productivity boost has been fading (in large part because measured productivity moves with the economic cycle), while the increase in relative construction wages has not.

The frontier itself (usually) grows as new technologies are deployed, including new and more efficient ways of deploying and managing resources used in construction.

As with the previous chapter on costs, the Commission has drawn on a broad range of evidence when considering the recent productivity performance and in attempting to establish the current level of innovation activity in the sector. This includes not only aggregate productivity statistics for Australia and other countries, but also less direct indicators, such as rates of international activity by Australian construction firms. A reliance on a broad range of evidence is valid given the limitations of aggregate data, including that the construction sector is spread across several ABS industry classifications — Construction; Professional, scientific and technical services; and Manufacturing.

Further, construction is a non-traded good and, as with other non-traded sectors, it is likely that a number of quality related improvements will not be measured in volume based output measures thereby not being captured in productivity statistics. Where such improvements come at the cost of greater input use they may actually decrease measured productivity — for example, improved workplace health and safety outcomes may result in incrementally more labour hours and greater safety equipment but also save lives.

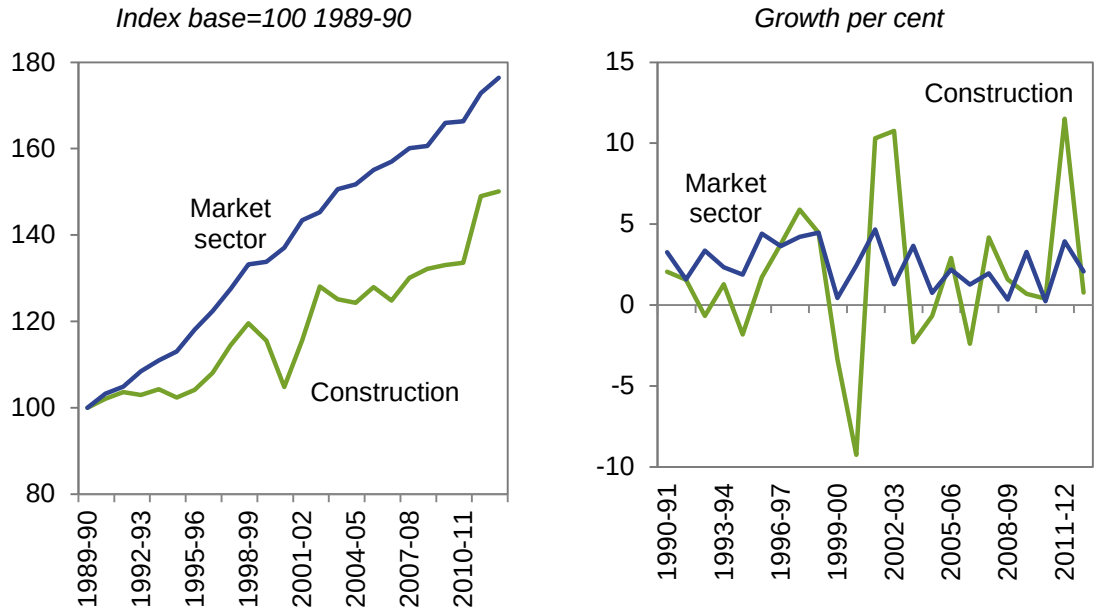
Macro evidence on productivity

While the terms of reference for this inquiry directs the Commission to examine the infrastructure sector, most aggregate data encompasses all construction activities — residential, commercial and infrastructure. Each of these sub sectors is different, producing different products, having different market structures, and facing different regulatory environments. Despite this, there are still a number of common elements that make an examination of aggregate productivity trends useful for understanding the productivity performance of the infrastructure construction sector.

Productivity growth in the Australian construction sector has ebbed and flowed over the last 30 years. There was a significant increase in labour and multifactor productivity from 1994-95 to 2012-13 (figure 10.1). However, most of the improvement was concentrated in relatively short bursts spanning just a few years, including most recently in 2011-12. By contrast, productivity growth in the 10 years

preceding 1994-95 was sluggish, and significantly lower than the market sector (figures I.1 and I.2 in appendix I).[4]

Figure 10.1 **Labour productivity in the construction and market sectors**
1989-90 to 2012-13



Source: ABS (*Estimates of Industry Multifactor Productivity*, Cat. no. 5260.0.55.002).

Labour productivity can be decomposed into two elements — capital deepening and multifactor productivity (MFP). The former represents capital investments that allow output from a given worker to increase from the use of better or more equipment. The latter represents technical change, which is effectively doing things better than in the past.

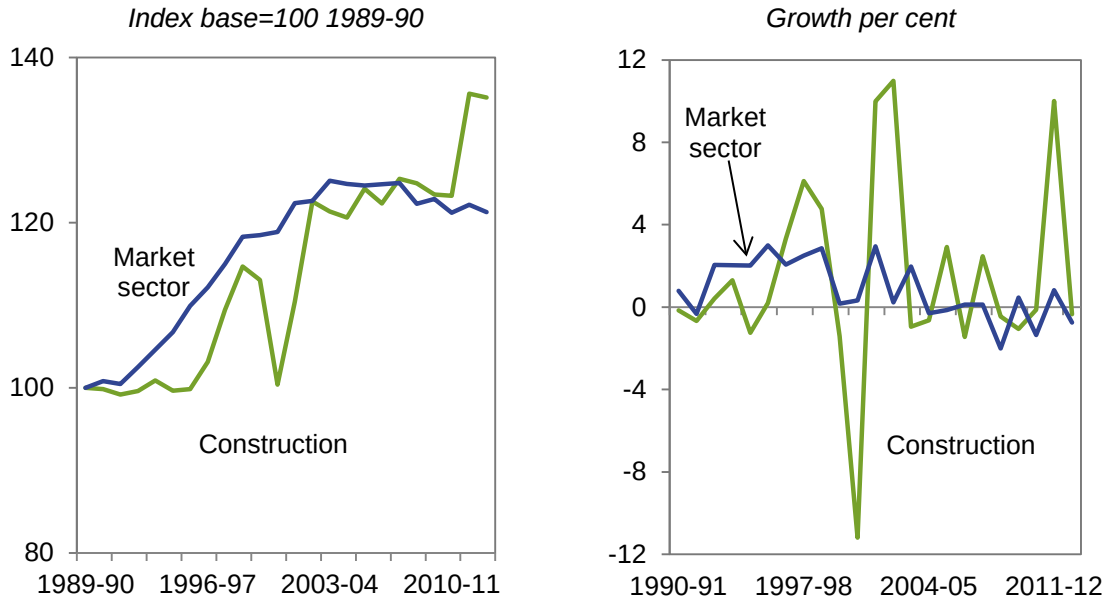
The two elements have showed differing trends in recent years. MFP growth in the construction industry was lower than productivity growth from 2002-03 to 2010-11 (figure 10.2 compared with figure 10.1). Indeed there was nearly zero growth in MFP over this period. Just as was the case with labour productivity, MFP growth in 2011-12 was high, but it was only this one-off growth rate that has meant any real improvement in MFP since the early 2000s. It also explains why MFP growth exceeded the market sector in this period.

4 The 12 industry market sector comprises the following industries: Agriculture, forestry & fishing; Mining; Manufacturing; Electricity, gas, water & waste services; Construction; Wholesale trade; Retail trade; Accommodation & food services; Transport, postal & warehousing; Information, media & telecommunications; Financial & insurance services; and Arts & recreation services. These are industries where labour productivity is better measured than other industries making up the economy.

In absolute terms, there has been a significant increase in capital inputs over much of the recent past, but most particularly from 2006-07 (figure 10.3). Given relatively modest growth in labour inputs from the mid-2000s, the outcome has been rising capital intensity. As discussed in chapter 9, this has occurred at the same time as the costs of physical capital inputs have fallen — which might be expected to prompt greater capital deepening. The rise in capital intensity over these years will have contributed to the more rapid growth in labour productivity compared with MFP (although does not explain the one-off upsurge in 2011-12).

The last six years represent a break in the persistent trend of low capital deepening apparent from the 1990s to the mid-2000s (figure 10.4).

Figure 10.2 **MFP in the construction and market sectors**
1989-90 to 2012-13



Source: ABS (*Estimates of Industry Multifactor Productivity*, Cat. no. 5260.0.55.002).

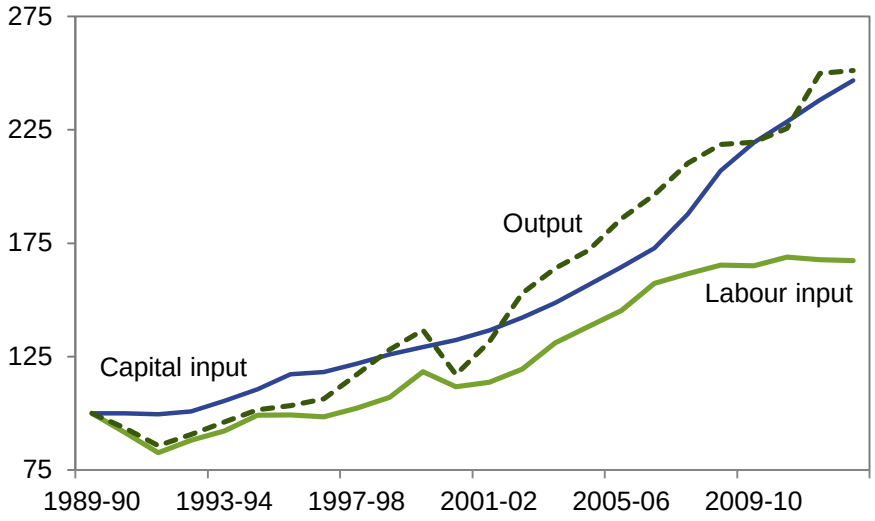
Several participants put forward views on what drove the historically low observed low levels of capital deepening. Loosemore (sub. DR117, p. 1) suggested there was a systemic lack of take up for new capital, and that:

> … it is not necessarily the level of innovation and the number of ideas that is the problem but the low absorptive capacity of firms in the sector … which is determined by many cultural, institutional and organisational factors.

The CFMEU suggested that the historical pattern might reflect compositional effects, most particularly the influence of residential and commercial construction (which is also included in the aggregate data) (sub. DR174, p. 5). It stated:

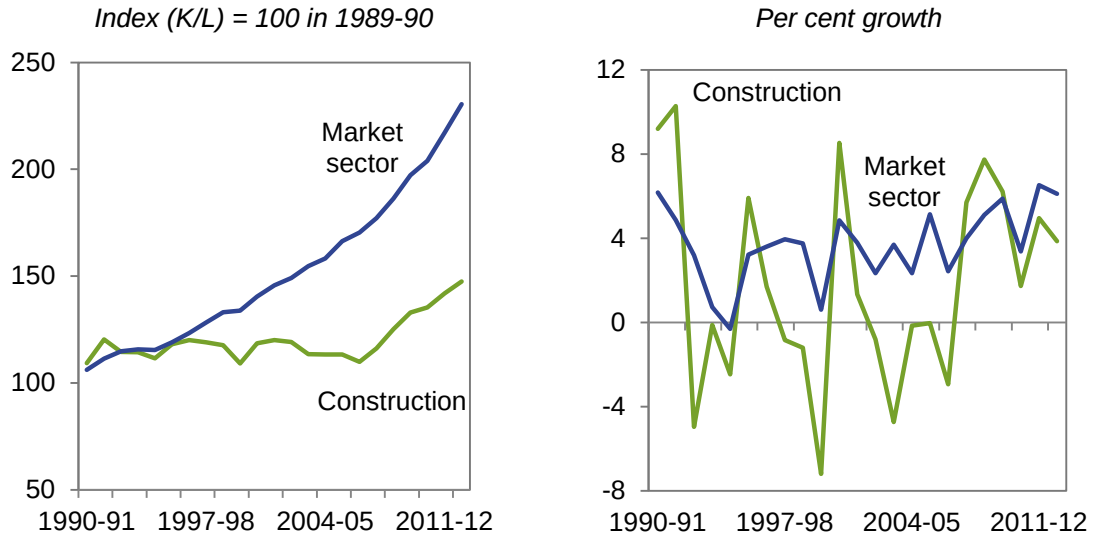
… activity in different sectors of the industry can have a significant effect on the aggregate figures. If the commercial and residential sectors were experiencing low levels of activity and difficulty in raising capital for projects it is not surprising that they would experience low levels of capital deepening.

Figure 10.3 **Input, output and productivity aggregates in construction**
Index, 1989-90 = 100



Source: ABS (*Estimates of Industry Multifactor Productivity*, Cat. no. 5260.0.55.002).

Figure 10.4 **Capital deepening in construction and the market sector**
1989-90 to 2012-13



Source: ABS (*Estimates of Industry Multifactor Productivity*, Cat. no. 5260.0.55.002).

However, observed changes in relative sub-sector activity intensities are inconsistent with such a notion explaining low levels of capital deepening.

In its Draft Report, the Commission also canvassed several explanations, including muted incentives to invest in new capital equipment due to long-lived assets (such as crane and other heavy equipment) creating investment cycles, issues related to the industrial environment and the scope for new equipment to be profitably used (Hirsch 2003), along with a possible move to the use of capital equipment offsite in activities such a prefabrication (and therefore it being captured in other industries by the ABS).

A common theme emerging from many of these possible explanations is that the Australian data on construction sector productivity performance is so limited as to make a definitive diagnosis of the main drivers of low capital deepening difficult. Problems with aggregate data on construction, and possible solutions, are discussed further below.

The critical role of innovation, and the absorption of innovation, is a further point stressed in a number of submissions, and is also discussed further below.

Some regional variation is also evident

The productivity story also varies across Australian jurisdictions. Again, the detail of the statistics collected by the ABS makes it difficult to explore productivity in the infrastructure sector by state. However, some variations across states in construction productivity are apparent. Over the period 2005 to 2011:

- both Victoria and South Australia experienced declines in construction industry MFP, though there was an improvement nationally
- New South Wales and Queensland had strong MFP growth over the same period (table 10.1).

Table 10.1 **Estimated average annual rates of MFP growth in the construction industry, by State and Territory**

Per cent

	1990 to 1999	*1999 to 2005*	*2005 to 2011*
NSW	1.7	0.4	3.3
VIC	3.0	1.7	-1.2
QLD	2.0	-0.5	1.7
SA	1.1	1.6	-1.5
WA	0.8	0.6	0.5
TAS	-0.8	1.3	0.0
NT	-2.0	5.9	-6.6
ACT	6.3	-2.4	0.5
AUST	2.0	0.7	1.2

Source: Cunningham and Harb (2012, pp. 13–14).

International comparisons of aggregate performance

The international evidence on Australia's productivity performance in construction, relative to other countries, is quite mixed, and subject to varying levels of robustness. As with international comparisons of cost performance (discussed in chapter 9), caution is needed with regard to methods of comparison and in interpreting results.

A consideration of *trends* in productivity levels across countries suggests Australia is performing quite well. However it is not clear that the data are comparable. Looking at *relative performance*, which takes account of changes across time in the relative position of industries in terms of productivity across countries, reveals a picture of stronger performance compared to notable peers.

In regard to growth trends,[5] on face value, Australia's construction labour productivity growth rates have eclipsed those of Canada and the United States, with the latter showing negative labour productivity growth over the 30 year period from 1977 (figures 10.5 and 10.6).[6] However, Australia's performance relative to the United Kingdom, whilst lagging from the mid-1980s to mid-1990s, has also been comparatively strong recently.

These results are hardly definitive. Long–run negative total factor productivity, as apparent for the United States, would usually be taken to mean that knowledge and technologies are moving backwards, a patently dubious proposition. That suggests there may be unmeasured quality increases, structural changes in the industry that mean that output has shifted to less productive activities, or growing regulatory or other impediments to efficient production. Nevertheless, it is uncertain whether any of these factors would be specific to the United States, suggesting that the relative performance may be better measured than the trends.

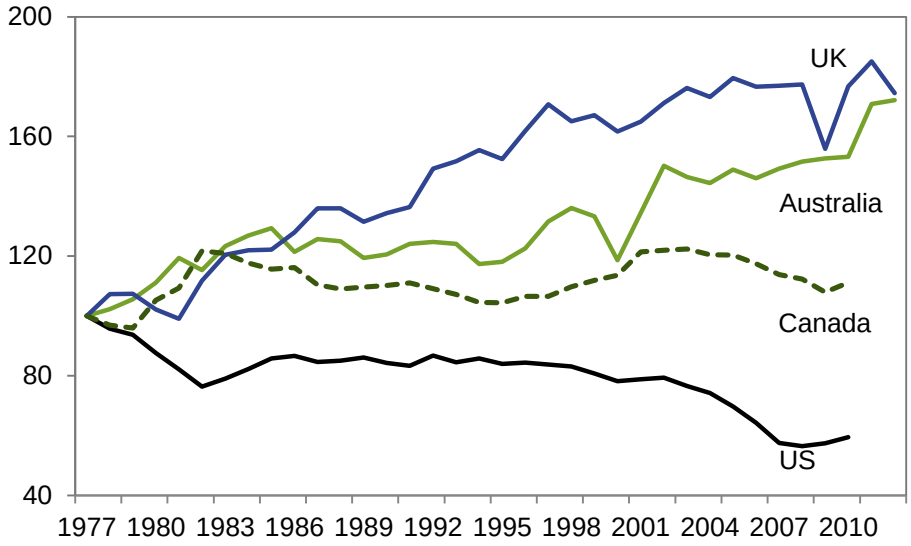
OECD data, which contains more up to date information than that collected by EU KLEMS, provides a further point of comparison (figure 10.7). While this data does not include the United States or Canada, it does suggest that, when compared to most European countries, including the United Kingdom, recent Australian labour productivity performance has been quite good.

5 Using EU KLEMS productivity data with updates based on growth rates seen in series produced by national statistics bureaus.

6 The negative labour productivity performance in the United States has been verified in other studies. Teicholz (2013) has provided a comprehensive analysis in this area and provided some explanations for the pattern.

Figure 10.5 **Labour productivity in construction**

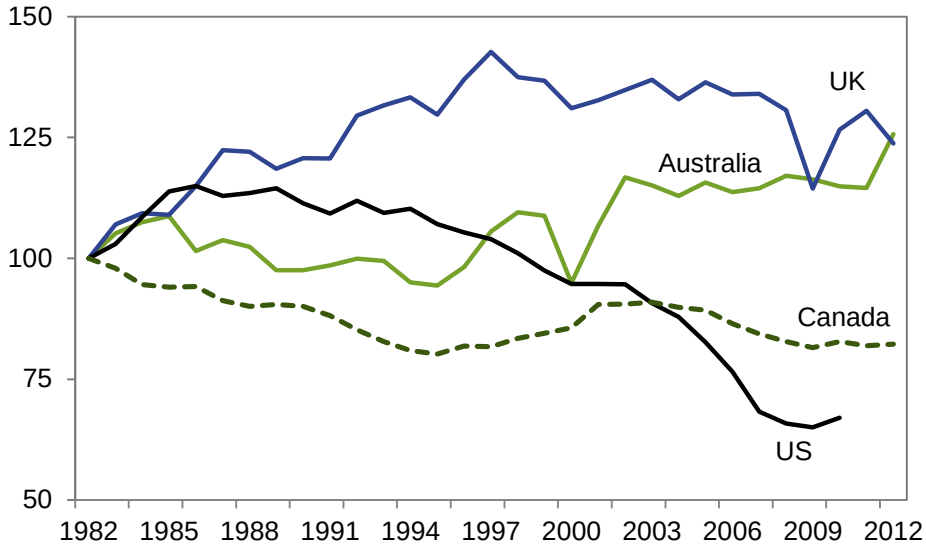
Gross value added per hour worked, volume indices, 1977 to 2012, 1977 = 100



Sources: EU KLEMS, November 2009 Release; ABS (*Estimates of Industry Multifactor Productivity*, Cat. no. 5260.0.55.002); OECD StatExtracts, Productivity and ULC by main economic activity (ISIC Rev.4); World KLEMS.

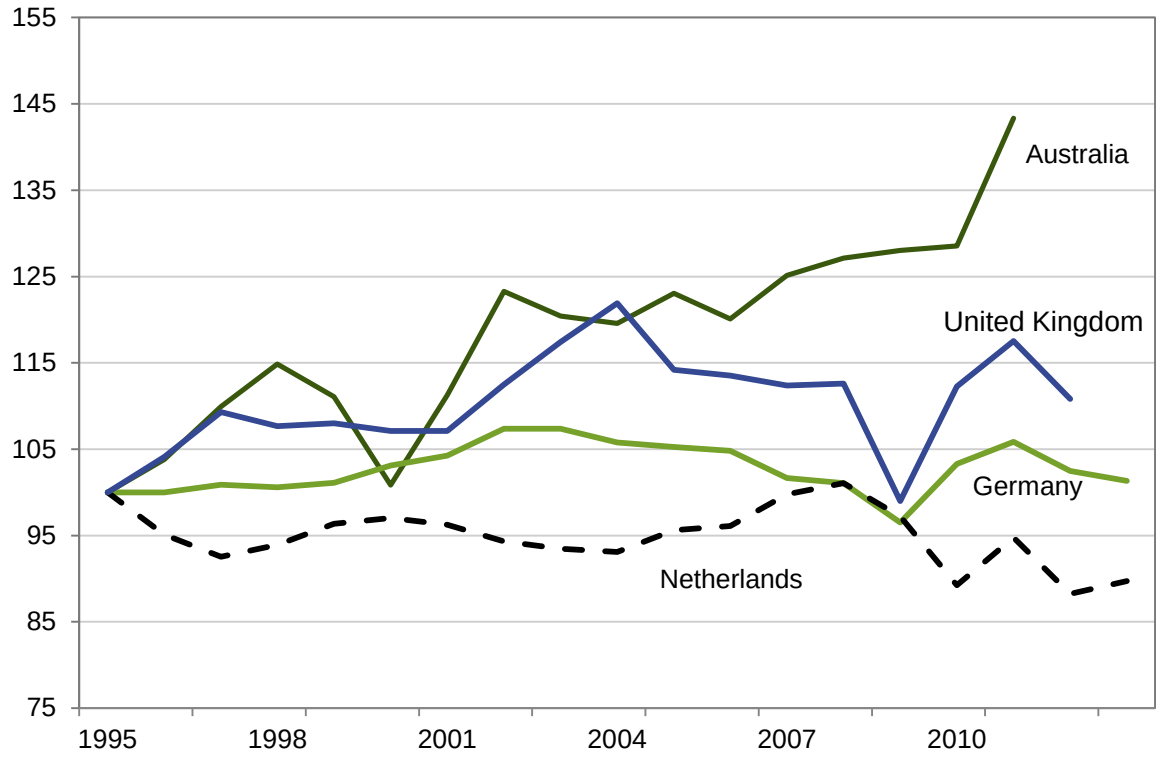
Figure 10.6 **Total factor productivity in construction**

Total factor productivity (value added based) growth, 1982 to 2012, 1982 = 100



Sources: EU KLEMS, November 2009 Release; ABS (*Estimates of Industry Multifactor Productivity*, Cat. no. 5260.0.55.002); World KLEMS; UK Office of National Statistics (*Multi-factor Productivity - Indicative Estimates to 2012*); Statistics Canada (*Table 383-0021 Multifactor productivity, value-added, capital input and labour input in the aggregate business sector and major sub-sectors, by North American Industry Classification System (NAICS)*).

Figure 10.7 **Gross value added per hour worked, constant prices**
1995 to 2013 (1995=100)



Source: OECD StatExtracts, Productivity and ULC by main economic activity (ISIC Rev.4).

There have been some recent attempts at comparisons of relative performance between Australia and other countries, but these can also be problematic. For example, using the EU KLEMS data, Young et al. (2008) sought to explore Australia's productivity gap compared with the United States. In doing so, the authors considered Australia's labour productivity performance for a number of industries, including construction. On face value, their results show a marked decline in the level of Australian construction sector productivity compared with the United States across the 1990s and through to the mid-2000s (table 10.2). This is not reconcilable with the EU KLEMS data as analysed above, which shows that Australian labour productivity growth rates in construction have grown while those in the United States have fallen (figure 10.5). These trends *should* mean that Australia's relative productivity performance compared with the United States has *improved*.

Table 10.2 **Industry labour productivity in Australia as a percentage of US industry productivity**

Industry [a]	*Industry structure by hours share*			*Australian productivity by industry sector relative to US*				
	1990	2000	2005	1990	2000	2005	Difference 1990–2000	Difference 2000-05
Mining	1.4	1.1	1.6	136.6	169.7	98.1	33.1	-71.6
Finance	4.6	3.9	3.9	61.9	86.3	96.2	24.4	9.9
Wholesale Trade	10.6	8.3	7.7	60.9	72.8	71.3	11.9	-1.5
Manufacturing	15.7	13.5	11.6	47.7	58.0	55.7	10.3	-2.3
Electricity, Gas and Water	1.3	0.8	1.0	68.2	71.0	52.2	2.8	-18.9
Retail Trade	9.5	9.1	10.1	80.5	82.6	79.3	2.1	-3.3
Accommodation	3.8	4.6	4.3	129.5	115.3	102.4	-14.1	-12.9
Construction	7.7	8.4	9.7	95.9	77.0	51.9	-18.9	-25.1
Communications	1.9	2.1	2.0	95.2	59.6	49.7	-35.6	-9.9

[a] Industries chosen for comparison on the basis that data does not contain significant measurement or methodological issues.

Source: Young et al. (2008).

The results obtained by Young et al. (2008) are likely to be due to the underlying methodology on which the paper was based, which clouds its interpretability. The method used appears to re-express the value of Australian production in US dollar terms using GDP purchasing power parities and then readjusts the value to quantity terms using the US price deflator. This means that the usual concept of labour productivity — quantity of value added from an hour worked — is confounded by several relative price effects. In that context, Young et al's paper should not be interpreted as indicating a decline in Australian physical productivities relative to the United States. The Commission considers that future work is required before any conclusions could be drawn from this analysis in terms of comparative levels of productivity performance between countries.

Australian case studies

Several studies have been undertaken that look at construction sector productivity in Australia, or at related aspects of performance, and are useful in providing further detail on recent firm and industry level productivity performance. These include Access Economics and World Competitive Practices Pty Ltd (1999), Croce et al. (1999), Langston and Best (2001), Proverbs and Faniran (2001), Best and Langston (2005), Langston (2012), MBA (2012) and Loosemore (2014a). While a large part of the discussion in these studies concerns construction in the broad, some include consideration of non-residential projects.

The recent study by Langston (2012), for example, compares 337 high rise projects completed between 2003 and 2012 in the five largest cities in both countries, with costs measured using a basket approach. Quality and efficiency were also measured using a number of methods. The paper found that:

> … there is evidence that base costs in Australia have outstripped the United States, meaning that 'real' construction efficiency in Australia is relatively less. If Australia held an advantage in the past, then it seems that advantage might be disappearing. Notwithstanding the larger number of projects found in the United States (251) compared to Australia (86), the top 10 US performers in terms of construction efficiency have higher scores that the top project found in Australia, and the reasons underpinning this clearly demand future project-level investigation. (2012, p. 2)

While not focused on larger infrastructure projects, the paper nevertheless considered construction of a size that means its results are relevant to the current inquiry. This is especially so because many of the factors that influence outcomes in the construction of the non-residential buildings being compared — logistical expertise, efficient site management, the use of technologies and industrial relations — are also likely to directly affect construction of social infrastructure (such as hospitals and prisons).

Other indicators of a proxy kind

As discussed above, productivity is made up of a number of elements. This suggests that while aggregate statistics relating to infrastructure construction activities are lacking, other partial measures may shed light on the productivity performance of the Australian industry. For example, innovation (potentially spurred on from research and development activity) helps drive MFP. Similarly, it would be expected that if Australia's construction sector is relatively productive, tradeable elements of the industry would be an exportable commodity.

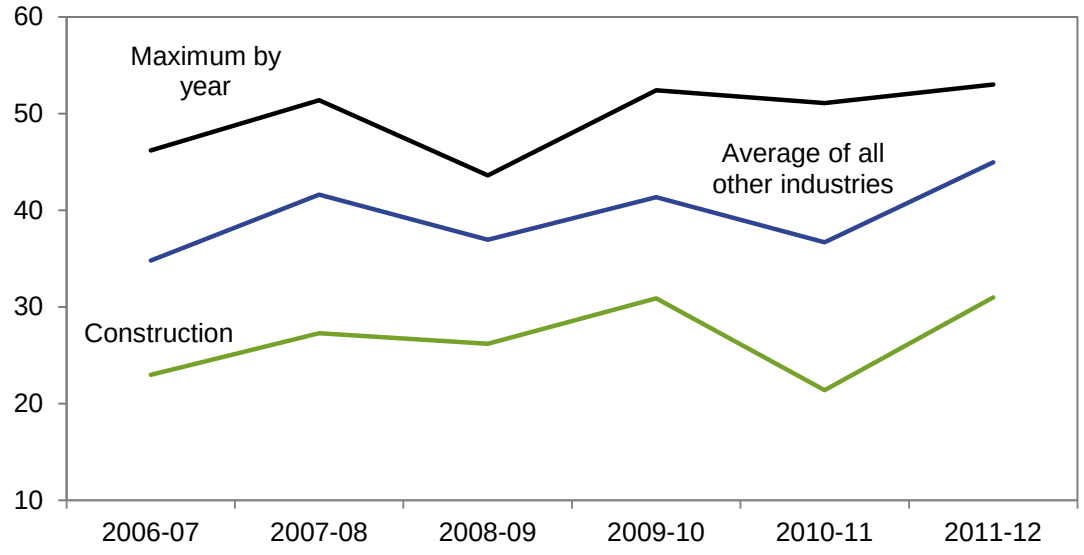
Research and development in construction

The Australian construction sector's MFP growth has exceeded the market sector over the past two decades. This may reflect several factors, such as improved diffusion of technology, increased management capabilities, reforms to workplace relations and innovation. Over long periods, sustained MFP growth is more likely to reflect technological developments linked to the generation and adoption of new ideas. While only a proxy, research and development (R&D) intensities provide one measure of innovation.

Available OECD measures of R&D intensity show that the Australian construction industry compares well with other countries such as the United States and United Kingdom. Using a percentage of value added measure, Australia's construction industry had levels of R&D intensity that were well above the United Kingdom across the period 1999–2006, and which were also well above those in the United States for the period 2003–06.

Recent survey data from the Australian Bureau of Statistics on business implementation of innovation, however, points to a relatively low level of innovation activity by construction firms relative to those in many other Australian industries (figure 10.8). In discussing these data, AEC Connect (sub. DR126, p. 1), suggested it was indicative of continued poor levels of innovation in the sector, particularly in the areas of service, process and managerial/organisational innovation. They also argued that low levels of innovation within construction were observed in many other countries. In contrast, Loosemore (2014a, p. 3) has presented a more qualified viewpoint, arguing that a considerable amount of innovation does occur in the construction sector, but that much of it is hidden from view.

Figure 10.8 **Businesses which introduced or implemented innovation**
Per cent, 2006-07 to 2011-12



Source: ABS (Summary of IT Use and Innovation in Australian Business, Cat. no. 8166.0, table 1).

Exports and international exposure of Australian constructors

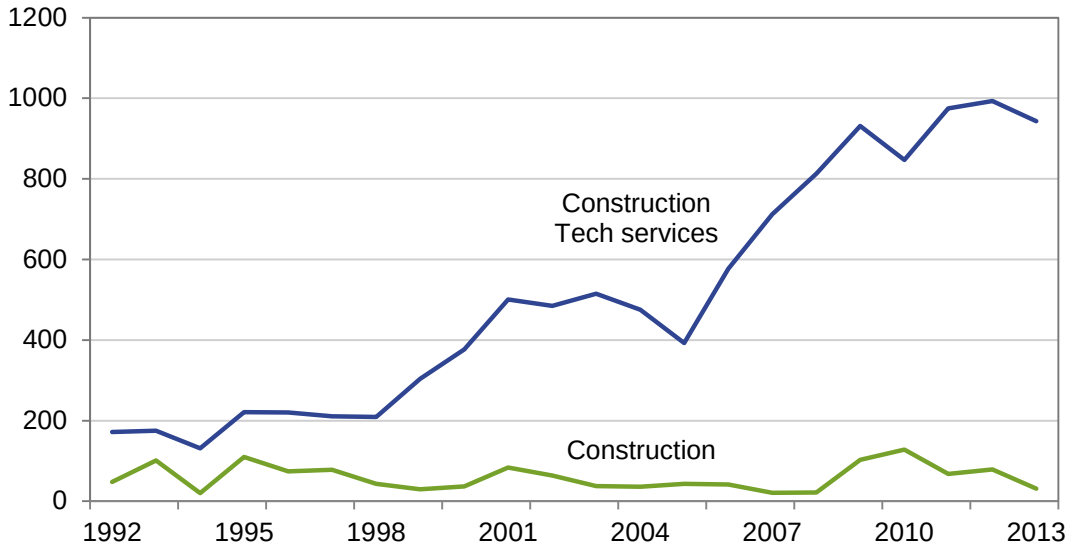
During the course of its inquiry, the Commission was made aware of the significant level of international involvement by Australian construction firms. This is at least

suggestive of a sector that is well regarded internationally, and that is able to compete in overseas markets with other major international firms.

Other areas of the industry, such as architectural, engineering and other construction related technical services, also show an industry that is becoming more internationally focused. Examining aggregate export data shows that Architectural, engineering and other technical services have increased their exports significantly during the 2000s. This points to overseas demand for Australian expertise (figure 10.9).[7]

Export data also pick up the fact that measures of direct exports of many of the construction industry outputs, as defined by the ABS, are not feasible (for example, the work of trades). While some exports from the construction sector do occur, they are not significant and have remained relatively stable.

Figure 10.9 **Exports of construction services**
$m, June 1992 to June 2013



Source: ABS (*Australian System of National Accounts,* Cat. no. 5204.0, table 5).

Summing up productivity data

Taken together, the multiple sources of evidence presented above tell a mixed story.

The aggregate Australian data on productivity in the construction sector point to protracted periods of sluggish performance interrupted by shorter-duration upturns

7 This activity is not measured as part of construction sector productivity.

(especially noticeable in the long-term evidence provided in appendix I). Nevertheless, overall productivity levels are significantly higher in 2012-13 than they were in the early 1990s, reflecting the importance of these shorter periods of strong growth.

In an international setting, there is some evidence(as well as claims by a range of stakeholders), that Australia's performance relative to other countries may have slipped in the recent past, however this is difficult to establish with any certainty — and indeed sector-wide statistics point to a different trend. Several elements of the industry have also seen strong growth in exports, suggesting relative productivity performance has been stronger.

In discussing measures of productivity performance, several participants pointed out that aggregate evidence should be treated with caution when linking it to specific factors, and is subject to changes caused by broader economic forces. For example, the Australian Council of Trade Unions, in discussing recent changes in industrial relations, stated:

> … there are far bigger economic forces at work affecting the rate of productivity growth, like the mining boom, the investment in electricity generation capacity, and droughts. (sub. 95, p. 5)

In a similar vein, a forthcoming article by Loosemore (2014a, p. 9) argues that:

> Past research has shown that deterministically attempting to prove a relationship between productivity and any single variable is fraught with problems because of the number of potentially intervening variables, many of which are unmeasurable.

It is also important to acknowledge the existence of measurement errors when trying to obtain aggregate productivity data for construction activities. These include:

- where input measures are used (such as summing input prices to estimate likely output prices), output, and therefore productivity growth, can be underestimated;
- in using output measures, it is common for there to be difficulties in finding robust output prices (such as the price per kilometre of road) and in finding comparable 'outputs' across projects;
- significant differences in productivity measures can result depending on whether hours-based or employment-based measures of labour input are used (O'Grady and McCabe 2009).

Clarity about what each study in this area is attempting to assess, and how, is therefore critical when comparing results and making inferences across them (box 10.2).

Box 10.2 **What is being measured?**

In surveying international work on construction sector productivity, Best and Langston (2005, pp. 2–3) discuss the various definitions and points of focus that are commonly used:

> *Productivity,* in a general context, may be defined as 'the degree to which the power to make or provide goods or services having exchange value is utilised as measured by the output from the resources utilised' (Davis 1951). In simple terms productivity is typically expressed as the number of units of output produced per worker (unit of labour input) or per day (unit of time input), or simply 'output over input'. The complexity and diversity of construction projects makes the quantification of outputs very difficult, and for any comparison exercise the problem of finding completed projects (units of output) that are comparable is an added difficulty.
>
> *Efficiency* and *effectiveness* are not the same, although both may be seen as part of *project success* (Takim and Akintoye 2002). Efficiency may be linked to management and organisation (measured by factors such as adherence to schedule, budget and specification) while effectiveness is measured by client/user satisfaction. Project success can have two distinct components: project management success and product success (Baccarini 1999). The first focuses on time, cost and quality outcomes, the second to project delivery that satisfies the client/user.
>
> *Performance* is not the same as productivity and may include factors that have no direct relation to conventional meanings of productivity, such as contractor/customer relations. Loosemore and McGeorge (2002) suggest that performance has four parts: productivity, time, cost and quality. Xiao and Proverbs (2002a) attempt to measure construction contractor performance by a comprehensive set of measures of time, cost and quality performance, and relate performance in many instances to client perceptions of contractors' performance.
>
> Governments and site supervisors, then, are interested in *productivity* (at macro and micro levels); clients and their project managers focus on *success* , while firms like to gauge their *efficiency*, and may want to compare their efficiency to that of their competitors. Some combination of these parameters may be encapsulated in *performance*, and the term is often used in the literature, although not necessarily with any consistency.

Certainly, concerns about productivity in the construction sector are not confined to Australia. A recent report on international trends in construction productivity, for example, stated:

> Labour productivity in the construction sector has been flat or has even been falling in many advanced economies over the past 20 years and has trailed productivity in the rest of these economies. Some of this under performance relates to more stringent quality standards. In addition, some upstream productivity gains by suppliers of raw material and prefabricated components are not reflected in construction productivity data. Even adjusting for these factors, our analysis shows that construction sector productivity growth has lagged behind that of other sectors. (McKinsey Global Institute 2013, p. 30)

A further point emerging is the need for improved metrics in this area. Improvements in data collection and benchmarking (as also discussed in chapter 9) would be helpful in improving the understanding of productivity issues in the construction sector. In this context, de Valence argues that many of the confusing and contradictory trends observed with regard to productivity primarily reflect problems that arise from including different types of construction within aggregate measures:

> … the levelling off of labour input … has only slightly increased since 2005. However, over this period both construction output and capital input have grown by around 50 per cent. That this coincided with the Mining Boom Mark 2 could reasonably be attributed to the difference between the two building sectors and engineering construction, which is much more capital intensive than building. (sub. DR140, p. 7)

He goes on to argue that one solution to this would be to reclassify the data collected on the sector via a restructured ANZSIC classification that separates out engineering construction from building (sub. DR140, p. 5).

The Commission sees merit in this approach given the considerable difficulties that arise when attempting to analyse productivity performance, and a wider range of other indicators, in the various sub sectors of the industry.

RECOMMENDATION 10.1

The Australian Bureau of Statistics should be funded to revise its approach to collecting productivity and other data within the construction sector. Separate collection and regular reporting of data for building construction and heavy and civil engineering construction would greatly improve the statistical information available to researchers and policymakers.

10.2 Main productivity challenges

While the aggregate evidence on productivity in Australian construction does not suggest a record of extremely poor outcomes, it does indicate that there remains significant room for improvement (box 10.3).

Box 10.3 **Productivity trends and imperatives: one view**

In his submission responding to the Commission's draft report (sub. DR116), Martin Loosemore detailed his views on productivity trends and their causes:

> The data available from Australia … shows clearly that the only thing that can be concluded with any certainty is:

1. Construction labour productivity has trended up since the 1990s, ahead of all-industry average but has been losing ground.
2. Construction MFP has trended up since 1990s, lagging the all-industry average but pulling ahead recently.
3. Increases in construction MFP have been met with increased wages which have reduced efficiency gains.
4. We 'may' have lost our international competitive advantage over last decade but comparative data is limited and unreliable.
5. Relative MFP gains during the ABCC era should be taken in context of [the] second 'capital-intensive' phase of [the] mining boom.
6. The 'delivery' phase of mining boom will probably make future relative gains in construction productivity much harder to secure.

   … But productivity measurement is notoriously difficult and as the Draft report rightly points out, it's very difficult to link it to one factor. Research indicates that the major causes of lost productivity in construction are (not in priority order):

   - Variability in subcontractor capability/performance (can vary up to 20%)
   - Interruptions/poor coordination (waiting for the next trade, waiting for information/instructions, waiting for materials, waiting for plant, weather, IR disputes etc);
   - Working continual overtime (exhaustion/burn-out);
   - Size of the labour force (relative to size of site);
   - Unplanned increases in labour force (flooding the job to make up time);
   - Poor site management/supervision;
   - Lack of up-front integration in project teams;
   - Lack of commitment to, and focus on, productivity and continuous improvement;
   - Skills/competencies (productivity training);
   - Lack of detailed short-term planning;
   - Contractual conflict and poor subcontractor relationships (trust);
   - Design (constructability/complexity/uniqueness/prefabrication);
   - Design management (timely and accurate information);
   - Productivity is not rewarded;
   - Lack of information about productivity improvement;
   - Not measuring and monitoring productivity.

In the course of its inquiry, the Commission was provided with various views about how productivity outcomes could be improved in the sector, and these are discussed in greater detail in this section.

A consistent theme in the areas for improvement raised by stakeholders was that a multi-tiered approach was needed, focussing in part on workplace relations, but also on broader policy settings and industry practices.

The most significant future productivity challenges within the industry identified by stakeholders included:

- project definition and procurement approaches
- firm level project management
- prefabrication
- design
- labour utilisation and workplace relations (discussed in chapter 13)
- incentives for innovation
- regulation and competition.

This list is also broadly consistent with many past international and Australian studies (including the National Research Council (United States) 2009 (box 10.4)) and, in many respects, with broader work on drivers of productivity across a range of industries.

Box 10.4 **Opportunities for breakthrough improvements**

In 2009, the US National Research Council conducted a comprehensive study of areas that might deliver significant productivity improvements in the US construction industry. It identified the following as key areas for reform:

7. Widespread deployment and use of interoperable technology applications, also called Building Information Modelling (BIM)
8. Improved job-site efficiency through more effective interfacing of people, processes, materials, equipment, and information
9. Greater use of prefabrication, preassembly, modularization, and off-site fabrication techniques and processes
10. Innovative, widespread use of demonstration installations
11. Effective performance measurement to drive efficiency and support innovation.

Source: National Research Council (United States) 2009, p. 1.

While some of the above factors may be amenable to government policy improvements, others are matters best left to the industry to address. The Commission has therefore made recommendations where the former applies, but is

also mindful of the need for broader policy frameworks to contribute to, and not detract from, an environment of innovation and competition in the industry.

Project definition and procurement approaches

Procurement approaches and project definition have critical flow-on effects for construction productivity outcomes, a point emphasised in both stakeholder discussions held as part of this inquiry and in submissions.

As discussed further in chapter 12, time is an important element in terms of innovation and productivity outcomes. Poorer outcomes can result where clients rush to market with ill-conceived ideas, or place too many time pressures on potential constructors. The importance of project scoping and upfront due diligence has been highlighted in a number of submissions:

> Poor project governance in Australia is a major reason why infrastructure projects fail to meet their timeframe, budget and service delivery objectives. Australian governments must improve the project procurement and transaction management processes to: reduce tender, construction and operational cost; increase schedule reliability; eliminate fees leakage; eliminate windfall operational profits, and promote innovation. (Industry Super Australia sub. 60, p. 24)

> Effective governance is of paramount importance to ensure successful project delivery. The project steering committee or control board provides high level oversight of implementation and management of the project and ensures that both the project team and contractors are held accountable for effective delivery of the project. (Victorian Government sub. 81, p. 53)

In his submission, and in earlier research, de Valence identifies procurement methods as *the* primary driver or inhibitor of innovation and productivity improvement (sub. 16; de Valence 2010). Consistent with recent procurement strategies of most Australian governments, he argued for a 'horses for courses' approach, where structures for purchasing, risk-sharing and delivery are determined by the nature of the project, and that the development of such structures is the responsibility of the client (sub. 16, p. 4). In looking at some of the general attributes of more effective past projects here and overseas (box 10.5), and drawing on earlier work in Infrastructure Australia (2008), he points to clarity of project scope, allowance for unforeseen changes, and collaborative and trust-based relationships as being especially important (sub. 16, p. 5). For such 'horses for courses' approaches to be effective, government clients must have the necessary expertise (or contract it in) in order to complete the required due diligence at the beginning of a project so that the most suitable procurement method can be selected.

Box 10.5 **Heathrow Terminal 5**

A prominent international example of a landmark or mega project where innovative approaches to construction and contracting were used is Terminal Number 5 at Heathrow airport in the United Kingdom. Despite some very significant operating system difficulties experienced on opening, and a very long planning approval stage, during the construction phase itself the project had many notable performance successes.

de Valence, drawing on a range of sources, describes several innovations put in place by the BAA plc that contributed to this success:

> In its role as the client BAA took on all the risk for the £4.3 billion project, under the unique T5 Agreement that the 60 first tier contractors signed. In total, 15,000 suppliers were involved. The overall project was divided into 147 sub-projects, with an integrated team led by BAA responsible for each one. Unlike the majority of megaprojects, T5 was delivered on time and on budget ((Hammond, Wolstenholme and Fugeman 2008).
>
> To achieve its objectives BAA implemented a comprehensive strategy to change both its own capabilities and those of its main suppliers. Brady et al. (2007) looked at the role of BAA, how it applied lessons from previous projects, its interaction with the networks of firms involved and how their capabilities were developed. Consultants were sent by BAA into the major suppliers to identify ways and means to improve their efficiency and the Agreement included gain sharing when cost targets were bettered (Davies, Gann and Douglas 2009).
>
> The key relevant point about T5 is that innovations in many forms were actively sought out and developed. These included product innovations in off-site fabrication such as the roof structure (Frankland and Hulme 2008), technological innovations such as the tunnelling process and equipment (Williams 2008), process innovations such as the two logistics centres (Potts, K. 2008), and management innovations such as the insurance provisions and incentives built into the T5 Agreement. Deakin and Koukiadaki (2009) detail the industrial relations aspects of the project.
>
> Caldwell, Roehrich and Davies (2009) suggest that the risk associated with these large, complex projects can provide the motivation for clients to pursue and reward innovation by contractors and suppliers. … By taking on and actively managing project risk, BAA was able to pursue a strategy of rewarding performance enhanced by innovations from all participants.

Sources: de Valence (2010); Brady et al. (2007); Brady and Davies (2010).

Once contract types have been decided, the incentives that lie within them are also important for driving the productivity of individual projects. The incentive structures within contracts regarding time and cost overrun and innovation are particularly influential. In this context, the University of New South Wales discussed the low incentives provided by some contracts in these areas (sub. 44, p. 3).

There have been some recent attempts by government to improve project selection and decision-making practices, including the production of guidance material

(chapter 2). Together with possible improvements in procurement and delivery processes (chapter 12), these attempts may encourage future productivity growth.

Firm level project management

Project management is defined broadly to include logistics, organisation and choice of skills and technologies employed on and off-site by the constructor to manage a project during the construction phase.

Evidence at the enterprise level suggests that these factors can be an important driver of construction sector productivity. One detailed international study of the productivity of constructing large buildings (box 10.6) pointed out that simple factors, such as the type of carpentry methods and supervisory practices, were likely to explain the significant differences in productivity levels between countries. While this case study relates to buildings, which form only a subset of construction activities in this inquiry, it still underlines the fact that project management practices at the firm level in countries with similar levels of economic development as Australia can have far-reaching productivity implications. It would be surprising if this were isolated to buildings.

Other research has demonstrated that choices of building technique, such as the improved use of formwork systems and reinforcement, can have a positive impact on productivity.

Given the large amounts of capital and labour involved in major projects, there is a premium on coordination of projects. Speedy access to materials and minimisation of repeat work are therefore critical to improved performance. Conversely, delays, including those that are often directly related to planning and logistics, are generally considered to be key sources of poor productivity performance (Olomolaiye, Jayawardane and Harris, 1998).

Project management was described by several participants as an area where significant improvements were required in Australia. For example, the University of New South Wales argued that:

> Project management skills and frontline management skills need to be improved — particularly in communication, coordination, logistics and execution. (sub. 44, p. 4)

In part, it was argued that generational change in the construction industry had led to the loss of valuable management skills once older managers had retired from the industry. Several submissions, including Lend Lease (sub. 46, p. 39) and Engineers Australia (sub. DR123, p. 1) also mentioned the loss of skills in government clients.

Box 10.6 **European construction contractors: A productivity appraisal**

An often cited study on international construction productivity was conducted in 1999 by Proverbs et al. This involved a questionnaire, together with plans for a standard seven storey concrete frame (from the ground slab up), being sent to construction planners in Britain (31), France (13) and Germany (10). Respondents were asked to provide planned man-hour estimates for the various operations involved in constructing the structure, as well as background information on working hours, choice of technology etc. Productivity data are presented in terms of man hours per tonne of reinforcement fixed, sqm of formwork erected, and cbm of concrete placed. The results were then subject to analysis of variance to provide a comparative analysis.

The results showed low productivity for the British firms as a group, translating into higher labour costs on average for the standard structure, despite lower British labour rates. Differences in mean productivity rates were apparent for the three basic processes of formwork erection, reinforcement fixing, and concrete placement for the three countries, together with the out-turn costs for the whole structure. This is calculated by applying published all-in national labour rates to the quantities for the standard building and the mean productivity rates.

	Formwork Mean manhours/m2	*Reinforcement Mean manhours/tonne*	*Concrete Mean manhours/m3*	*Mean Planned Completion Time in Weeks*	*Mean Total Labour Cost of Standard Building GBP*
Great Britain	1.61	20.41	2.47	22	158 061
France	0.87	27.65	1.54	13	108 974
Germany	1.07	17.17	1.47	18	195 633

Source: Proverbs et al. (1999, table 2, 4 and 6).

High variability (in terms of coefficient of variation around the mean for planned completion time for the whole project and for slab construction) was also found in the performance of British contractors compared with those in France and Germany. This meant that, while the best of the British firms were on a par with those on the continent, mean performances were dragged down by a long tail of poorly performing firms.

	Planned Completion Times	*Predicted Slab Formwork Productivity*	*Predicted Slab Concrete Productivity*	*Predicted Slab Reinforcement Productivity*
Great Britain	32%	53%	61%	90%
France	37%	27%	43%	30%
Germany	22%	36%	40%	24%

Source: Proverbs et al (1999, table 2 and 3).

(Continued next page)

Box 10.6 **(continued)**

In discussing these results, Edkins and Winch (1999, p. 13) state that possible sources of poorer performance in Britain may include higher supervisory ratios, reliance on traditional forms of carpentry, and reliance on sub-contracted labour.

They also consider possible sources of the large divergence in performance across British firms, and state:

> … in a situation where the firms are (presumably) in direct competition, it is difficult to see how such wide variations in cost performance can persist. There are, in principle, three possibilities: some clients are paying over the odds for their concrete structures; some groups of workers are being paid much less for their time than others; or the top performers are using more capital-intensive continental methods, but the additional capital costs associated with them allow low-paying, low productivity firms to remain competitive. (p. 14)

The authors concluded that the most likely situation was a combination of all three factors.

Sources: Proverbs, Holt and Olomolaiye (1999), as discussed in Edkins and Winch (1999, pp. 12–14).

Participants also pointed to fragmentation in the construction industry supply chain as a particular problem that could be greatly improved.

Prefabrication and design

The expanded use of prefabricated elements (such as curtain walls, modular elements, structural steel and precast concrete) and other off site techniques is seen by many construction industry commentators as having further potential to deliver significant productivity improvements.

In part, this is because off-site techniques permit the use of a suite of information technologies that are more difficult to use on site. These include design automation, numerical control machinery, data integration and management, instrumentation for quality control, enterprise resource management, automated data collection and materials tracking, and other advanced technologies that are broadly available in manufacturing (Eastman and Sacks 2008, p. 517). Offsite techniques also assist in reducing disruption on a site, as many elements of the construction are assembled elsewhere, and better planning of timing and delivery is also facilitated. Factory construction also allows smaller tolerances in quality control and hence greater precision and uniformity in constructed modules. This can allow for the relatively easy assembly of significant components of an infrastructure project.

Design plays an important facilitative role in employing such techniques and, more broadly, is seen to be a key driver of enhanced productivity across the sector. The University of New South Wales submission, for example, stated:

> Good design which links through to productivity and manufacturing and a well-managed design process is critical to productivity.(sub. 44, p. 5)

A large number of submissions and consulted stakeholders discussed Building Information Modelling (BIM) as a particularly promising form of assistive technology in regard to design, and also for the construction phase and facility operation. This technology is discussed in greater detail in chapter 12 and appendix C.

The broader role of innovation, competition and regulation

Innovation is a key driver of productivity improvement.

Some suggest that the construction industry lacks innovation compared with other industries. Certainly, R&D intensities in the construction industry are lower than in many other sectors (for example, manufacturing). The lower relative intensity may partly reflect that R&D and innovation is more likely to occur in upstream suppliers (such as technical services, pre-fabrication technologies and construction equipment) that are not counted as part of the industry. Despite this, the apparently relatively strong multifactor productivity performance of the industry discussed above suggests the story is not too bad. However, this does not mean that no more can be done.

Some aspects of the industry lend themselves to greater innovation. For example, Tatum (1986) (as quoted in de Valence 2010, p. 51) identified a number of features of the construction industry that could be considered as advantages in regard to innovation, including that:

- project teams are presented with high levels of necessity and challenge, which promotes innovation by forcing examination of new technologies for each project
- integration of engineering, design and construction can simplify the construction process and decrease cost
- the low capital investment typical of construction firms allows high flexibility for the adoption of new technologies
- a pool of technologically experienced personnel provides depth of knowledge

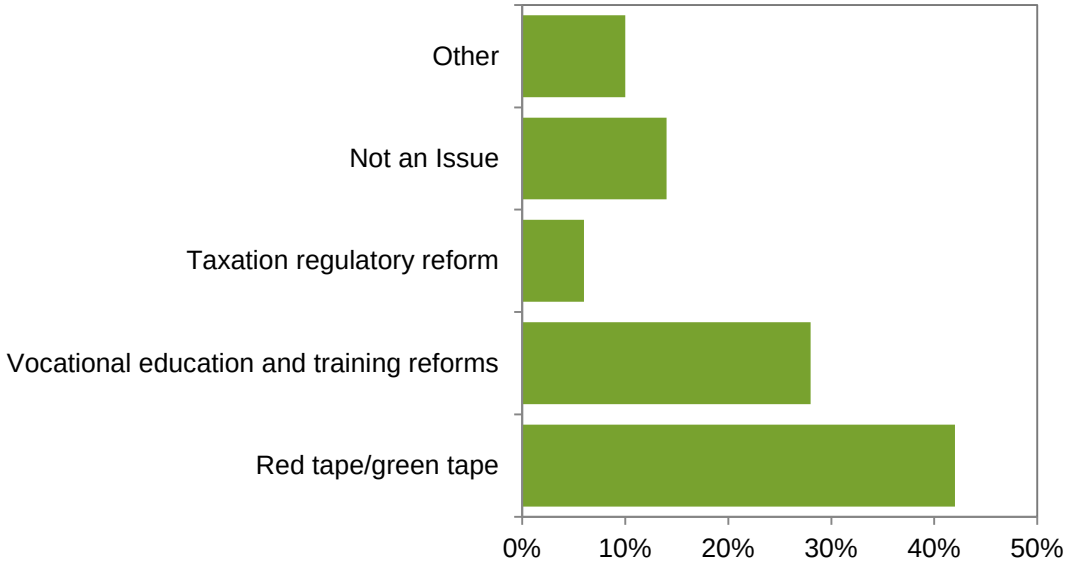
- strong emphasis on process limits barriers to imitation, because new processes can spread rapidly without patent restraints (but this may also discourage innovation)
- construction production processes do not create rigid restraints.

In the course of its inquiry, the Commission was made aware of significant innovations, and scope for further innovation, in the industry.

A common theme in submissions, and in past industry surveys (figure 10.10 and table 10.3), was that regulation in the sector, particularly as it affects costs, allowable methods and construction timeframes, can inhibit innovation. However, the different surveys have quite divergent measures of the importance of regulation, so it is important not to overdramatise the adverse impacts of regulations and standards. Moreover, the impacts of compliance burdens in construction on innovation may be similar to other industries.

Figure 10.10 **Policy issues of concern for industry**

Per cent



Source: Construction & Property Services Industry Skills Council (CPSISC) stakeholder survey, as reported in PWC (2013a, p. 6).

An important, if qualified, role for technology was stressed by many participants, and this is a point echoed in industry surveys (figure 10.11). For example, the University of New South Wales pointed to a need to:

> Increase industry engagement with new technologies which have driven productivity improvements in other sectors. Technologies that offer particular promise to increase productivity include: ICTs [information and communication technologies] to allow people to work more flexibly; Onsite mechanisation; Offsite fabrication; Materials

> management systems; Automated tracking and GPS; cameras and bar coding technologies; Mobile technologies; BIM and; Augmented reality. Many of these are used in engineering but less so in the building sector. (sub. 44, p. 7)

Several participants provided the qualifier that, while technological change is likely to be critical, new technologies need to be integrated with, and not work against, project management and planning.

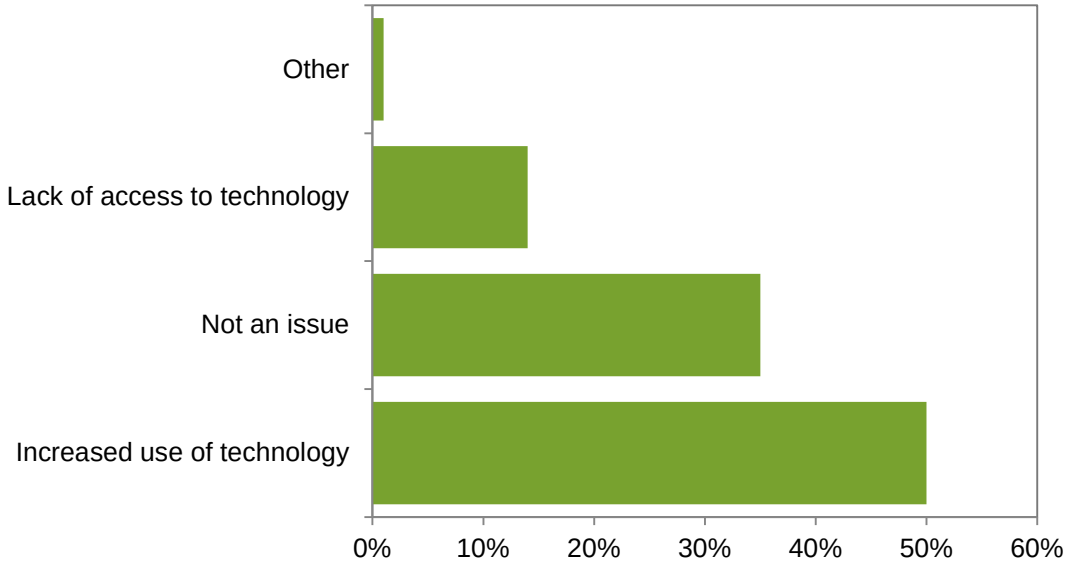
Broader competitive processes are also critical in facilitating the entry and exit of market players. For example, new entrants to the market, including from overseas, can bring with them important innovations, including new technologies, organisational and managerial innovations. (These issues are discussed in greater detail in chapter 11.)

Table 10.3 **Nominated barriers to innovation**
2010-11

	Construction industry		*All industries*	
	Government regulations and compliance	Adherence to standards	Government regulations and compliance	Adherence to standards
Innovative businesses	%	%	%	%
0–4 persons	15.2	5.7	15.4	5.2
5–19 persons	21.6	6.0	17.6	6.3
20–199 persons	6.6	4.4	17.5	7.7
200 or more persons	7.3	5.2	7.7	2.3
Total	**17.0**	**5.7**	**16.5**	**5.9**
Non-innovative businesses				
0–4 persons	10.8	5.6	10.8	3.0
5–19 persons	11.2	4.1	11.2	2.9
20–199 persons	6.8		7.8	0.3
200 or more persons	0.0	0.0	9.9	5.4
Total	**10.8**	**5.2**	**10.8**	**2.9**
All business types				
0–4 persons	11.7	5.6	12.2	3.7
5–19 persons	16.0	5.0	14.4	4.6
20–199 persons	6.7	3.4	13.8	4.9
200 or more persons	4.7	3.3	8.4	3.4
Total	**12.5**	**5.4**	**13.0**	**4.1**

Sources: ABS (*Innovation in Australian Business*, 2010-11, Cat. no. 8158.0).

Figure 10.11 **Technology concerns**
Per cent, 2013



Source: Construction & Property Services Industry Skills Council (CPSISC) stakeholder survey, as reported in PWC (2013a, p. 7).

10.3 Concluding comments

There is little evidence to suggest that Australia's relative global productivity performance within construction should fall in the 'extremely poor' category. Instead, some evidence points to Australia outperforming comparator countries in several areas.

Nevertheless, as in all industries, improved productivity (when this also encompasses quality improvements) is the key method for reducing the costs of output to customers, improving business returns in the shorter run, and providing more infrastructure for a given spend. Most stakeholders considered that the industry could do much better. The Commission broadly concurs that there is scope for a significant improvement in the productivity performance in public infrastructure.

The incentives to improve productivity are likely to be driven by wiser purchasing judgements by governments and the competitive circumstances of markets, which are analysed in subsequent chapters.

11 Competition and the structure of the infrastructure construction market

Key points

- Competitive markets generally promote efficiency and help hold down costs and prices. These outcomes are less likely the more a market exhibits significant concentration together with high barriers to entry, highly differentiated products and other features that allow (or do not counter) the use of market power.
- The infrastructure construction market exhibits a degree of concentration, especially in the 'large and complex' market segment. Although estimates vary, Leighton Holdings and the Lend Lease Group together hold a significant market share. Some see these entities as akin to a duopoly, although the Australian Competition and Consumer Commission has not found cause to take action under the competition law against either organisation.
- Some aspects of the infrastructure construction market may act as barriers to entry, such as smaller firms lacking the 'financial capacity' to bid on larger projects, procurement practices, and international firms finding it difficult to obtain Federal safety accreditation. However, these impediments are not insurmountable, and the market appears largely contestable, especially in recent years.
- The infrastructure construction market is segmented according to the type, value and location of projects. This reduces the number of potential bidders on any given project. However, there appear to be few barriers to additional firms entering most segments, and little information showing that there is concentration in segments that manifests in market power.
- Governments, as the major buyers of public infrastructure, may be able to exercise countervailing power in setting and negotiating contracts and conditions. They can also address market power issues indirectly through the use of pro-competitive procurement policies.
- The Productivity Commission has not found any concrete evidence that the current structure of the infrastructure construction market diminishes competition in ways that would substantially inflate infrastructure costs.

Contracts for public infrastructure construction are typically awarded through competitive tendering processes, in which the price along with indicators of capability, quality, reliability and other facets of the services offered by different construction companies are compared.

Depending on the size and complexity of the project, a contractor may provide a single service with its own equipment and labour (as is the case in many smaller road projects), act as a project manager that subcontracts further and coordinates the delivery of the project, or partner with another firm or firms with complementary expertise in a joint venture or consortium. For example, the New South Wales Government recently awarded a $1.15 billion contract to a Thiess John Holland Dragados joint venture to provide two 15 kilometre tunnels as a part of the North West Rail Link (Transport for NSW 2014). The head contract partners will in turn engage several tiers of subcontractors to work on aspects of the project. The choice of subcontractor will often depend on the price, quality, reliability and other aspects of the services they offer, relative to other suppliers.

The extent to which any particular infrastructure project is delivered at the lowest cost possible (given its specification) will depend largely on the degree of competition at the various levels of the infrastructure construction market. Competition, or the threat of competition, limits the scope for suppliers to raise prices and obtain excessive profits, as they face being undercut by rivals and/or losing future work.

Whether the infrastructure construction sector is sufficiently competitive to adequately constrain costs and prices is contentious. In particular, some consider that the major Australian 'Tier 1' construction companies are able to operate as if akin to a duopoly. A further issue is whether constructors in particular geographic markets, or with particular specialisations, are able to exercise some market power. There is also a concern that agreements between some head contractors and unions may be restricting competition among subcontractors. But where some see closed shops, others see specialisation, scale efficiencies and competition.

This chapter examines the extent to which the infrastructure construction market is competitive, as well as some means that governments can use to increase competitive pressures where justified. One way to test the level of competition is to examine whether prices appropriately reflect costs and whether profits are generally constrained to 'normal' levels. However, this is a data-intensive exercise that entails difficult judgments. Another way is to examine the structure of the relevant market to ascertain whether sufficient conditions for competitive outcomes are present. For example, the more a market exhibits significant concentration together with high barriers to entry, highly differentiated products and certain other features, the more susceptible it will be to monopolistic pricing. Given the short timeframe of the inquiry and the general lack of necessary data, the Commission has undertaken a high-level analysis using the latter approach.

To this end, the chapter discusses:

- whether there is undue concentration in the infrastructure construction market (section 11.1)
- whether there are barriers to entering the market, and measures governments can take to reduce them (section 11.2)
- the nature and potential effects of market segmentation (section 11.3)
- the potential for government as the major buyer of infrastructure to exert countervailing power (section 11.4)
- whether there are issues in key input markets — specifically those for sub-contracting — that could affect competition and generate higher costs and prices (section 11.5).

11.1 Concentration in the infrastructure construction market

Leighton Holdings and the Lend Lease Group are the two major operators in the Australian infrastructure construction market, especially where large and complex projects are concerned. While there are numerous local and international firms in this sector, these corporations control several of the Australian Tier 1 constructors and collectively enjoy a significant market share. A number of inquiry participants suggested that these firms may be akin to a duopoly (CFMEU, trans. p. 190; Independent Contractors Australia, sub. 100, p. 1; McLeod Rail, sub. 49, p. 2), which could lead to higher prices for clients (as well as higher profits for the firms). The companies themselves dismiss these concerns (box 11.1).

How big are the 'big two'?

There is a variety of estimates of Leighton and Lend Lease's combined market share.

- Drawing on data from 2008-09, the Department of Infrastructure and Regional Development (sub. 64) estimated that together they account for around 75 per cent of the infrastructure construction market.
- Using data for 2005–2012, the Commission estimates that they have been involved in just over 60 per cent of major infrastructure projects[8] (by value). This

8 Using data sourced from DAE (2013), the Commission estimates that, since 2005, there have been over $55 billion worth of major public infrastructure projects (where each of the contracts included in this analysis was worth over $50 million).

figure represents an upper bound estimate of their combined market share, as it includes the value of projects won as part of a joint venture or as one of many contractors on a large project.

- IBISWorld (Kelly 2013a, 2013b) estimated that, while Leighton and Lend Lease are the biggest private players, their combined market share in 2012-13 was less than 20 per cent of each of road and rail, and heavy industry and other non-building construction sub-markets.

Why are the IBISWorld market share estimates so much lower than the figures estimated by the Commission (and the Department of Infrastructure and Regional Development)? The estimates cover different time periods, and there are also differences in the delineation of the markets used in the analyses. The IBISWorld estimates are also complicated by the inclusion of statutory authorities — such as Roads and Maritime Services from New South Wales and the Roads Corporation from Victoria — as providers, rather than buyers of public infrastructure. This assumes that there is no contracting out of projects. In reality, these authorities frequently outsource work to contractors. Since it can be reasonably assumed that Leighton and Lend Lease would have captured some of this work, these two players would probably have a combined market share higher than that estimated by IBISWorld.

In the Commission's view, while market shares do change over time, it is likely that Leighton's and Lend Lease's combined share of the total market for major public infrastructure will be significantly more than 20 per cent. Equally, the Commission's estimate of 60 per cent is likely to overstate the market share of the 'big two'.

Even with this wide range of estimates, some caveats and complications should be noted. Each of the above studies combines the market shares of the subsidiaries (or divisions, or brands) of the 'big two' as if they are part of the one business and do not seriously compete against other subsidiaries in their stable. Authentic competition among subsidiaries would greatly reduce effective concentration in the market. Conversely, to the extent that each of the subsidiaries or divisions specialise, and thus come to be more dominant in particular market segments, the greater could be any divergence from competitive outcomes associated with a given 'global' share of the market.

In the only comment in submissions directed at the actual degree to which the 'big two's' subsidiaries, divisions or brands have competed rather than specialised over recent years, the Independent Contractors Australia stated that 'in 2012-13 both Leighton Holdings and Lend Lease eliminated the independence of their divisions and introduced central control over all tendering' (sub. 100, p. 18.)

Box 11.1 **Some comments on the Leighton-Lend Lease 'duopoly'**

In its submission, Salini Australia Pty Ltd contended that Leighton Holdings and Lend Lease dominate large scale public infrastructure construction in Australia, with few international contractors established here for any significant period, and other local Australian companies lacking the necessary size, scale and/or the will to bid for major public infrastructure projects with a value of over $200 million. Salini argued:

> A bias towards the 'Australian' duopoly in the construction of public infrastructure, despite maintenance of business practices driving up costs and against currently public policy (including enterprise bargaining agreements with unions), ensures a sustained increase in the cost of construction and reduction in the amount of public infrastructure able to be built. (sub. 1, p. 1)

Austrade noted that, of the two or three bidders generally shortlisted for a contract, typically, there may be ' … one from Leighton, one from the Lend Lease and sometimes an international bid' (sub. 74, p. 21).

And the Department of Infrastructure and Regional Development, drawing on assessment of market shares using data for 2008-09, submitted:

> Most of the work done on large projects is undertaken by a small group of relatively large firms. These firms are also either subsidiaries of Leighton Holdings or Land Lease. Therefore, market share analysis on contracts awarded to the subsidiaries could imply control by just two firms. (sub. 64, p. 27)

The Australian Constructors Association (ACA), which represents firms such as Leighton and Lend Lease, disagreed with the suggestion of market dominance:

> [The ACA] … does not accept any proposition along these lines and submits that international players of significance (often with a market capitalisation much larger than Australian based entities) have operated in Australia for decades and have remained in the country or withdrawn on the basis of their own commercial decisions as opposed to the existence of strong local brands either in the past or in terms of the recent existence of the Lend Lease and Leighton groups. (sub. 72, p. 15)

The ACA argued that competition is fierce and its members:

> … vigorously compete against other ACA members as well as other large local or international businesses for involvement in construction projects whether they are infrastructure, resources and mining or commercial in nature. (sub. 72, p. 15)

Lend Lease argued for a focus on competition, rather than market share, and contended that ' … [t]he Australian construction industry is highly competitive' (sub. 46, p. 6) and ' … competition in all areas of the infrastructure construction market would be described as not only robust but 'fierce'' (sub. DR201. p. 11).

Consistent with this, the Department of Infrastructure and Regional Development reported that:

> Unpublished research undertaken by the Department in previous years suggests project clients consider the market to be sufficiently competitive. (sub. 64. p. 27)

This was supported by the Queensland Government who noted:

> While there are two very big players in the Australian market there are a number of medium sized contractors who, through the encouragement of joint venture arrangements, impose market discipline on the delivery of major projects. (sub. DR203. p. 58)

The ACCC's investigations

The perception that Leighton Holdings and Lend Lease Group enjoy some market power may have been motivated by recent mergers and takeovers (box 11.2). These have reduced the number of separately-owned entities in the sector.

Box 11.2 A brief history of Leighton and Lend Lease's mergers and acquisitions

Several operating companies or 'brands' operate under the banner of Leighton Holdings. Currently, these are Thiess, John Holland, Leighton Contractors, Leighton Properties, Leighton Asia, Leighton Welspun, Leighton Offshore and Habtoor Leighton Group. The first three of these are Leighton Holding's major players in the domestic market for public infrastructure.

The process of acquiring companies with the capacity to contribute to major infrastructure projects began in 1983, when Thiess was brought into Leighton Holdings. The Group did not make its next acquisition until 2000, with the partial purchase of John Holland. In 2003, John Holland expanded through the acquisition of some of the contracts, resources and staff of Transfield Construction. Leighton's stake in John Holland was increased to 100 per cent in 2007.

Lend Lease also has several operating entities, particularly with regard to project management and construction, but these are generally recognised as geographical divisions of the single Lend Lease brand. Lend Lease's expansion through acquisition largely rests on the purchase of Valemus Group in 2011. Valemus Group was previously comprised of Abigroup, Baulderstone and Conneq.

Leighton Holdings and Lend Lease also engage in activities other than just construction. In addition to developing infrastructure, resource and property projects, Leighton has an array of investments in telecommunications, engineering and infrastructure and other listed entities. Leighton also had ownership stakes in the companies that own, operate and maintain the AirportlinkM7 in Brisbane and the Cross City tunnel in Sydney, as well as ongoing maintenance contracts that complement the initial design and construct phases of the Victorian Desalination Plant, the Royal Adelaide hospital and seven schools in Queensland.

In addition to an assortment of operating entities mostly related to the development and construction of infrastructure and property projects and investment management services, Lend Lease has a portfolio of infrastructure and commercial and residential property assets. These assets include retirement living and aged care facilities and shopping malls.

Sources: Leighton Holdings (2014a); Lend Lease (2014a).

Where they may reduce competition, potential mergers can be analysed by the Australian Competition and Consumer Commission (ACCC), either informally before they occur, or, if the purchaser chooses to proceed without the ACCC's approval, afterwards as a part of a formal process. For a merger or acquisition to be ratified, the ACCC must be satisfied that it will not result in a 'substantial lessening of competition'. In instances where competition may be lessened, a merger or acquisition may progress only with a clearance from the ACCC or an authorisation from the Australian Competition Tribunal.

In appraising the process of consolidation among contractors, the ACCC has not issued any statements of issues or public competition assessments since 1999.[9] This implies that the ACCC saw no evidence prior to the consolidation that the mergers and acquisitions would substantially lessen competition.

Much of Leighton Holdings' consolidation — including its merger with Thiess and the purchase of a majority stake in John Holland — occurred before the publication of the ACCC's Mergers Register, which captures mergers since 2002. The register does, however, capture John Holland's merger with Transfield Construction in 2003. Although it regarded the two firms as competitors offering similar services to similar clients, the ACCC concluded that there were enough competitors remaining in the market to constrain the conduct of the merged entity (ACCC 2014a).

In the case of the most recent acquisition by the 'big two' — the purchase of the Valemus Group by Lend Lease — the ACCC considered that there was limited overlap between the activities of the two parties involved. While both were involved in other segments, Lend Lease and Valemus only competed in the 'supply of non-residential building construction services involving Tier 1 projects' (sub. 83, p. 2). Since they competed only to a limited degree, the ACCC considered that the subsuming of Valemus into Lend Lease could only have a limited impact on competition. As a result, it did not oppose the acquisition.[10]

9 A statement of issues is a document published by the ACCC in merger reviews where the ACCC has come to a preliminary view that a proposed merger raises competition concerns that require further investigation. A public competition notice is a detailed summary of the ACCC's reasons and issues considered by the ACCC in a merger review.

10 The ACCC's decision on Lend Lease's purchase of Valemus suggests that there is a degree of market segmentation, which in turn implies that consolidation in the industry need not reduce competition. If the firms involved in a consolidation offer different services to different clients on a different scale, any merger or acquisition would simply add capacity in areas where the purchaser was previously lacking. Segmentation issues are discussed further in section 11.4.

It should be noted that the ACCC does not investigate the market structure or comment on the competitiveness of an industry in the absence of a current or recently completed acquisition. However, the ACCC does retain the power to investigate and take legal action against misuses of market power and anticompetitive or cartel-like behaviour. This has resulted in two successful actions in the construction industry. The first action was taken in 1999 for cartel behaviour with regard to pre-mixed concrete in Queensland between 1989 and 1994 (ACCC 2014b). The second action was taken in 2011 with regard to 'cover pricing' in local and State government construction projects in Queensland between 2004 and 2007 (ACCC 2014c). Neither action involved Leighton or Lend Lease.

Summing up

Following various mergers and acquisitions, the Lend Lease Group and Leighton Holdings groups of companies command a significant share of the infrastructure construction market. On some estimates, their market shares would appear sufficient to allow them to exercise market power to inflate prices and/or profits, were other aspects of the market environment to facilitate this.

However, the ACCC has not interfered with the mergers and acquisitions process, nor has it taken legal action against the companies for misusing market power, or for anticompetitive or cartel-like behaviour. Further, during the course of this inquiry, the Commission has received no evidence relating to matters it considers the ACCC should have pursued.

This does not necessarily mean that 'the big two' are unable to exercise some market power. However, it also leaves open the possibility that other facets of the market (and/or the legal environment) act to constrain whatever market power they may have.

11.2 Barriers to entry

Even with substantial concentration in the market for infrastructure construction, relatively competitive outcomes can still be achieved if there are few material barriers to firms entering and exiting the market, such that infrastructure projects remain 'contestable'. In these circumstances, existing suppliers would have incentives to maintain prices at close to efficient levels in order to retain market share and discourage potential competitors. If they were to inflate their prices sufficiently, purchasers would be open to new firms entering the market, and those

new firms, recognising an opportunity, would have incentives to move into the market by undercutting the existing suppliers.

However, where barriers to new firms entering a market are high, existing firms have more space in which to raise prices before prompting a competitive response. Alternatively they can pursue a predatory pricing strategy in which, to deter entry, they drop their prices for a period of time.

One of the simplest indicators of the strength of barriers to entry is the degree to which new entrants have entered the market. Although there are a number of international firms contesting the market (a considerable proportion from depressed European markets)[11] and a few notable successes — such as the awarding to Salini and Impregilo of the $340 million contract to construct a four kilometre long elevated skytrain for the North West Rail Link in Sydney — international firms are yet to command a substantial share of the market. Moreover, in many cases, these firms find it necessary to partner with or join a consortium involving a local firm. The Commission estimates that international contractors have been involved in just over 18 per cent of infrastructure projects costing more than $50 million.[12] This suggests that that any existing barriers are not necessarily insurmountable, at least for large foreign firms, although it does not exclude the possibility that there are still barriers that reduce the level of competition. Nor, of course, does it exclude the possibility that Australian firms also face barriers to entry.

The barriers to entry most applicable to infrastructure construction arise from economies of scale and barriers created by government regulation or procurement practices. Potential barriers of these types that might arise in relation to the public infrastructure are discussed below. Some may contend that the need for a workable relationship with unions can also act as a barrier to entry in some aspects of the construction sector. Issues relating to such relationships are discussed in chapter 13.

11 In one notable example, four of the six expressions of interest in the construction of the first section of WestConnex were joint ventures that featured international firms.

12 This estimate includes projects undertaken as a part of joint ventures and consortia, such as the $1.5 billion contract obtained by Acciona (Fair Work Ombudsman 2014a) to develop the Northern Link tunnel in Brisbane (as a part of a consortium including BMD and an Italian firm, Ghella) and the $1.15 billion contract for the Northwest Raillink tunnels in Sydney won by Dragados (as a part of a joint venture between Thiess and John Holland) (Transport for NSW 2014).

Balance sheet risks

Under most contractual arrangements, firms accept the risk associated with problems arising on the project (delays, input price changes and rework). Such problems place a financial burden on the firm. The ability to bear such risks becomes more important as projects become larger or more complex. Because the costs associated with high value or high risk projects can be substantial, firms undertaking the contracts without the capacity to manage costly risks face insolvency. To the extent that they have relatively strong balance sheets, existing firms with greater market share should be relatively better placed to absorb large, but infrequent, costs; making them appealing to procurers looking to avoid the disruption associated with financial difficulties on the part of the contractor.

The ability of larger firms to manage financial risks is typically acknowledged in pre-qualification requirements, including, for example, the financial indicators that form a key aspect of the Austroads national pre-qualification system.[13] While there are other aspects of the scheme that relate to the contractor's capacity to undertake different types of road and bridge construction projects, limits on these financial indicators place a ceiling on the value of a contract the firm can bid upon. In appraising its financial capacity, the procuring agency examines the contractor's 'business viability over both the short and the long term' (box 11.3). The scheme essentially recognises that the 'financial capacity' of the contractor matters.

As projects increase in value, the number of contractors permitted to bid for them declines. Over 300 firms have prequalification in excess of the 'F1' level, meaning that they have the financial capacity to undertake a project of up to $1 million in value. In comparison, there are only 43 entities with a financial level of 'F150+', permitting them to bid on road and bridge projects in excess of $150 million. This level falls to 25 if temporary joint ventures are excluded and subsidiaries are not viewed as discrete entities. As a result, there are substantially more potential bidders for smaller value contracts, while 'financial capacity' acts as a barrier to contractors competing for higher value contracts.

Even so, given a large number of potential bidders still qualifying for larger projects, and the many international firms with significantly larger balance sheets than the major Australian firms, it is not clear to the Commission that this constitutes a barrier to entry that of itself would significantly diminish competition.

[13] The Austroads national pre-qualification scheme is a mechanism that allows contractors to register their credentials as bidders for road and bridge contracts, rather than continually re-apply through Expressions of Interest. It is administered by State and Territory governments. Contractors that are prequalified in one authority can apply for recognition of their prequalification in other States and Territories.

Box 11.3 **The Austroads national prequalification scheme**

Prequalification is a system in which contractors obtain pre-approval for certain type of projects. Because they are pre-approved, contractors' bids can be assessed relatively quickly. As a result, projects can get underway in a relatively timely manner.

The process of prequalification is generally used for relatively standard projects, such as road and bridge construction. In projects such as these, the Expression of Interest (EOI) process yields little further insight into a contractor's capacity than prequalification, but at considerably higher cost.

As in the EOI process, prequalification establishes a contractor's:

- experience
- technical capacity
- financial capacity.

A contractor's experience is assessed with regard to six criteria. These are project history, project management, relationship management, stakeholder engagement, utilisation of management systems, and traffic management. Similarly, there are three relevant criteria in determining a contractor's technical capacity. These are experience, evidence of appropriate staff, and availability of plant and equipment. The authority's combined assessment of a contractor's experience and technical capacity determines which types of projects they will be accredited for and to what level of complexity.

The contractor's financial level is determined as a multiple of the contractor's working capital, where the working capital is defined as the difference between net assets and net liabilities. Because it is determined in absolute terms, even if two firms perform similarly on different scales, the larger firm will be accredited at a higher financial level. For example, if firm A's balance sheet shows $100 million in assets compared to $80 million in liabilities, while firm B retains $10 million in assets relative to $8 million in liabilities, firm A's financial level will be greater than that of firm B by a factor of 10.

There are five categories related to the construction of general roadworks (R1, R2, R3, R4 and R5). Bridgeworks has four categories (B1, B2, B3 and B4). Each level captures projects of a similar type, but, as the number increases, so does the complexity. There are also categories for specialist works such as machine-placed concrete paving (K1 and K2), machine-placed asphalt paving (A1 and A2), pre-tensioned concreting (C1 and C2) as well as steel fabrication (S) and protective treatment (T).

There are 13 levels for a firm's financial capacity. They range from F0.25, which indicates a firm is pre-qualified for projects of less than $250 000 in value, to F150+ which indicates pre-qualification for projects of over $150 million.

Sources: Austroads (2013), VicRoads (2014).

Procurement-related scale issues

As procurers of infrastructure, governments shape the conditions under which contractors can participate in tenders.

How they do this has the potential to advantage larger firms in some cases. For example, contractors — in particular smaller contractors — may be deterred from participating in tenders for public projects where they are required to post substantial performance bonds or take an equity stake (as in certain public-private partnerships that incorporate the construction of the project). While such requirements — originally designed to mitigate risk and enforce probity in procurement — do not create economies of scale, they do reward them. As discussed in section 11.4, the advantage that large scale firms might otherwise enjoy can be mitigated by altering procurement approaches.

Federal safety accreditation

To work on most Commonwealth-funded infrastructure projects, head contractors must be accredited by the Federal Safety Commissioner (FSC).

There is a concern that the FSC requirements may deter (or delay) foreign construction firms from entering the Australian market. Austrade noted that:

> … a number of international companies have advised Austrade the process is cumbersome and tends to eliminate the possibility for international firms (without recognised experience in Australia) to lead public project consortiums in Australia. This is regardless of the depth and breadth of their international business. (sub. 74, p. 23)

There is also a concern that firms (whether foreign or local) that would undertake Commonwealth-funded projects only intermittently may be discouraged by the scheme.

However, as discussed in detail in chapter 15, while the Commission believes that there may be means of improving the FSC requirements, it is not clear that they represent an undue barrier to entry that significantly reduces the level of competition in the Australian market.

11.3 Segmentation in the infrastructure construction market

The infrastructure construction market is segmented in various ways, with projects varying according to size (or value), type and location.

- Market segmentation is implicit in the way in that road and bridge project prequalification is administered. Not only are firms assessed according to their financial capacity, they are also graded according to the type and complexity of the projects they have delivered (box 11.3). For example, smaller firms may be prequalified at a low financial level and in certain, specialised tasks, whereas a larger project manager may be prequalified at high levels for a variety of tasks.
- The ACCC considers market segmentation when it examines proposed mergers. The ACCC categorises construction markets according to whether they are large or small, and according to the type of construction services — distinguishing between engineering construction and non-residential construction services.
- The market can also be segmented geographically because capital and/or labour may not be especially mobile. Hence, contractors often have preferred states or regions in which they are active.

This segmentation means that any major project offering will be met by only a proportion of the contractors in the broader market. This group will consist of generalist contractors, which have experience across a broad range of projects, and specialists — with the capacity to undertake projects both within the region and at the appropriate financial level. The upshot is that only a limited number of firms will be able to undertake *a specific* project, and the number of contractors that could potentially undertake *all* projects is further limited to a very few.

Depending on the extent of such segmentation, competition for some projects in some segments could in theory be quite limited, particularly if one constructor accounts for a significant share of work in the particular segment.

Analysis by the Commission of Leighton Holdings' and Lend Lease's share of different 'type of project' segments of the infrastructure construction market reveals that they have a combined interest in approximately 57 per cent of road and bridge construction projects over $50 million (by value). This is similar to their estimated market share of the total market for public infrastructure. However, the market shares in other segments differ more markedly, ranging from 46 per cent to 70 per cent for port and rail construction projects, respectively. These figures indicate a moderate-to-strong degree of concentration in the different market segments.

It is not clear whether Leighton Holdings' and Lend Lease's concentration in particular segments compounds any lack of competition resulting from segmentation itself. Given that the only barriers to firms moving between segments is evidence of experience, technical capacity and 'financial capacity' (whether through prequalification or a more general EOI tender process), it seems likely that each of these segments remains contestable. Were excess returns to appear in a segment, this would provide incentives for more contractors to enter the segment, which should increase competition and drive down project costs.

That said, the data available to the Commission do not indicate whether Leighton Holdings and/or Lend Lease have a greater share of geographic or other types of segments or segments in the infrastructure construction market.

Nor does the data indicate whether companies other than Leighton or Lend Lease have large shares of segments of the market. It should be noted, however, that inquiry participants have suggested Brookfield Multiplex captures a significant share of social infrastructure work in Western Australia and some smaller operators have been able to win a considerable amount of the work in some regional areas or on certain specialised projects.

11.4 Countervailing power of government

Where suppliers in an industry possess market power (as some consider to be the case with Leighton Holdings and Lend Lease), their ability to inflate prices to earn 'above normal' profits can be dampened where buyers are able to exercise countervailing power. Such power depends on a buyer's capacity to 'credibly bypass the supplier' and exists when:

> … the specific characteristics of a buyer — such as its size, its commercial significance to suppliers or the manner in which it purchases from suppliers — provide the buyer with additional negotiating leverage. (ACCC 2008, p. 47)

In theory, governments, as the major buyers of infrastructure, have this opportunity, through their size and the prospect of repeated business. Indeed, governments could in effect act as monopsony purchasers. Contractors' ongoing viability demands that they obtain not only contracts today, but also a stream of contracts into the future. Governments can potentially use the threat of the withdrawal of future work to ensure competitive performance and pricing on current projects, provided that they can credibly have their projects undertaken by other contractors and have the requisite skills to effectively negotiate and manage the detailed contracts required for infrastructure procurement (see below).

Governments also have the ability to modify the way in which they offer projects to the market. Given that the level of competition diminishes as project size increases, there may be competition benefits in splitting large projects into a series of smaller ones, where it does not undermine the efficiency of procurement or construction. This would allow firms with less 'financial capacity' to compete for projects, ensuring that there are more potential bidders.

This approach was advocated by Mr Bryan Nye, Chief Executive Officer of the Australasian Railway Association in evidence to a NSW Legislative Council examination of rail infrastructure costing in NSW. Mr Nye argued that many large rail projects could be split into smaller projects. As an example, Mr Nye cited:

> … a new $3.4 billion rail project underway in Victoria, which if tendered in its entirety would only have attracted tenders from two contractors. However, the project was split into smaller packages with the result that around 12 companies are now involved in the project. (GPSC3 2012, p. 39)

This idea was ultimately endorsed by the Standing Committee. It recommended:

> … [t]hat Transport for NSW review its tendering strategies to ensure that infrastructure projects are broken down into appropriate sized packages to increase competition between tenderers and lower barriers to provide opportunities for local businesses. (GPSC3 2012, p. 40)

Splitting or un-bundling large infrastructure construction projects into smaller ones involves some costs. These costs — which procuring agencies should assess against the benefits of a series of smaller scale projects — include the costs of multiple tender processes, project co-ordination and re-integration subsequent to completion. (As discussed in chapter 12, considerations relating to the optimal allocation of risk also bear on whether projects should be split or combined.)

In theory, while governments have some scope to countervail any market power of suppliers, to be effective it requires intent and sophistication. One difficulty governments face is that, even though they are at one level a single entity, different agencies are often engaged in procurement, often staffed by people with variable experience, and coordination can be complex. Moreover, agencies often face incentives to take risk-averse approaches to contract selection and project delivery, which may favour the main players with an established track record and relationship with an agency.

Further, a client's countervailing power may be affected by broader economic conditions. The Queensland Government identified the link, arguing that market power:

> … depends on the market 'heat'. The client holds the power in tight market conditions, while industry holds the power in an overheated market. (sub. DR203, p. 56)

Until recently, higher resource prices have stimulated investment in privately funded mining projects and increased competition for scarce engineering and project management resources (chapter 9). This has weakened governments' capacity to exercise countervailing power. As the resources boom abates, the potential for governments to countervail should increase.

A broader view of procurement

Prudent procurement policies can go a long way towards restricting market power and any associated increase in costs. As a part of their infrastructure planning, a government needs to consider the range of projects that it expects the market to absorb in the near future. If a government schedules several very large projects at much the same time — 'project congestion' — operators may respond in ways that result in increased project costs.

In particular, it would be problematic if a large project attracted few viable bids because the major contractors were already committed elsewhere and unable to marshal the resources for an additional project. This might result from difficulties in bearing any specific financial risks of the new project, limits on its managerial resources, and any constraints on its access to the necessary sub-contractors. Once any of the major contractors are not available to bid, the competitive pressure on the remaining players would be relaxed. This may allow them to price higher than they would otherwise and, to the extent that reduced competitive pressure creates complacency, may result in weakened incentives for innovation or the adoption of technology as well as inattention to cost cutting.

To date, this problem appears to have been avoided. The empirical information provided to the Commission suggests that Lend Lease and Leighton have sufficient and flexible access to the market for the services of subcontractors, to capital and to joint venture partners to compete effectively with each other and with other operators on most large projects throughout Australia, including in the 'hot' Sydney market.[14] And foreign entrants are clearly playing a more prominent role in maintaining pressures for innovation and price competition. However, governments

[14] In 2013, in Sydney, both Leighton and Lend Lease were among the three short-listed bidders for the M1-M2 link and almost all aspects of the North West Rail Link.

are planning large new infrastructure projects, so what holds now, may not hold in the future.

Awareness of the market and how it responds to policy is potentially important in two other respects. A poorly articulated schedule of projects may further increase the uncertainty for new entrants to the market, creating another barrier to their involvement. Similarly, in examining rival bids from existing and new entrants, government procurers might consider how their current procurement decisions affect future market structure and competition. It would be unfortunate if conservative procurement practices of governments favoured the large incumbents, reducing competitive pressures from existing and potential rivals.

Accordingly, procurement agencies should consider in advance any effect of their project schedule on the response of the market and the bidding capacity of businesses, to ensure that it does not inadvertently create market power or weaken contractors' incentives to perform.

By and large, the Commission considers State and Territory governments have shown a strong interest in further improving their procurement practices and in promoting a more competitive environment (chapter 12), which should limit concerns about an a lack of competition in the construction of public infrastructure.

11.5 Competition issues in input markets

As in the broader market for public infrastructure, the level of competition in input markets can also influence infrastructure costs. Submissions have pointed to a number of input markets where competition issues could arise, including those for sub-contractor's services, finance,[15] labour and quarried construction materials. This section touches on concerns in the first of these. Labour market issues are discussed in detail in chapter 13, while some issues around quarrying are discussed in chapter 15 (although, as discussed there, while there may be valid concerns about the effects of regulation on the supply of quarried materials, competition issues are peripheral to those problems).

[15] Although the Commission previously identified competition in the market for working capital as a potential source of increased construction costs, a recent study commissioned by the Australian Constructors Association has disabused the Commission of this notion (DAE 2014a). The study reported that financing costs constituted less than one per cent of the total cost of five major types of public infrastructure projects (roads, railways, ports, water supply and sewerage and energy).

Competition and subcontractors

Several submissions have commented on the actions of the major contractors in their dealings with subcontractors. McLeod Rail argued that there exists a tendency of major contractors to 'screw the subbies' (sub. 49, p. 4). Independent Contractors Australia agreed, arguing that:

> … the head contractor's profit is enhanced by pushing down the prices paid to the 2nd and 3rd tier contractors and forcing the subcontractors to wear risk and carry losses. (sub. 100, p. 8)

Few doubt that the market for the services of subcontractors can be fierce or that major contractors will often seek the lowest price possible for the services they need.[16] As in other markets, competition among subcontractors to supply higher tier businesses or other clients is a key to constraining costs and prices.

However, there is no requirement for a subcontractor to supply their expertise at any price. In the event that a subcontractor accepts a job quoted below the cost of their materials, labour and equipment, and a margin to cover the risks entailed, they would make a loss. And while there may be some circumstances in which subcontractors price below the cost of a project in order to develop a relationship with a head contractor, such a position is not sustainable over the longer term. Indeed, were subcontractors to only ever be offered 'below cost' rates, the supply of subcontractors would be expected to fall, which in turn should see heightened competition (and higher rates offered) for the services of those remaining.

Thus, while competition among subcontractors in the infrastructure construction market can no doubt be fierce, that of itself does not warrant a specific policy response.

Policy concerns may arise if there are 'sweet-heart' deals between some unions and head contractors which embed 'jump-up' clauses and generous wages and conditions to secure industrial harmony. There may also be agreement to discourage the use of subcontractors that employ non-union members from working on a project. While such agreements would increase the cost of the project to the head contractor, the suggestion is that these costs can be readily passed on. Indeed, the

[16] A caveat is that higher tier contractors obtain benefits from maintaining good relationships, particularly with key subcontractors, and avoiding a situation in which a sub-contractor fails during a project or refuses to supply their services on subsequent projects. In this respect, McLeod Rail argued that, because of the current model of 'adversarial contracting', they '… do not really enjoy working for major Tier 1 contractors. We would far prefer to work for Tier 2 and smaller contractors, and for rail operators who value our service and the relationship they have with us' (sub. 49, p. 4). McLeod Rail also stated that when confronted with a situation in which they were under-paid for a job, they 'are unlikely to work for that contractor again'.

agreements may provide the contractors with a point of competitive advantage over rivals, as government clients put a high store on the ability of contractors to provide industrial harmony when assessing tender bids. This is an element of risk aversion by the government procurer, perhaps transferring risks at 'any price'. This is discussed further in chapter 13.

11.6 Concluding comments

Data on market shares suggests that there is a high degree of concentration in the Australian infrastructure construction market. Although different measures yield varying estimates, the Leighton Holdings and Lend Lease Group companies together appear to command a substantial share of the market. Assuming that these two groups do coordinate the tendering activities of the various companies, brands and divisions in their stables, this would satisfy a key precondition for the groups to exhibit at least a degree of market power.

However, there are several factors that may restrict the ability of constructors to use any market power they possess. Based on the high level analysis in this chapter, the infrastructure construction market appears to have few substantial barriers to entry and is, by and large, contestable — as substantiated by the increasing entry of foreign companies into the market in recent years. There is also a high level of concentration among buyers of public infrastructure — typically governments — which may offer some scope for them to exercise countervailing power. The ACCC, in its investigations, has not found cause to restrict the mergers or acquisitions undertaken over recent years by Leighton Holdings and Lend Lease Group, or to take legal action against them for competition purposes.

While some important uncertainties remain, including market segmentation and the relationship between unions and the major constructors, it is not clear that the current structure of the market inhibits competition in a way that significantly increases infrastructure costs. Moreover, by promoting the threat of competition or sharpening the countervailing power of government — characteristics of the current market structure — procurers can help to ensure that prices remain reasonably contained and that any above-normal profits, should they appear, occur only temporarily.

12 Government procurement

Key points

- Government clients use a range of different contracts and tendering processes to procure public infrastructure based on the complexity and risk of individual projects. These processes seek to minimise the transaction costs imposed on bidders.
- Nonetheless, bid costs remain high by international standards, primarily driven by the design requirements — reported to account for around 50 per cent of the total bid costs.
- While there is disagreement over the level of upfront design needed for infrastructure projects, some reforms could help reduce bid costs. Improvements should be nationally consistent to assist further in reducing bid costs and achieving best value-for-money outcomes.
  - Governments should invest more in the initial concept design, but in doing so, provide opportunities for tenderers to contest the key standards of the design.
    - However, probity structures need to become sufficiently flexible to ensure adequate consultation can occur so that standards are contestable.
  - Governments should look at contributing to bid costs in return for ownership of the design, allowing them to 'cherry-pick' innovative ideas from unsuccessful tenderers whilst providing a return for innovative ideas.
- Other avenues to lower bid costs also exist.
  - Supporting documentation should remain a condition of the tender but only be required to be submitted by the preferred tenderer.
  - Local content rules, while not binding or altering final costs, add to bid costs and may risk the selection of the best value-for-money bidder. The objectives that underpin them are also questionable. These rules should be abolished.
  - Government clients already seek feedback on ways to improve their tendering arrangements, but scope exists for its more systematic use.
- Government clients are already examining ways to ensure the selection process identifies the best value for money provider, but further scope exists.
  - The scoring of Expressions of Interest should focus on expertise and not overly on *local* experience to ensure lower cost international suppliers are not ruled out.
  - To provide for better costing and the identification of least 'whole of life' costs, governments should provide concept designs in a Building Information Modelling format when the project is of sufficient complexity.
- Evidence on cost overruns suggests that the project scoping and delivery practices used in the development and procurement of infrastructure projects, including the skill base of public procurers, can be improved to reduce infrastructure costs.

The way in which government clients procure Australia's public infrastructure can play an important role in determining its costs. What is done prior to the approach to market, the type of contracts let and consequent risk allocation between parties, along with the ability of governments to subsequently manage the project are all critical ingredients of the story.

Contracts for public infrastructure projects are typically awarded through competitive tendering processes in which the price along with indicators of capability, quality, reliability and other facets of the services offered by different construction companies are weighed and compared. These processes are varied and depend on the project's complexity and risks involved (section 12.1).

Procurement practices have the potential to determine not only the transaction costs involved in agreeing to what will be built and at what cost (the 'bid costs'), but also, perhaps more importantly from the taxpayers perspective, the turnout cost of the project. The cost of the bidding process and the processes used to determine the turnout cost of an infrastructure project is the focus of this chapter. The level of these costs will rest on whether procurement processes:

- are unnecessarily costly (increasing transactions costs) (section 12.2)
- elicit the best value for money bids from private sector constructors (section 12.3)
- provide incentives for cost minimisation throughout the construction phase of which government procurers have the necessary skills to operationalize (section 12.4).

12.1 Tendering and contracting arrangements used for major infrastructure projects

The tendering and contracting arrangements used to procure infrastructure projects vary throughout Australia. Often major infrastructure projects are broken into a number of different 'packages' that represent different parts of the overall project. The breaking up of major projects considers the:

- availability of design resources (internal and external)
- need for specific expertise on critical design elements (such as signalling in railways)
- timeframe for the project (for example early site works, if separable from the construction, may be required to expedite the build and can be separately tendered)

- capacity of the market (number of potential tenders in the market, their size and ability to take on project risks, and their specific expertise) (GPSC3 2012, p. 37).

Packaging of projects is generally done to ensure competitive pressure exists during the tendering process and is discussed in greater detail in chapter 11.

Once project packages are chosen, the contracting strategy (which includes both the contract type employed and the tendering process used to obtain bids) defines how each package is to be delivered. There are numerous contract types employed by Australian governments. While contract types can blur between categories, typical options include:

- construct only
- design and construct options that are characterised by an integrated approach to design and include a range of contract types that may be implemented under 'guaranteed maximum price' arrangements, including:[17]
  - design development and construct
  - design, novate and construct
  - design and construct
  - design, construct and maintain
- alliance contracts
- managing contractor arrangements.

The interaction of packaging and contract types means that a number of different market participants can be involved in any one project, each bearing different responsibilities and risks. For example, the Epping to Chatswood Rail Link in Sydney included 12 work packages and 6 different contract types (GPSC3 2012, p. 38).

The four broad contracting types, and their associated tendering arrangements, are discussed briefly in the following sections. In this chapter arrangements that underpin public-private partnership (PPP) contracts or those relating to unsolicited bids (appendix J) are not explicitly discussed as the critical financing and equity elements are discussed in chapter 6. Despite this, once such arrangements are in

[17] Guaranteed maximum price arrangements are designed to limit changes to the contract price or completion date by specifying a maximum price and completion date. The contractor bears the risks of any ambiguities in the tender documents by allowing no claims for variations from such ambiguities. Further, no cost adjustment for inflation is provided and extensions for time delays limited (for example by disallowing claims for bad weather or industrial disputes).

place the constructor is usually engaged to build the infrastructure asset under one of the four broad contracting methods discussed here.

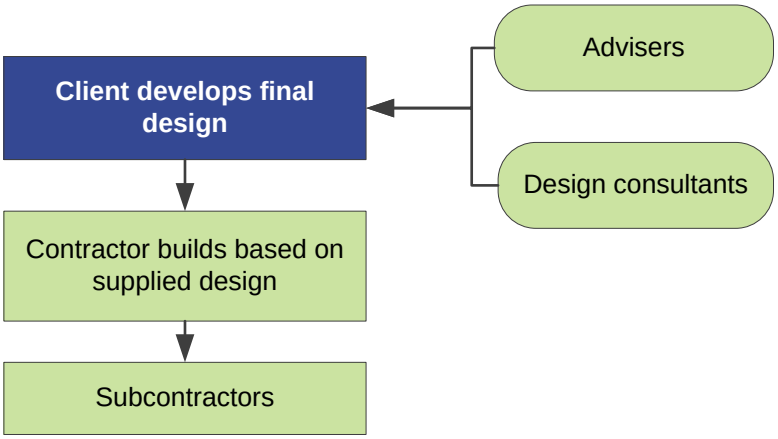
Each Australian jurisdiction has specific guidance on the use of each contracting arrangement (see appendix F for more details). This guidance material sets out the advantages and disadvantages of the approaches to better inform agencies of the tradeoffs between the risk allocation among parties and costs.

Construct only contracting arrangements

Construct only contracts (figure 12.1) are issued where the agency undertaking the work has completed most of the design work (this is often done by or in conjunction with consultants engaged by the agency but who do not form part of the constructor's team). The contractor is usually required to have some input into the design to ensure that it is buildable.

In these contracts, risks associated with design faults are usually borne by the client (such as omissions and errors associated with the tender documentation that set out the majority of the design elements).[18] The client is typically responsible for the costs associated with variations in its requirements as well as the costs associated with latent conditions (unforseen issues in site conditions that would not be expected to be discovered upfront by the client).

Figure 12.1 **Management approach under construct only contracts**



Source: Adapted from ProcurePoint (2008).

[18] Contract conditions may seek to limit the exposure of a client to such errors through developing a schedule of importance in the contract documentation on which a contract price is agreed. This develops a hierarchy of contract documentation, and if an item is omitted from a lower order documents but specified in a higher order document, any rework due to the omission is the responsibility of the contractor.

Design and construct arrangements

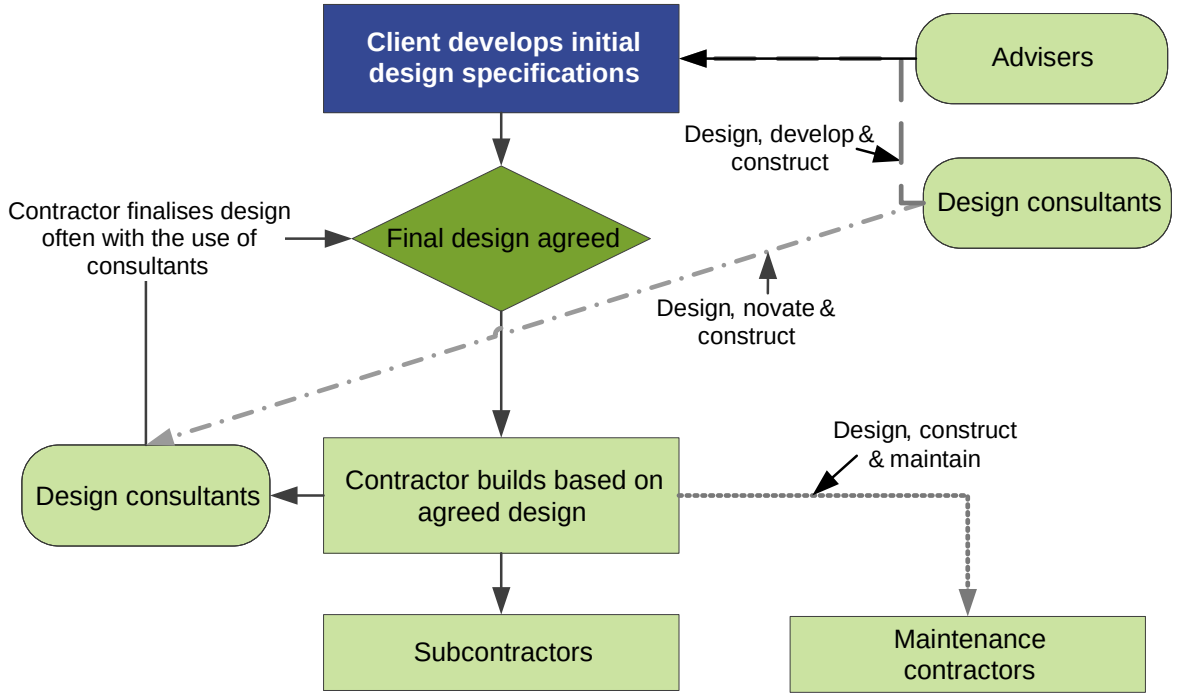
Design and construct contracts (figure 12.2) typically take the form of the client providing a project brief, which specifies performance and quality requirement and may include a concept design. The contractor then engages its own designers to finalise the design. Potential contractors bid on the innovative nature of their finalised design and a lump sum construction price.

Design and construct contracts have several variants:

- design development and construct — where the client provides a more detailed preliminary design that is further developed by the contractor
- design, novate and construct — where the client has the option to appoint designers to complete the design who are not part of the successful tenderer's design team
- design, construct and maintain — includes addition maintenance requirements for a set number of years.

Typically clients do not bear the risks of any variation due to error or omissions in the agreed final design, but do face the full costs of any directed variation. Further, the risk of latent conditions is generally allocated to the contractor.

Figure 12.2 **Management approach under design and construct contracts**



Source: Adapted from ProcurePoint (2008).

The completeness of the design by government clients (and therefore the input requirements placed on tenderers) varies from project to project. Design input from the client can range from little more than the site plan to a document of several hundred pages that sets out the precise specifications (Miller et al. 2009). In many instances, the level of design completed by clients is related to their expertise. For clients with specific knowledge of the idiosyncrasies in their sector, such as airport owners, upfront design levels may be significant (for example, the Commission was informed during consultations that most of the design work for Melbourne Airport's terminal upgrade was completed by the client given their knowledge of required passenger flows and existing building conditions).

Design and construct contracts are the most prevalent type of contract used by both government and private clients. A recent example is the Clem Jones Tunnel in Queensland. Under this arrangement the Queensland Government entered into a PPP with a private sector consortium, following which the special purpose vehicle created by the PPP used a design and construct contract to engage the constructor.

Alliance contracting

An alliance contract (figure 12.3) essentially turns a project into a joint venture. This contract type is often termed a 'relationship contract'. Under an alliance model, two or more entities agree to undertake the work cooperatively, making decisions jointly using intensive relationship facilitation. During tendering processes where alliancing is used, key personnel are often required to go through several workshops and role playing exercises to test how well different groups work together as these factors become extremely important to the successful operation of the contract. For this reason, alliance partners are often selected early in the process on non-price considerations.

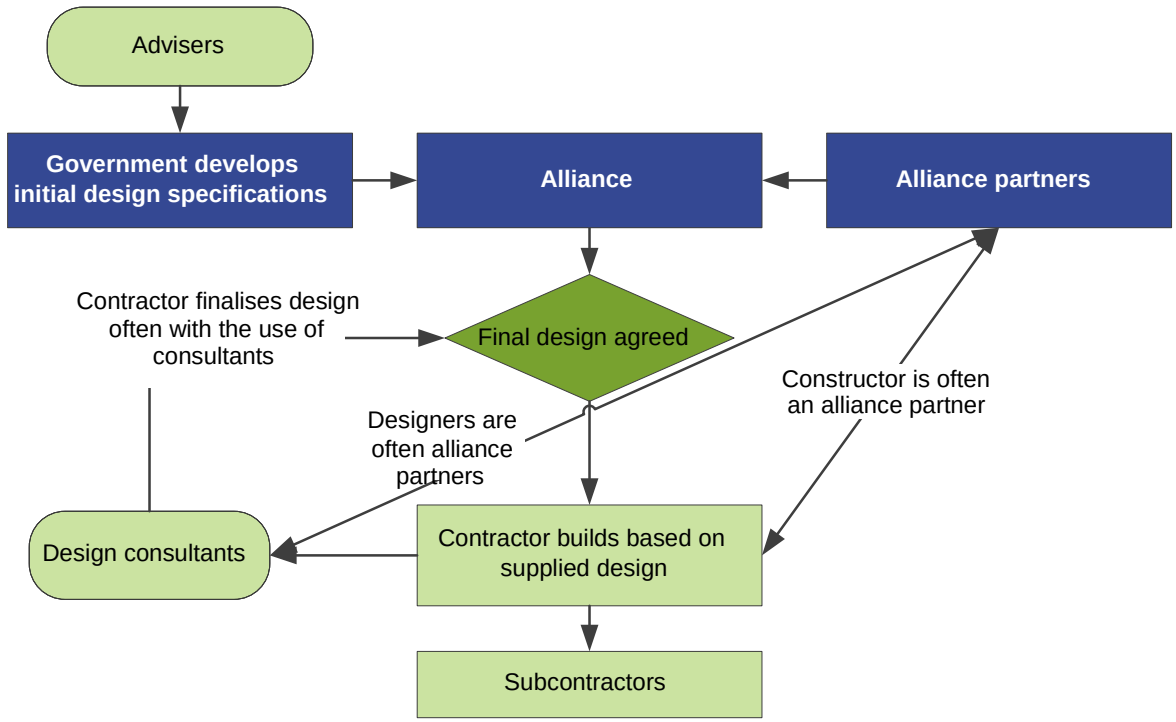
Project risks, particularly in areas where there are significant uncertainties, are often shared along with any rewards from completing the project early or under budget.

Alliance partners typically include the client, designers, consultants, management service providers, suppliers and the construction contractors. However, not all parties involved in the project need to be alliance partners, and instead can be engaged through more conventional contracting arrangements.

Alliances are often considered to be of greatest value where the purchaser government or agency has had limited experience with the risks for the project (for example, in some rail sectors and desalination plants where the infrastructure building is not routine). A recent example of an alliance contract was Victoria's South Morang Rail Extension, which incorporated the constructors, the government

and the existing infrastructure operator whose activities were to be affected by the project.

Figure 12.3 **Management approach under alliance contracts**



Source: Adapted from ProcurePoint (2008).

However, a recent study by the Victorian Department of Treasury and Finance (2009) suggested that overall, alliance contracts had increased both the risks taken on by clients and the contract cost compared with more traditional contracting methods (Victorian Government, sub. 81). In response, an Inter-Jurisdictional Alliancing Steering Committee published the National Alliance Contracting Policy and Guidelines in July 2011 that has resulted in a waning in enthusiasm for the model (Victorian Government, sub. 81). Some governments have also begun to shift away from alliance contracting arrangements as they feel compromised in being able to give directions to constructors. But some in the industry see the shift away from alliancing as a step backwards (Lean Construction Institute of Australia, sub. 103) and expect it to lead to more adversarial client-contractor relationships, resulting in more costly and less timely infrastructure delivery (Menno Henneveld Consulting, sub. 62).

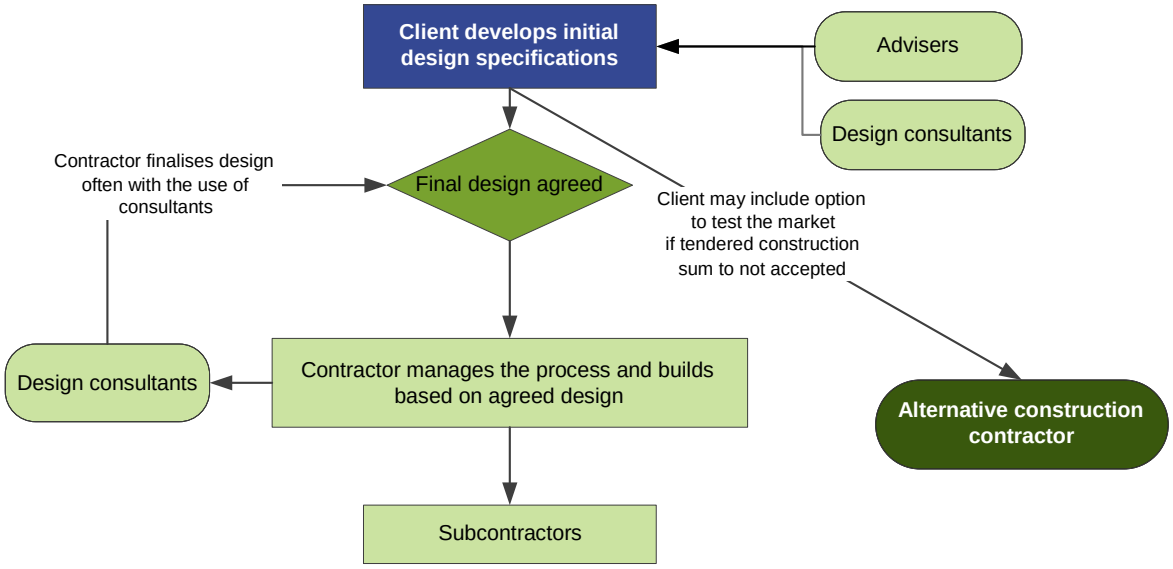
It is still the case, however, that if neither party can convincingly price one or more of the project's risks, and neither is willing to absorb responsibility without compensation, then alliance contracting is potentially the only feasible pathway to complete the project. In this context, it should be noted that the option to abandon

the project, depending on the scope of the risks to be taken on and their potential costs, may be preferable and should always remain open. An example of alliance contracting arrangements where pricing risks proved difficult was the contracts let for the dredging of the Port Phillip Channels in Victoria.

Managing contractor arrangements

Under a managing contractor arrangement (figure 12.4), the contractor will undertake a significant part of the project management role usually undertaken by the client. This may involve the contractor obtaining development approvals, undertaking onsite investigations and any required stakeholder engagement. The contractor will also finalise the design and develop the program for construction, commissioning and maintenance.

Figure 12.4 **Management approach under managing contractor arrangements**



Source: Adapted from ProcurePoint (2008).

Successful contractors are selected on the basis of a tendered management fee and an assessment of their past management performance. The tender document will also set out the target construction cost for the project.

The contractor is usually paid for the actual costs incurred by the consultants and service providers used in developing the program of work under an 'open book' arrangement plus the tendered management fee.[19]

There are usually a number of additional requirements in place to ensure competitive pressures are maintained during the various phases of the contract. The contractor is required to assess the build cost of the project and submit a guaranteed construction sum (GCS) for agreement or to confirm it can be built within the target construction cost range. Many managing contractor contracts will include an option for the client to test the market at this stage on the basis of completed designs or if the client elects not to select the GCS.

If the GCS is accepted, the contractor will complete the works and generally take on any design risks as with design and construct contracts. Clients are responsible for costs of any directed variations.

Under the open book arrangements, the contractor is paid the actual costs of materials used during the construction, subcontracts and consultancy fees plus its management fee. Contractors are usually given the incentive to manage the costs of a project and are entitled to a share of cost savings (based on the GCS), usually around 50 per cent.

Managing contractor arrangements often also include a number of other incentive arrangements. Aspects such as time savings and the achievement of disruption targets can also be included. Indeed, these contract types are generally selected on the basis of being able to include such incentive payments.

Managing contractor (and alliance) arrangements are likely to be beneficial where bids under traditional forms of delivery are likely to include allowances for very low probability risks (in essence, traditional contracting will provide for 'too much' insurance against risks being purchased); or which cannot be priced by either party.

An example of a managing contractor procurement model was the recently delivered Fiona Stanley Hospital in Western Australia. Despite being subject to significant changes in scope prior to the engagement of the contractor Brookfield Multiplex (which increased costs substantially), the project was delivered on time and on budget (Office of the Auditor-General Western Australia 2012).

[19] An open book arrangement is where the contractor provides all raw material and other cost information to the client.

Early contractor involvement

The early contractor involvement model is a blend of the managing contractor and design and construct procurement models. Under early contractor involvement, a contractor is brought in early to work with the client in the initial scoping stages of a project. The contractor works with the client to develop design and cost models for the project. This has the advantage of allowing the client and contractor to better allocate project risks and ensure the 'buildability' of initial designs (Department of Infrastructure and Transport 2012a).

Like managing contractor arrangements, the contractor would typically be required to submit a bid on the risk profile of the project that the client could accept or instead go to market under a more traditional design and construct arrangement.

The tendering process — from pre-qualification to successful tenderer

Tendering processes should be designed with bid costs in mind. When greater input is required from the contractor, such as under design and construct arrangements, the tendering process seeks to limit the number of potential bidders prior to the identification of the potential construction costs. Where bid costs are likely to be lower, such as under construct only arrangements, governments are more likely to use 'open tender' arrangements and encourage as many constructors as possible to submit bids on the full construction cost of a project.

Prior to the start of the tendering process beginning, pre-qualification systems are in place in a number of infrastructure sectors (for example, much of the work for roads is tendered directly to pre-qualified businesses). Governments have established pre-qualification systems to limit the ability to tender to only those businesses that have been assessed as being capable to complete the specific type and value of work that is being sought. This is done in order to reduce tender costs for all parties. However, for most major 'bespoke' infrastructure projects, pre-qualification systems are not used.

The pre-qualification process assesses whether a contractor can viably deliver projects of a certain type and size. Assessments are generally made on the past record of a business along with their financial and technical capabilities. In some instances, pre-qualification schemes encourage contractors to commit to continuous improvement practices (ProcurePoint 2013). Pre-qualification is generally awarded within different project size scales.

The pre-qualification system is most advanced in the roads sector (possibly due to the greater reliance on construct only contracts and the large volume of individual

projects). In this sector, a national system exists — the Austroads National Prequalification System (Austroads 2013). This scheme is administered by each State and Territory Government but is done so under an agreed set of pre-qualification limits and allows for mutual recognition between state-based systems (see box 11.3 for more detail). In other sectors pre-qualification is generally utilised on a state-by-state basis.

Some jurisdictions have sought to centralise pre-qualification in order to limit duplication between different client departments within the one jurisdiction. Victoria, for example is in the process of centralising pre-qualification for all building and construction:

> Victoria is centralising its whole of government pre-qualification scheme for building and construction industry consultants and contractors (the Construction Supplier Register) within the Department of Treasury and Finance. This will enable streamlined assessment and auditing of contractors for pre-qualification and for compliance with the Guidelines on projects. (Victorian Government sub. 81, p. 36)

Noting that for particular projects, tendering arrangements are likely to vary given specific characteristics of the construction job, the 'typical' tendering process for construct only and contracts requiring design inputs (representative of design and construct, alliance and managing contractor arrangements) is discussed below.

Tendering on construct only contracts

Tender processes for construct only contracts often make use of pre-qualification systems. In these instances, governments will tender directly using 'request for tender' documentation that sets out the design of the project. The requests for tenders are limited in the sense that only those with the relevant pre-qualification can submit a bid.

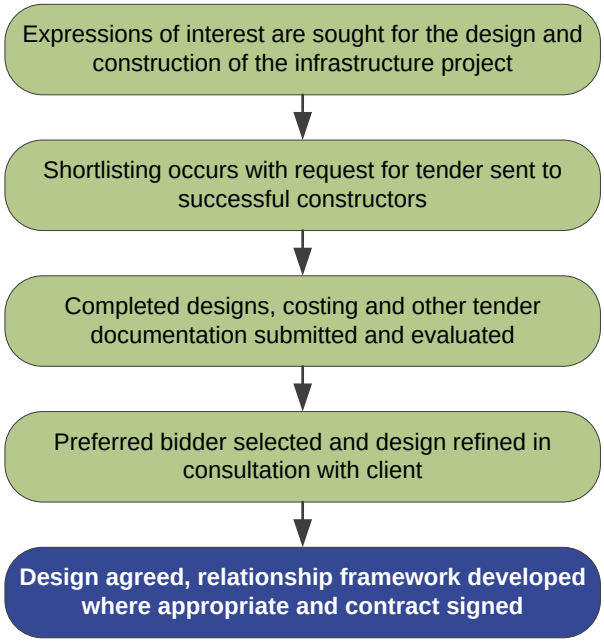
Under these arrangements, there are limited requirements placed on contractors with respect to design input apart from the necessary due diligence to ensure the project is buildable and will comply with building and planning regulations. These requirements, however, may turn out to be significant if the design provided by a government client is poorly developed.

Tendering on contracts requiring significant design input

Tendering on design and construct contracts, including alliance contracts, requires more input into the process from both the client and tenderer. A stylised representation of a typical tender process under these arrangements is depicted in figure 12.5.

If pre-qualification is not used (or in some instances, even if pre-qualification is part of the process), an Expression of Interest (EOI) is first sought from market participants prior to the request for tender. The EOI stage is used to limit the number of tenderers who submit possible designs. This limits both duplication in design effort along with the burden placed on clients in assessing a large volume of proposed designs. It also reduces the workload on tenderers who do not make it to the request for tender stage and who would otherwise be required to submit a full tender in order to express an interest in building the project.

Figure 12.5 **A stylised tendering process where design input is required**



The EOI process typically requires tenderers to submit a range of information and plans relating to past performance, workplace management issues and initial approach to the build.

Tenderers are then shortlisted based on the non-price elements outlined in the EOI. The shortlisted businesses are then sent a request for tender that sets out what the client is seeking — generally a potential design, the build cost and any supporting documentation.

Under alliance contracting arrangements, the request for tender stage would also require tenderers to undergo a number of other assessments that are used to examine how well the client and potential partners will work together. These assessments are used to determine the potential effectiveness of the intensive relationships framework that underpins the alliance contract.

Tenderers have a set timeframe in which to submit their response to the request for tender. Once this material is assessed, a preferred tenderer is selected. The preferred tenderer's design is then further developed in consultation with the client. Once this (and the relationship framework under an alliance contract) has been agreed, contracts are signed.

12.2 Are government tendering arrangements too onerous?

The process and associated costs of the tendering arrangements used by government clients in the procurement of public infrastructure are frequently raised as a concern for industry. For example, Lend Lease submitted:

> Excessive tender deliverables sought within tight timeframe and then post tender further/additional information and clarifications requested that requires extensive resource commitment. The cost imposition to the industry is considerable given that all tenderers are taken on the journey over a prolonged period and that in a field of three tenders, two sets of costs are sunk. (sub. 46, p. 39)

Similar sentiments were also expressed by Ai Group:

> The excessive requirements placed on construction companies by government for public infrastructure projects have long been a burden on business and lead to unnecessary costs. (sub. 47, p. 24)

It is argued that such costs can inflate the costs of infrastructure provision and potentially limit the number of participants in any tender process as firms have to risk a substantial investment in the design of projects they may never build. In this section, the main sources of costs associated with tendering (the 'compliance costs') and some potential areas of improvement are discussed. In effect bid costs are a transaction cost — they create a wedge between what the client (government pays) and what the contractor receives. Ideally this transaction cost should be at the minimum efficient level otherwise some gains from trade will be lost. Further, as individual contractors do not win all tenders, some of the costs imposed during the tendering process for both successful and unsuccessful bids could be recouped in higher costs for the projects they subsequently do win.

What are the major costs in the tendering process?

Most industry participants have noted that tendering costs in Australia are relatively high. For example, Wal King the former CEO of Leighton Holdings stated:

> Procurement is very expensive with huge costs of tendering. For example, a project like EastLink in Melbourne would cost a consortium some $20 million to bid. Airport Link is costing about $30 million per bid. (King 2007, p. 3)

Other evidence supports this view. Although dated, a 2006 survey conducted by Blake Dawson Waldron Lawyers for the Australian Constructors Association suggested that bid costs were rising and accounting for a more significant share of the total project cost:

> Overall, one third of respondents note that their bid costs are less than 1% of the project value. However, 10% of respondents estimate their bid costs at between 3% to 5% of the overall project works. Of considerable concern, 18% of those involved in projects valued at over $500 million place their bid costs at between 3% to 5% of the project value. In terms of hard currency, this represents a significant cash investment by each bidder, in the order of between $15 to $25 million, simply for the chance of winning a project. (2006, pp. 17–18)

Ernst & Young (2011) found similar bid costs of between 3 and 5 per cent of project value for road and rail projects in 2011.

Tendering costs in Australia are also reportedly high by international standards. The Infrastructure Finance Working Group suggested that:

> Bid costs in Australia have been found to be between 25 to 45 per cent higher than in Canada, which is considered a comparable overseas market. One of the main reasons for this is differences in information requirements. Procurement processes require fully costed solutions supported by detailed information on design, construction, maintenance and financing. (2012, p. 23)

Similarly, Austrade reported that feedback from international firms attempting to gain work in Australia is that bidding costs are significantly higher than elsewhere:

> Without exception, international constructors advise Austrade that tendering in Australia is expensive with a number of these constructors claiming Australia is the most expensive jurisdiction to tender in globally. Austrade has been advised by those same companies that this is in part (but far from fully) explained by the relatively large size of Australian contracts awarded.
>
> For example, a European company (with operations in over 20 countries and that is undertaking work in Australia currently) advised Austrade in 2013 that Australian bid costs are double the second most expensive country they operate in. (sub. 74, p. 13)

However, Lend Lease has stated that there are significant similarities between the *processes* used in Australia and those used overseas:

> There are a lot of similarities in the overall procurement process with those overseas however the biggest difference impacting the outcomes is the size (and consistency) of the pipeline in Australia e.g. comparing to somewhere like the UK. (sub. 46, p. 39)

In Australia, the major component of bid costs relates to project design.[20]

The Commission was told that design costs alone comprise around 50 per cent of the total tender costs. During the resources construction boom, given the competition for scarce resources, design costs increased significantly, further inflating bidding costs. However, the recent slowing of resources investment activities (see chapter 9) has seen some of these pressures begin to dissipate which has the potential to reduce future bidding costs.

The remainder of the bidding costs are made up of both the on-costs of the constructor's staff involvement in the process and the costs associated with preparing and submitting other documentation. For a contractor that has been sent a request for tender, this other documentation includes plans relating to:

- workplace relations management
- health and safety management
- schedule of compliance with various state or national codes of practice
- industry participation plans (Vic DTF 2013c).

Other plans are also often required, and include:

- project management plan
- construction plan
- community engagement plan
- enterprise training plan
- environmental plan
- earthworks plan
- Indigenous participation plan
- traffic management and safety plan (McCloy, B., Principal Evans & Peck, pers. comm., 20 January 2014).

These documents are required by governments to ensure that the contract will be executed as per their wishes. They are often project specific and are required to be updated for each bid. Government clients are not unique in this respect. Some private clients are also interested in additional plans (beyond design and those

[20] Design costs also represent a significant component of total project costs. For rail and road projects, work commissioned by the Australasian Railway Association found that under design and construct contracts design costs represent 4-9 per cent of rail project turnout costs and between 5-8 per cent of road project turnout costs (sub. DR178, p. 20).

required on regulatory grounds), particularly those relating to past safety, workplace relations and environmental management performance. For both public and private sector clients, good safety performance is important.

Good industrial relations management skills are also important in ensuring a build runs on time, even if the risks and costs of industrial disputes are transferred to the constructor in the contract. This risk can also be hard to contract-out. The client (or its agent) will always be exposed to calls to intervene (by project proponents if not the contractors themselves) should industrial harmony breakdown.

This suggests that there are some areas where the client will need to retain significant awareness of the contractor's risk management approaches regardless of the black letter of the contract and indicates its importance to the selection of a preferred tenderer.

The Commonwealth Department of Infrastructure and Regional Development found that the overall information requirements add significantly to bid costs:

> Industry has indicated a view that tendering for public infrastructure works has a high cost, particularly due to the depth of information required at the Expressions of Interest phase, whilst also indicating that there is a lack of appropriate lead time into the bidding process. (sub. 64, p. 23)

This additional material has been claimed by many industry participants to be unnecessary for constructors to cost the project and has the potential to detract from the process of selecting the best value for money bid:

> With the prequalification of tenderers through the panel process, the focus of the tender should be on attaining the best value for money and innovative Design and Construct proposals from the prequalified field. (McCloy, B., Principal Evans & Peck, pers. comm., 20 January 2014)

Similar claims were put to Austrade by the international firms it has had dealings with (sub. 74, p. 14).

Further, these plans are often also required for pre-qualification purposes, raising concerns over the duplication of material. There also appears to be no consideration given to whether similar plans had been submitted during earlier tender processes.

How could tendering costs be reduced?

Design costs are a major factor explaining high bid costs in Australia. However, there is generally disagreement as to whether design requirements placed on tenderers should be reduced or increased, with industry putting forward both that

greater design input would be beneficial and that greater design specification could help contain costs. For example, Lend Lease stated:

> Lend Lease suggests that legislative frameworks governing procurement be opened up to encourage the selection of members of project teams before the scope of design is settled … (sub. 46, p. 38)

Current arrangements, Lend Lease argued, reduced the scope for design innovation:

> The rigidity (and well defined nature) of the process requires sufficient detail to be developed by the client so that suppliers are always meeting the scope of the project. This stifles innovation and assumes that the client has developed an optimal starting point in terms of project brief and design … (sub. 46, p. 39)

Counter to this, Salini Australia stated:

> … projects are poorly developed by government agencies prior to tender. It is worldwide practice that most of the design is developed by the Employer prior to tender, leaving verification and assessment of possible improvement to the tender stage, which is far less expensive for the bidders. … The number, detail and quality of the design required to be submitted with the tender exceeds what would ordinarily be produced by the Contractor to support a Design and Construct Lump Sum proposal. (sub. 1, p. 5)

As reported by Austrade, Salini's position was supported by other international construction companies:

> Austrade notes that some of the lodged submissions to the Productivity Commission advise high tender costs are exacerbated by poorly developed projects by government agencies prior to tender. This view is supported by a number of international players including by senior executive of a North American company who advised Austrade in 2012 that there is a preference by project directors in Australia to push design onto each bidding consortium. In their view a more cost effective option is to provide a base set of designs and ask consortiums to bid on these and/or make suggested improvements to the design rather than transfer a significant share of the initial design risk onto bidders. The current approach, in their view, elevated design costs in Australian tender processes. (sub. 74, p. 14)

Better developed designs also provide for more accurate project costing and reduce the risks of rework being necessary when errors in the design are found (a risk generally borne by the constructor and thus priced into the bid).

Some solutions to this impasse appear to exist and include:

- greater levels of initial design and contestable specifications, including active consideration by government clients prior to going to market of whether the project offers scope for innovation or whether there is a preference for certainty
- contributions by government to the design costs of tenderers

- changes to the timing of tender information provision
- reducing the information requirements.

Initial levels of design on which tenders are based

Several reviews have examined whether governments should complete more of the design work upfront prior to tender. Despite this, opinions of stakeholders remain divided.

Opponents of greater levels of upfront design argue that in doing so, governments can unintentionally limit innovation and inflate costs if they get initial design specification wrong (Lend Lease, sub. 46, for example). Some argue that less design work should be completed prior to tendering. Even though this would impose greater costs on industry, it might provide a greater scope for overall lower costs in construction and maintenance.

On the other side, greater levels of upfront design can improve decision making. If governments were to go to tender with less detailed designs there will be greater uncertainties over the benefits and costs of the project. With governments increasingly procuring infrastructure that is of a higher 'quality' than in the past — designed to have greater public amenity (or minimise the impact it has on amenity) and for dual use (such as incorporating bus or bike lanes on new roads) — there is a greater uncertainty over potential benefits and heightened need to assess such factors when developing the business case for any new infrastructure investment. Ideally, marginal quality improvements should be assessed against the additional costs incurred. This would necessitate greater levels of design prior to tender.

However, innovation and improved information for decision making need not be inconsistent. Governments should consider whether or not a specific project offers scope for design innovation. In areas where there are potentially many different design possibilities, seeking greater design input from tenderers is likely to yield greater benefits compared to situations where design possibilities are limited.

In cases where there are a range of design possibilities, tendering process can be altered so they do not limit the ability of tenderers to develop innovative ideas. Tenderers could be invited to challenge the initial design specifications if they believe a cheaper alternative existed that would still satisfy the governments quality objectives (as assessed and determined during the cost-benefit analysis). This would require governments to not only set out their design specifications but also the objectives they are seeking to achieve which underpin them. This issue is discussed further below.

RECOMMENDATION 12.1

All governments should invest more time and resources in the initial concept design specifications to help reduce bid costs, but in doing so, provide opportunities in the tender process for tenderers to contest the specifications of the design.

Ai Group, amongst others, supported greater design input by governments as a means to reduce tendering costs:

> Ai Group continues to support the recommendations we made in 1990 that governments better define the project concept work before putting projects out to tender by engaging and paying a company to perform the design work, rather than requiring tenderers to perform it. This would ensure only those companies that could meet the projects requirements would tender. (sub. 47, p. 24)

If implemented, it is also unlikely that governments would bear *additional* risks associated with design faults (for a given project specification) if traditional risk allocation approaches are maintained — it would still remain the duty of the winning tenderer to ensure the design is buildable and accept any risks associated with rework or redesign should it not meet the agreed specifications. It may also generate some savings as bidders would be better placed to assess the project costs and therefore price project risks, removing any margin necessary to compensate the constructor for the greater uncertainty created by poorly developed designs. Governments would still bear the costs associated with changes to the scope of the project or the risks that their specification is unworkable — a risk that may be reduced if such specification became contestable.

There are other advantages to this approach. In some instances, greater design specifications would also negate the need for shortlisting a limited number of tenderers through an EOI process. Ai Group (sub. 47, p. 24) suggest that shortlisting would automatically occur as only those capable of building such a project would tender for the work. This could help ensure a more competitive bidding process.

Greater levels of design specification could also increase opportunities to use open tender arrangements for major infrastructure projects — arrangements that are commonly used in Europe (Salini Australia, sub. 1). However, such opportunities are likely to be limited by the resources of the client, which for larger projects are unlikely to be large enough to deal with the demands of a large number of shortlisted tenderers (nor would it likely be efficient to devote such resources to expanding the number of bidders in all situations).

However, for this approach to be viable, governments would either need the necessary in-house skills to develop projects, or the resources to purchase such

skills from the market by making use of consultants. The ability of government departments to do this during the decision-making phase has been questioned by a number of inquiry participants (chapter 2).

Implementing greater design by governments is also likely to require some changes to the decision-making process used to select some infrastructure projects. Participants have suggested that timeframes are already too tight and lead to adverse cost outcomes:

> Unrealistic time constraints are the cause of failure in many projects. The adverse consequences of late project commencement and unrealistic project timelines cascade through projects creating a reactive project environment and reducing the time to properly plan, innovate and collaborate. When time is squeezed, people are forced to revert to conservative and historical ways of doing things. Problems become magnified as contractors are forced to do the same down the supply chain. (University of New South Wales, sub. 44, p. 3)

With both better planning and better upfront design, government clients should be more able to set reasonable tendering and project timeframes as they will have a greater understanding of the work required and risks involved. Roads Australia has suggested that such an approach could yield gains:

> In the experience of our private sector members, a far more rigorous approach by government to the preparation, communication and transparency of procurement processes can deliver real and significant cost efficiencies. (sub. 66, p. 4)

Similar sentiments were expressed by Professionals Australia (sub. DR142).

Issues exist around the political nature of the decision making and the timeframes over which it occurs (chapter 2). Sponsoring government departments would need both the necessary time and resources to further develop and assess any infrastructure project.

Contributions to tender costs in return for ownership of designs

Governments seek design input from tenderers to take advantage of the expertise and potential for innovation from experienced private sector constructors and designers. The process provides scope for governments to access a wider pool of expertise than is available in-house (or within budgets) and therefore opens up greater potential for innovative and lower cost designs to be found.

However, as discussed above, requiring design input comes at considerable cost to tenderers. And, as only one tenderer is successful, the process means there is some duplication of effort along with the potential for good design elements to go unused. Even though one bid may represent the lowest cost or generate the greatest net

value and therefore be selected, unsuccessful bids may contain ideas and innovations that could further improve the successful design.

Several participants have suggested a means to overcome this, and to reduce the costs imposed on tenderers, is for governments to contribute to the design costs in return for ownership of the designs. Governments effectively purchase the designs from non-preferred tenderers from which any innovative ideas can be 'cherry picked' and incorporated into the final project design of the preferred bidder.

This approach would have several advantages:

- it may provide stronger incentives for tenderers to put forward innovative designs and identify any errors or omissions present in the initial tender documentation[21]
- if coupled with tender arrangements that allowed tenderers to contest quality-related project specification, a greater number of alternative approaches to achieving a desired outcome may be identified
- it would provide a return on the investment made in bidding on government work and may increase the number of tenderers and thereby increase competition for work.

Government contributing to tendering costs has broad support from a number of industry participants — for example, the Australian Constructors Association (sub. 72), Ai Group (sub. 47) and Lend Lease (sub. 46).

But not all participants agreed that contributions to bid costs should be rendered in turn for ownership of the tendered designs. There has been some concern raised over ownership of intellectual property under such arrangements.

However, these types of tendering arrangements have been used in recent infrastructure projects, which suggest issues surrounding ownership of intellectual property are not insurmountable. Victoria's Linking Melbourne Authority has developed a request for tender for the East-West link project where the Authority has agreed to contribute one-third of the tender costs in return for ownership of the submitted designs (Wiggins 2013). The Australian Contractors Association, however, believed the payments for this project were too low:

[21] During consultations the Commission was told that contractors are often reluctant to make the client aware of errors in the initial design specification discovered in the preparation of bids (including instances where initial site investigations have errors in their results). It was suggested that such disclosure may not be rewarded and instead could be used by the client to modify the design of a competitor's successful bid that did not identify the error.

> While the Victorian Government is to be commended for trialling the reimbursement of some of the external costs of constructors in bidding for large projects, the actual amounts likely to be reimbursed compared to the real cost of bidding are far apart. (sub. 72, p. 16)

A similar approach to that taken for the East-West link in Victoria has also been applied to tenders submitted for the Operations, Trains and Systems contract (the PPP contract) of the North West Rail Link in New South Wales (North West Rail Link 2012b). Contributions are capped at $10 million. The Victorian Government has also used this strategy for the alliance contracts of its Regional Rail Link project (sub. 81, p. 37).

However, it is important that contributions to bid costs do not simply represent a subsidy paid to bidders, nor encourage frivolous bids. Contributions to bid costs need to also provide benefits to the client. Such benefits could be from design innovation or increased competitive tension during the process. If it is unlikely that a project lends itself to the development of innovated ideas that would be beneficial to the client then contributions to bid costs should not be made. It is also important that initial designs and site investigations such as those related to geotechnical engineering (an issue discussed later in relation to risk) are sufficiently developed so that government clients are not paying each tenderer for the same information that would have been more cheaply discovered (or purchased separately) by the client in the first instance.

Given these issues, in terms of implementation, some additional criteria would need to be placed on tenderers in order for them to receive payment. These are needed to prevent frivolous bids and overcome any potential incentives to underbid and seek to re-cost at the preferred bidder stage when the client requests alterations based on the purchased innovations. Further additional upfront work would also be required of the client in order to determine whether contributions to bid costs would also be a net benefit. The additional criteria should include:

- a minimum tender documentation compliance requirement such that only those businesses genuinely competing for the project and allocating appropriate resources would be eligible
- restricting contributions to the design elements of the bid — governments would need transparency of those costs, thereby requiring an open book tender approach
- an understanding by government clients of the potential design costs imposed on tenderers before going to market in order to set an appropriate maximum contribution and to assess the veracity of the costs presented under the open book arrangements.

RECOMMENDATION 12.2

When tendering for major infrastructure work under design and construct arrangements, government clients should consider contributing to the design costs of tenderers on the condition that governments own the design, where a thorough prior assessment has demonstrated that design innovation is both worth seeking and likely to be received.

Fast track to preferred tenderer

Some participants to this inquiry have advocated a 'fast track' to preferred tenderer for the construction contract as a means to contain bid costs. Such a process would seek to select one preferred tenderer quickly prior to the development of any detailed design work for the project. This would eliminate any duplication of work between rival tenderers and ensure that for most projects, only the successful bidder would be required to invest in developing a detailed design (reducing the overall costs of the process).

However, issues with maintaining competitive pressures and in support of a sound level of probity may arise under such an arrangement. Proponents of this approach suggest that as the client still has the right to not accept the final bid from the preferred tenderer, and return to the market, competitive pressure is maintained. But under such a scenario, financial and time costs are imposed on the client in re-issuing the request for tender documentation and the subsequent time involved in eventually selecting a successful tenderer. This suggests that clients may have some reluctance to go back to the market. As a result, some of the competitive pressure under a fast track arrangement may be lost. Further, a lack of competition amongst potential constructors has been suggested to have lasting effects on contract price and the potential for time and cost overruns to occur (Teo et al. 2012) — an issue that is subject to ongoing Australian Research Council funded work (Bridge, sub. DR190).[22] It may also limit any potential design innovation that is provided when multiple businesses are vying for the work. However, an informed client that has done the necessary due diligence on design and possible construction costs is likely to be well placed to assess the tendered costs, thereby making the threat of a return to market credible.

[22] The *Reforming the Procurement of Construction and Financing of Australian Infrastructure: Advancing Capacity, Competition and Investment* project is examining a range of relevant issues including the influence of competition during the tendering process on best value for money outcomes from procurement processes. This work is due to be finalised in June 2014 (Bridge, sub. DR190).

The success or otherwise of such a model will be tested as government clients experiment with the early contractor involvement approach. Further, such a model may lead to benefits in the procurement approach applied to PPPs (discussed in chapter 7). However, where design and construct contracts have been chosen as the preferred procurement model, given the possible limitations of the fast track process and with considerations of possible reductions to the bid design costs from more developed designs and client contributions it is unlikely that such an approach would yield *net* benefits.

The timing of tender information provision

The initial EOI process and request for tender require a number of documents to be submitted beyond those related to project design and costing. Many of these, it is argued by industry, are not required to assess the value for money of the tender proposals and therefore may not be required in the initial stages of the tender.

Instead, much of this information could become a condition of the tender but only be required to be submitted by the preferred tenderer. For example, documentation relating community engagement, training, earthworks, traffic management, and industry participation could be submitted by the preferred tenderer alone.

The delaying of information provision to the preferred tenderer stage would have the advantage of reducing bid costs for all players — a position supported by a number of participants, such as Norton Rose Fullbright (sub. DR134, p. 7). Governments would also maintain the right to select an alternative supplier if the initial preferred tenderer did not satisfy the requirements. However, such an outcome is unlikely as most Tier 1 contractors have significant experience in delivering against the conditions imposed by government contracts (and in many instances would have already submitted such information as part of pre-qualification). Operators would also be unwilling to damage their reputation and chance of success in future tenders by moving to a preferred tenderer stage based on price but being unable to satisfy the remaining contract provisions forcing the client to return to market.

RECOMMENDATION 12.3

Government clients should alter the timing of information provision in the tendering process for infrastructure projects so that non-design management plans are only required of the preferred tenderer. The obligation to produce documents upon becoming a preferred tenderer should remain a condition of the initial request for tender.

Reviews are also important

Seeking feedback on procurement practices has the potential to inform government on areas where improvements can be made. Throughout consultations, the Commission was informed that many government clients sought feedback on the processes used to refine their future approach. For example, Roads and Maritime Service in New South Wales has recently sought to reduce the number of documents required to be submitted during the tender process (McCloy, B., Principal Evans & Peck, pers. comm. 20 January 2014).

Along with seeking feedback on particular procurement processes, there has been significant work done across governments to develop better procurement models. As put by the Australian Government Department of Infrastructure and Regional Development:

> … there is a need for governments to continually review procurement and project management approaches to ensure that they are consistent and robust. Whilst the Commonwealth does not have a major role in direct procurement of transport infrastructure, through the IWG [COAG Infrastructure Working Group], it has led the coordination on a number of policies designed to improve governments' management of projects:
>
> - the publication of National PPP Guidelines and National Alliance Contracting Guidelines, and the support of Traditional Contracting Guidelines (as outlined above);
> - development of Best Practice Cost Estimation for Publically Funded Road and Rail (currently under review); and
> - the publication of Best Practice Case Studies in Infrastructure Planning and Delivery. (sub. 64, p. 27)

Nevertheless, there is scope for reviews of procurement processes to be more systematic, thorough and nationally coordinated so that agencies and jurisdictions can learn from innovations discovered 'over the fence' and over time.

Improved data collection (recommendation 9.2) provides an opportunity to collect information that would allow governments to more systematically review individual procurement processes to see if they can be made more efficient for all parties.

12.3 Do tendering arrangements elicit least cost bids?

It is important that tendering processes both create the right incentives for tenderers to submit least cost bids, and that those managing the process are able to identify

the least cost bid in selecting a contractor. Several aspects of the tendering arrangements can influence both of these, including the:

- attitudes and practices of those assessing bids — will determine which businesses are shortlisted and which are not and may inadvertently rule out a more efficient provider
- use of new technologies — accuracy of costings can be improved through both imposing higher standards on information provision or through the use of new technologies such as Building Information Modelling (BIM) tools
- imposition of project-specific quality standards — will directly affect the cost of building infrastructure and if rigidly applied may limit the scope for innovation and/or the potential for lower cost solutions to be found
- imposition of local content rules — can lock tenderers into certain suppliers, preclude innovation, or impose additional compliance costs
- ability of the process to maintain competitive pressure — moves to reduce the number of tenderers too soon over concerns about bidding costs may inadvertently remove competitive tension from the tender process
- provision of information on risk — the under provision of information on risk (or incorrect information) can inhibit a tenderer's ability to accurately price risks and as an insurance measure may create incentives to 'bid high'.

Attitudes and practices of those assessing bids

The way in which government clients assess EOIs and bids can play an important role in a least cost bid being selected. It can also influence the total costs imposed by the tender process. Some industry participants have argued that there is an inherent conservatism in the assessment of EOIs, resulting in a 'local bias' towards incumbent contractors. As suggested by Salini Australia:

> A bias towards the 'Australian' duopoly in the construction of public infrastructure, despite maintenance of business practices driving up costs and against currently public policy (including enterprise bargaining agreements with unions), ensures a sustained increase in the cost of construction and reduction in the amount of public infrastructure able to be built. (sub. 1, p. 1)

Austrade has reported similar claims:

> … A number of international constructors have made similar claims to Austrade. For example, an Asian domiciled constructor advised Austrade it was confident it could have delivered a previously contracted tunnelling project in Australia for less than half the cost that was tendered by the winning consortium but believe they were not awarded the contract because of lack of a local partner. (sub. 74, p. 18)

Governments are interested in ensuring probity through tender processes and many have established policy documents to help ensure fairness. For example, the Victorian Code of Practice for the Building and Construction Industry requires government clients to evaluate tenders based on predetermined (and published in the tender document) criteria.

> Evaluation criteria must be specified in the tender documents and should include as appropriate:
>
> - financial capacity;
> - organisation capacity;
> - performance capability;
> - resource availability;
> - health and safety management; and
> - price. (Victorian Department of Infrastructure 1999, p. 24)

Through these processes, some governments have sought to overcome any local bias in assessments. This appears to have been successful, with Austrade reporting:

> A number of international constructors have also advised Austrade that they consider there has been positive political will at a federal government level that recognises and values their global capabilities. These same companies advise the challenge though is ensuring this recognition is replicated at a 'Project Assessment Team' level as currently this is not the case and the majority of projects are awarded and run at a state level. (sub. 74, p. 18)

However, there is a risk that if poorly designed, probity rules may create a local bias. This could occur if rules create barriers to new entrants seeking information about ways to navigate the procurement process as a government client may perceive it could be in breach of its probity rules by providing such information.

Governments have previously identified that tender evaluation is an area where performance could be improved. COAG's Infrastructure Working Group, through the Victorian Department of Treasury and Finance reviewed practices surrounding traditional contracting in 2012 (Department of Infrastructure and Transport 2012b). The review did not raise concerns over any selection bias that may occur within government departments when assessing tenders. Instead, recommendations to flow from the review suggested that past contract performance by tenderers be formally considered in any evaluation to align practices by government clients to those in the private sector (Department of Infrastructure and Transport 2012c, 2013).[23]

[23] Appendix F briefly describes the general procurement practices of private sector clients.

Taking into account previous performance of any given contractor in delivering a project as a means to shorten the tender process (and reduce costs) raises several issues.

- Probity — there is a concern that probity may not be maintained through such a process as it limits the opportunity for other market participants to be involved.
- Requires additional information — the government client needs to have good information on past performance of the proposed tenderers. They also need information on the possible build costs of the project they are seeking to deliver to see that the bids are within the expected and reasonable range of costs.

One possible solution to the probity issue is the greater use of codes of practice such as Victoria's Code of Practice for the Building and Construction Industry (Victorian Department of Infrastructure 1999) that set obligations on the businesses that delivery projects on behalf of government clients. Victoria, for example, currently uses such arrangements to aid in the management of industrial relations issues — both the specifics of the code and the issues it seeks to address are discussed in detail in chapter 13. The scope of codes of practice could be extended to place certain probity related obligations on potential suppliers — such as an obligation to not be involved in potentially corrupt activities. In doing so, governments need to ensure that probity requirements are reasonable and do not result in barriers to an effective and efficient tender outcome.

Selecting contractors early based on their previous performance could be trialled under the early contractor involvement procurement models. The contractor selected to be involved early in the process could be chosen on the basis of previous performance in the absence of traditional market testing. As with the early contractor involvement model, a right to return to market if the proposal begins to look too costly could be embedded in the contract. However, for this to be adequately assessed, government clients would need up-to-date information of the likely costs of the project they are seeking to deliver. This would require better data collection as discussed in chapter 9.

RECOMMENDATION 12.4

The 'early contractor involvement model' should be trialled by government clients to test the costs and benefits of applying past contract performance by tenderers as a means of constructor selection, consistent with the practices of some private sector clients.

The assessment of the effectiveness of the trial should ensure that adequate consideration is given to alternative approaches that may yield greater benefits in terms of procuring the best value for money investment at the least cost.

The use of new technologies to improve 'whole of life' project costing

The ability of any tender process to elicit least-cost bids will rest in part on the quality of information provided to (and required of) tenders. For any project, there are both the initial construction costs to consider along with the future and ongoing maintenance costs. Ideally, clients would be procuring the least 'whole of life' cost for any piece of infrastructure (where future costs are discounted to the present to make a reasonable comparison). Further, both clients and constructors would also seek to minimise the costs of any design errors, which require rework or even rebuild activity, in order to minimise delays and costs (design fault risk generally rests with the constructor).

Traditionally, however, it has been difficult to incorporate both construction and ongoing costs into any assessment of a given design for an infrastructure project. Further, traditional design work makes the identification of clashes between various construction components difficult — this is particularly important for infrastructure that requires multiple services to operate within a particular space, as occurs in hospitals and other complex buildings.

This has led to the development of three dimensional models of building design known as building information modelling or BIM. Broadly, BIM has been described as a database that provides digital information about the design, fabrication, construction, project management, logistics, materials and energy consumption of a building (ACG 2010).

Proponents of BIM have suggested it has a number of significant benefits, including:

- improved information sharing
- time and cost savings
- improved quality
- greater transparency in decision making (ACG 2010).

BIM can be applied to various stages of a building's (or piece of infrastructure's) life cycle (appendix E). As such, it can generate benefits beyond the tender process if applied from the initial design stage (Air Conditioning & Mechanical Contractors' Association of Australia, sub. 19; Autodesk Asia, sub. 24; AIIA, sub. 25).

BIM has most potential in complex construction projects. The key feature of BIM is that it provides a platform to explore the structure of objects and their relationship to each other. It also provides a means to incorporate scheduling of activities during

the build phase (termed '4D' BIM) and allow for costing through the inclusion of cost data (termed '5D' BIM).

BIM can allow for any conflicts in various design elements to be discovered prior to them occurring, reducing rework or rebuild costs. It also provides a means for constructors to better schedule their construction activities, helping to find ways to minimise site costs. It has been suggested that between 60 to 90 per cent of project variations are the result of poor design documentation (CRC for Construction Innovation 2007). Further, it has been reported that between 20 to 30 per cent of the construction cost of complex buildings is made up of costs resulting from coordination errors, incorrect materials and labour inefficiencies (generated by poor scheduling of activities) (Brown 2008; Construction Users Roundtable 2004; Autodesk, sub. 24). BIM has been argued to be a tool to reduce these and has been demonstrated to lead to savings in other markets (Centre for Integrated Facility Engineering 2007; appendix E). However, for such benefits to be realised, industry users would require the necessary project management skills to implement the schedules generated — an area where the skill set of principal contractors have been questioned (see Loosemore 2014a).

The information provided by BIM also allows any potential tenderer to put forward more accurate costings for infrastructure projects. With the inclusion of both operations and facilities management and decommissioning into BIM, 'whole-of-life' costs can be considered at the tender stage. This would allow for the least whole-of-life cost tender to be selected, or at least consideration given to any tradeoff between upfront capital costs and potentially lower life costs. These, and a number of other benefits to flow from the use of BIM, were highlighted by a number of participants in their response to the draft report of this inquiry (for example, NICTA, sub. DR121; Autodesk, sub. DR130; buildingSMART Australasia, sub. DR170; and the Australasian Railway Association, sub. DR178; BTI Consulting, sub. DR213; and at hearings).

Given the benefits that can stem from the use of BIM, some government clients have mandated its use for building and infrastructure works. The UK Government has mandated the use of BIM for all projects by 2016 (UK Cabinet Office 2011). To facilitate this, the Government has played a co-ordination role in the development of standards. Singapore has also mandated the use of BIM (Autodesk Asia, sub. 24).

However, given the benefits of BIM can be captured by market participants, there appears little justification for government involvement in the absence of major impediments to its adoption. As with all new technologies, some impediments to adoption exist. In the BIM context, these relate to:

- a lack of BIM object libraries

- a lack model building protocols
- legal and insurance impediments
- a lack of standards for information sharing
- skill gaps
- adoption costs (ACG 2010).

It is expected that these impediments would be overcome by the market if sufficient benefits existed in adopting the new technologies — its use in other markets without a regulatory mandate such as the United States and Hong Kong suggests these are not insurmountable.

But some have argued that the widespread adoption of BIM has been impeded by market failures and therefore a role for government may be warranted (ACG 2010). In particular, it has been suggested that:

- externalities exist — significant benefits accrue to third parties from the development of aspects such as object libraries and building protocols, however, the costs borne by any one firm in the development of these is greater than the income they can capture from any one project
- information asymmetries — firms do not invest in BIM because there is no evidence of the benefits and there is no evidence of the benefits because there is not widespread adoption of BIM (ACG 2010, p. 41).

Given the use of BIM internationally, it is unlikely that significant information asymmetries exist. Further, claims of market failure are questionable given BIM's adoption by many industry participants already (for example, Lend Lease sub. 46) and its use in markets without mandate.

BIM has most potential for complex construction projects that have a number of different design elements. Its usefulness and potential cost savings may be limited in the delivery of smaller less complex infrastructure projects (such as those related to road repair or upgrade). Mandating BIM for all government contracts may therefore impose a number of unnecessary costs on industry and governments.

However, this may not exclude a role for government. To overcome the issue of externalities, there could be scope for government involvement. In the UK, for example, the UK Cabinet Office co-ordinated the development of standards and other protocols relating to legal and insurance matters and contracting with BIM (Building Information Modelling (BIM) Task Group 2014; UK Cabinet Office 2011). Several participants have called on Australian governments to take a similar role (BTI Consulting, sub. DR213).

Governments are a major and repeat client, and would be expected to share in some of the efficiency gains from the adoption of BIM in a competitive market. Therefore, as a client, it is likely to be in their interests to facilitate a more rapid adoption of BIM.

A number of participants suggested that in order for governments, as a client, to gain the most out of the adoption of BIM, they should take a leadership role in the coordination of standards and protocols (Autodesk, sub. DR130; Ridley and Co, sub. DR161; and buildingSMART Australasia, sub. DR170 among others).

Further, some have argued that a continuation of the current ad hoc use of BIM by government clients will lead to varying standards and confusion amongst industry participants and low uptake. As put by buildingSMART Australasia:

> … the inconsistencies in definition and guidelines represents a significant risk and a present, real danger to the successful adoption of BIM across Australia and therefore weakens the potential for enhanced efficiency and diffusion of knowledge across the construction and infrastructure industries. (sub. DR170, p. 3)

In the Commission's view, governments as clients could seek tenders on designs (more advanced than current as discussed above) that are set out in BIM format where a sufficient degree of complexity exists (a notion supported by industry participants such as Lend Lease, sub. 46). To gain the greatest benefits would require governments to be involved in, and lead, the development of any necessary object libraries, building protocols and modifications to contracting arrangements. A collaborative approach to developing a consistent set of these across governments and industry, as has been done in the UK, could assist with this.

Releasing concept designs in BIM format would encourage the rapid adoption of the technology by industry, potentially generating savings in both bid costs and overall construction costs.

RECOMMENDATION 12.5

For complex infrastructure projects, government clients should provide concept designs using Building Information Modelling (BIM) to help lower bid costs, and require tender designs to be submitted using BIM to reduce overall costs. To facilitate the consistent use of BIM by public sector procurers, Australian, State and Territory Governments should:

- ***facilitate the development of a common set of standards and protocols in close consultation with industry, including private sector bodies that undertake similar types of procurement***
- ***include in their procurement guidelines detailed advice to agencies on the efficient use of BIM.***

Project specific standards

Many design requirements, for example those relating to the longevity and user amenity of public infrastructure assets such as, have been increasing over time. Some have referred to the increased stringency in these requirements as 'gold-plating'. However, such a term is misleading as through these requirements governments are essentially purchasing different *quality* infrastructure compared to what they purchased in the past. Irrespective, such design requirements ultimately affect the costs of infrastructure projects. An example provided by the BCA suggests that they are significant:

> Changing design life and user amenity standards in Australia can also increase the cost of delivering major infrastructure projects. For example, it is estimated that the cost of the Brisbane Airport Link tunnels may have been 5−10 per cent less if they were constructed to design and amenity standards which applied 25 years ago.
>
> For a tunnel such as Airport Link, the design life issue can manifest itself in increased requirements for waterproofing, permanent support systems, corrosion protection, fire resistance, flood proofing, material specifications, etc.
>
> User amenity and safety now adds new requirements such as lifts in escape tunnels, smoke ducts, heightened air quality limits, breakdown lanes, security, traffic management and emergency systems including fire controls. The safety systems demanded by the government for Airport Link tunnels are at the extreme top end by world standards. (2013, p. 34)

But such an example ignores any potential benefits from the new requirements and the community's willingness to pay for quality improvements. Governments are not only purchasing a certain type of infrastructure, but also its quality. Ideally, tradeoffs between the cost of quality improvements and the resulting benefits should occur during the decision-making process in the cost-benefit analysis. To do so, development of the business case should incorporate a greater amount of early design work in order for initial costings to be determined (this would also have other advantages in terms of reducing bid costs as discussed above).

There are also other costs associated with greater specification:

> … While detailed specifications hold contractors to a standard and prevent them from innovating in an uncontrolled manner, over-specifying up-front reduces the scope for innovation. Governments and clients should consider the merits of traditional specification-based procurement versus outcomes-based KPIs around client service needs. This could provide more space for constructors to innovate in developing 'best value' solutions which deliver better long-term outcomes for governments, society and the industry. (University of New South Wales, sub. 44, p. 5)

Given both costs and benefits flow from greater specification, one solution to the apparent impasse is to view project specific standards as flexible. Benefits will flow

from improved decision making in initial project scoping (discussed in chapter 2), but other avenues exist during the tendering phase to examine ways to achieve set objectives at lower cost (ultimately varying the standard but achieving the same outcome quality) or provide governments with more information about the cost of their imposed quality standards.

To achieve this, governments could make some design standards contestable during the tender phase.

To do so, they would be required to publish the desired outcomes they are seeking to achieve from the established project-specific standards. This would allow tenderers to seek innovative lower cost approaches to meeting the quality objectives of governments without being forced to design and build to standards that industry in some instances considers overly costly compared to suitable alternatives (an area where potential savings exist as suggested by SKM, sub. 108). If coupled with the purchase of designs through the bid process, then incentives should align to create innovation in this area.

However, as with considerations of contributions to bid costs, government clients would need to consider the nature of the project and where it is likely that innovation will lead to benefits for the client and ultimately the end-user.

RECOMMENDATION 12.6

Within the request for tender, government clients should provide opportunities for tenderers to contest some key standards of the design where they have previously assessed scope exists for innovation to occur.

Local content rules

Australian governments have variously sought to encourage businesses that are successful in winning infrastructure projects to source inputs from local suppliers. In 2001, all Australian Industry Ministers signed on to the *Australian Industry Participation National Framework*. The framework saw governments commit to incorporating the following principles into their industry development polices:

> … full, fair and reasonable opportunity, free of interstate preferences, regional development, competitive neutrality, value for money, transparency of process, policy consistency and consistent with Australia's international obligations. (Department of Industry 2013a)

The broad rationales underpinning such programs relate to the development of 'world's best practice' through capability building, providing opportunities for Australian firms to access global supply chains and claims surrounding reducing the

information search costs for those who win government construction contracts in finding input suppliers. Programs within the national framework were further developed under the 2012 *Strengthening Australian Industry Participation* policy initiative.

Industry participation programs come in two parts.

- First are requirements placed on potential government contractors relating to setting out plans detailing how they intend to make use of local small and medium sized input suppliers if they were to be successful. Programs do not specifically require tenderers to source inputs from local suppliers.[24]
- Second is a government maintained database of Australian industry capabilities for various different types of projects — the Industry Capability Network (Department of Industry 2013b). At the Australian Government level, the database is maintained by Industry Capability Network Limited that employs technical consultants who are able to match buyers of goods and services with capable Australian suppliers.

At the Australian Government level, there is a specific program related to public sector infrastructure projects — the Supplier Access to Major Projects program (Department of Industry 2013c). This program also applies to major projects worth more than $500 million delivered by the private sector (DIISRTE 2013).The program claims to save:

> … companies time and money. It provides funds for the state-based Industry Capability Network (ICN) to work with project developers to identify supply opportunities for capable and competitive Australian companies. SAMP [Supplier Access to Major Projects program] seeks to increase opportunities for Australian industry, especially small and medium enterprises (SMEs) to participate in major projects and increase access to global supply markets for major projects. (Department of Industry 2013c)

Since 1997, $17 million has been allocated under 158 grants to Australian businesses. These grants are claimed to have allowed Australian businesses to win contracts valued at more than $11.5 billion that *could* have been awarded to overseas competitors (Department of Industry 2013c).

Despite activity in this area by all levels of government, there is little economic support for the existence of such policies. Further, as a means of promoting innovation and the adoption of better practices, such policies would seem a rather

[24] New South Wales's previous local content scheme, the *Local Jobs First* scheme, was more restrictive in terms of its requirements. However, under this scheme construction activities were exempted (NSW Government 2010, p. 4) and so it is unlikely to have influenced construction costs in that state.

indirect way of achieving this. Indeed, most governments have more direct policies targeted at research and development in order to promote innovation. While it could be argued that some rationale exists in governments providing assistance to small and medium sized businesses in overcoming any information barriers that may exist that inhibit them contracting with large contractors, the same cannot be said for imposing such requirements on the contractors themselves. That said, it could also be argued that local businesses should have a natural advantage in operating within the local regulatory framework, providing them some competitive advantage over overseas suppliers.

Contractors for major infrastructure projects have an incentive to minimise their costs. If a lower cost small to medium sized input supplier can reliably provide inputs during the construction of a piece of infrastructure, it would be in the interests of the contractor to make use of this supplier. The presence of the government maintained database and related services under the Industry Capability Network would reduce any search costs for contractors, and there would naturally exist incentives for them to seek lower cost suppliers in order for them to secure work. Any requirement around detailing a plan that sets out a local procurement approach imposed on tenderers would therefore seem redundant.

There is also limited evidence to suggest that the plans imposed on businesses through the tender process are effective. Instead, they are likely to represent an additional compliance burden on tenderers. As put by the Business Council of Australia:

> Recent policy changes requiring Australian Industry Participation Plans … for all private projects should be scrapped and the creation of the Australian Industry Participation Authority abandoned. This policy imposes unnecessary red tape and a costly compliance obligation on investors when there are just as effective non-regulatory mechanisms that can be used to grow opportunities for Australian industry participation in major investments. (sub. 39, p. 14)

Indeed, the Decision Regulation Impact Statement for the *Strengthening Australian Industry Participation* policy suggested the preparation of such plans for a major project could cost somewhere between $50 000 and $150 000 (DIISRTE 2013, p. 39). (Interestingly, the 'do nothing' option was not considered in the Decision Regulation Impact Statement.)

In response to the draft report, Ai Group advocated for the maintenance of local content rules (sub. DR165). They suggested that local businesses were at a disadvantage due to an 'undue emphasis on upfront purchasing costs' and a 'lack of enforcement and/or application of product standards' that allow foreign suppliers to avoid quality standards imposed on local businesses (also raised by the Australian Constructors Association, sub. DR169). However, in both circumstances, the use of

local content rules would only represent, at best, an indirect solution and is unlikely to provide a remedy. If such problems do exist, addressing them directly is the best solution. For example, better whole of life project costing, assisted through the use of technologies such as BIM, will highlight differences in material costs over the life of an asset and therefore will become part of the initial tender selection. Further, if product standards are not being adhered to, better monitoring and enforcement of the current rules is warranted. However, neither of these suggest a rationale for the use of local content rules.

Ultimately, local content rules in procurement policies do not appear to bind or add significantly to the final turnout costs of infrastructure projects. However, they may risk government not selecting the least cost bid on non-cost grounds. In any event, their objectives are questionable and the nuisance costs created suggest they should be abolished. Governments, if they wish, could instead let contractors on major projects know about the Industry Capability Network (fulfilling the information role) without imposing any further requirements during the tender process. If lower cost alternatives exist, then contractors will select from the list. It is unlikely filling out the paperwork has any additional benefits.

RECOMMENDATION 12.7

Australian, State and Territory Governments should remove the requirement for local content plans, such as the Australian Industry Participation plans, from tenders.

Maintaining competitive pressure

The competitiveness of individual constructors in the Australian market will rest heavily on the market structure — issues that are discussed in chapter 11. However, the tendering process, in particular the shortlisting arrangements, can also play a role. The shortlisting arrangements will also influence the overall bid costs imposed for a given project.

There is a general belief that there is a tradeoff between stricter shortlisting to reduce the imposts of the tendering process and the likely competitiveness of the bids received. Governments have traditionally sought to shortlist three to six contractors (or consortia) for major projects in order to encourage competition (Victorian Government, sub. 81).

However, the Australian Constructors Association has argued for stricter shortlisting by governments during the EOI stage to limit the number of contractors (or consortia) who receive a request for tender to two:

> … the ACA [Australian Constructors Association] submits that governments would receive better value for taxpayer dollars by determining a final shortlist of no more than two entities as this would generate real competition between the final two proponents while also providing the opportunity for a wider range of bidders to compete in early rounds of the process without having to expend vast amounts on initial bid costs. (sub. 72, p. 17)

The Association (sub. 72, p. 17) argues that:

- as tenderers would have an equal chance in winning, the process would guarantee 'significant effort' in the development of project teams and designs in the request for tender stage — improving the quality of design, innovation and the potential for the best value for money and timely project to be delivered
- tenderers would have greater scope to secure better financing for their project as the available pool of financiers is greater (not so spread across a larger number of players)
- it would reduce the overall (across Australia and for both private and public sectors) costs imposed by tender processes
- clients would be able to better work with shortlisted tenderers in developing their designs to the required specifications as their limited resources would not be spread across a greater number of teams.

On the other side of the debate, some have suggested that even the current practice of shortlisting around three contractors significantly reduces competition, creates barriers to entry and in the end increases the tendered build costs. As put by Salini Australia:

> … shortlisting often leads to exclusion of companies meeting all the necessary criteria but are excluded from being able to offer innovation and competition in the process, as they are removed from the process at this stage just because they exceed the predetermined number of tenderers allowed to bid.
>
> The shortlisting process itself generally leads to two or three companies being invited to participate in the final stage of a tender. In practice, Australian duopoly is always both shortlisted for obvious reasons including their strong capabilities and proven experience, as well as consolidated lobbying at all levels.
>
> This leaves room for, at best, one other player to participate in a tender when and if such an opportunity is made available. (sub. 1, p. 2)

Ultimately, Salini Australia claims that despite low barriers to entry, competitive pressure on constructors is limited due to the shortlisting process used in procurement:

> As it stands, the Australian market is not a real open market despite claims to the contrary: while anyone can establish a subsidiary or a branch office in Australia, get

> prequalified and participate in Expressions of Interest, this is as far as it goes in most of the cases regardless of the capability and experience of the company. (sub. 1, p. 3)

The tradeoff between bid costs and shortlisting is likely to be helped by greater design input from government clients and other changes to aspects of the tender process discussed earlier. With such measures, governments should have scope to encourage a greater number of bidders and reduce bid costs.

Ultimately there is no one-size-fits-all approach to short-listing. The risk of simply choosing to short-list a few or just the best known firms is a serious one. Not only does it expose the taxpayer to risk of increased cost over time by limiting competition, but it also may place too much risk on too few constructors.

To maintain competitive pressure, jurisdictions should be continuously engaged in assessing informally how strong the appetite is for projects amongst existing and prospective new bidders (chapter 11). This will also help in determining how projects may be packaged (discussed below). This requires active market surveillance but is likely to be well worth the cost.

Risk: levels and ability to price

As discussed in chapter 3, risks should be allocated to those best placed to manage, respond, and price them. Ideally, risks should be credibly allocated to those who can mitigate them at least cost and for those that cannot be mitigated, to the party best able to absorb the specified risks.

Many industry participants have suggested that the risks transferred to constructors under design and construct contracts are responsible for some cost increases.

However, it is unclear whether or not the current risk allocation is inefficient. While reducing the levels of risks borne by constructors may reduce the fixed contract price under such contracts, it may not reduce the overall costs of the project. Risks would instead be borne by governments which would come at some cost. Given concerns over the project management and construction expertise remaining in many government procuring agencies (discussed later), it can be argued that governments may not be well placed to take on these risks.

Importantly, there are some risks that cannot credibly be transferred to the private sector. Governments should never pay for the transfer of such risks.

Irrespective, governments tailor their choice of contract to the risk of the project — therefore allowing for differing arrangements for less and more risky projects. Further, significant work has been undertaken in assessing the appropriate use of

differing contracting arrangements at both the intergovernmental level (Department of Infrastructure and Regional Development, sub. 64) and within jurisdictions. The issue of risk allocation, therefore, may be best determined through learning from past processes and the systematic use of reviews (discussed in above).

Governments have also sought other means to ensure that the risk transferred to the market is not too great so as to limit the ability of industry to supply the required infrastructure. For large projects, governments are increasingly consulting with industry over the way a project may be packaged (in terms of breakdown of work and size of contracts). This is done to ensure competition by:

- reducing overall project complexity — if the work is too large or complex, there may only be one or two suppliers able to complete the entire package of work
- reducing the level of risk transferred to any one market participant — again, only a small number of suppliers may be able to take on the risk related to an entire project.

The cost threshold for this would apply should be assessed on a case-by-case basis by the procurer.

Packaging not only provides a means to better allocate risks, but it also allows for different procurement approaches to be applied to the differing parts of the project — ranging from the use of PPPs for some, to design and construct and construct only for others.

An example where consultation on project packaging has occurred is Sydney's North West Rail Link (North West Rail Link 2012a, p. 10). Appropriate packaging, determined through market investigations, provides both a means to overcome concerns with the current market structure (discussed further in chapter 11) and to avoid excessive risk transfer to suppliers.

RECOMMENDATION 12.8

For larger and more complex projects, government clients should pre-test the market to gain insights into possible savings from packaging the project into smaller components, reducing the level of risk borne by any one contractor, and promoting greater competition by relatively smaller construction companies.

An allied issue that could create unnecessary cost pressures relates to the information used to price specific project risks (Consult Australia, sub. 23). If insufficient or incorrect information relating to project risk is provided tenderers may not be able to correctly price this risk and subsequently do so by adding a margin for the uncertainty involved (which is likely to not reflect the true risk of the project). Systematic errors by government clients have meant that tenderers are

required to undertake their own investigations to better ascertain the risks involved, also generating inefficiencies due to the duplication of work:

> … the lack of and general quality of information provided by Principals at Tender goes directly to how Contractors assess and price risk. Principals must do more to provide accurate and robust information for Contractors to assess at tender. The results of not doing so are that the Contractor is forced to undertake its own investigations (which are not always possible); inconvenient to Principals and with four tenders pricing the works the costs to the market are four times that of the Principal undertaking the works. (Lend Lease, sub. 46, pp. 38–9)

By not undertaking sufficient site investigations, government clients also create information asymmetries against themselves as they are not in a position to assess the veracity of the contingencies within the bids. Better site investigation, and a consultative approach through the tender process to avoid any further duplication in effort, can lead to significant savings in the contract price and ultimately the construction costs of infrastructure projects (box 12.1).

Box 12.1 **Upfront investigations by the client are important**

Undertaking detailed site investigations can lead to cost savings for both the client and contractor. Without detailed site investigations, each tenderer will be forced to undertake their own site investigations, leading to a duplication of activity. With compressed tender timeframes, these investigations are unlikely to be as detailed as would be required to make appropriate assessments of the likely risks involved with any given project. Therefore, tenderers will add a significant risk contingency to the bid price.

In such situations, as clients have not done sufficient investigations of their own, they will not be well placed to assess the risk contingencies as part of the bid and are likely to end up paying significant 'insurance premiums' that could have been avoided.

The Commission was provided an example of an instance where the client undertook detailed site investigations and saved significantly on risk contingencies paid to the successful tender. The process involved the site investigations being undertaken well in advance of the tender process, allowing potential contractors access to the information and sufficient time to initially price the risks involved.

Once the tender process progressed past the EOI stage, the client sought advice on whether the site investigations were sufficient for each tenderer to understand and price the risks involved. Each tenderer sought further information. The client then undertook further site investigations (instead of leaving it to each tenderer) based on the requests. Compared to past projects, the client reported that significant reductions in allowance for site risks formed part of the bids.

Better and more complete project plans (formed by more informed government clients as recommended in chapter 2), coupled with greater design input, are likely to allow tenderers to better assess the risks of any given project. Further, government clients should seek to undertake the necessary due diligence on site conditions, such as any geotechnical works, which would otherwise be duplicated by each tenderer and thereby create unnecessary costs. Through this better planning, governments should also seek to provide more information on the actual risk responsibilities as set out in the final contract to tenderers earlier on in the process.

RECOMMENDATION 12.9

Government clients should invest more time and money in understanding the site risks for infrastructure projects and update the information provided to tenderers during the request for tender stage in consultation with potential contractors.

12.4 Do contracts provide incentives for cost minimisation throughout the build?

Once the successful tenderer has been identified, the operation of the contract will be important in determining the final costs of the project. Within contracts there are a number of provisions that are included to provide incentives for contractors to continually seek out options that will minimise the cost of the build. These can be broadly categorised into two:

- the allocation of who bears the risk of errors or events that can lead to higher costs and delays — risks are associated with mistakes in the design, weather, changes of mind, industrial action, and uncertain events (for example, unexpected discoveries in the geomorphology of an area or unexpected discoveries of artefacts such as fossils)
- incentive payments — rewards (or penalties, occasionally through the loss of bonds or liquidated damages) associated with delivering the project in a shorter timeframe, below bid costs or with less disruption to surrounding activities than anticipated.

There are numerous reports surrounding cost overruns from infrastructure projects. Some notable examples include the Epping to Chatswood rail line in Sydney, Melbourne's transport smartcard system (myki), and the National Broadband Network — the latter has an revised capital cost of $55.9 billion above the $37.4 billion in the original corporate plan (Evans & Peck 2011; NBN Co 2013, p. 35).

Internationally, Flyvbjerg (2009) suggests that cost overruns in the order of 50 to 100 per cent of budgeted costs are far from uncommon.

However, reports of cost escalation are usually based on the difference between budgeted costs at time of project announcement and the final cost at delivery. They therefore include any cost increases that result because of better project definition through the due diligence process and changes in the scope of projects. As such, they do not capture what occurs post contract signing — that is, how well the contracts are managed and whether some perform better than others.

Narrowing to project delivery, Auditor-General reports prepared by some governments on infrastructure projects paint a different story to that of overall project cost overruns. In Western Australia, for example, for the top 20 non-residential capital works projects undertaken around 2012 representing $6.2 billion in spending, 90 per cent of the cost variation of projects occurred during the evaluation phase (Office of the Auditor-General Western Australia 2012, p. 22). That is, the major cost variation occurred between when the project was initially announced at an expected cost, to the point where more detailed investigations had been done in order to establish a business case for the project.

This highlights the importance of decision making arrangements as discussed in chapter 2.

The incentives and effects of risk allocation within contracts

Contracts allocate risks. This is important in providing incentives for contractors to minimise any unexpected costs that might arise during construction. However, at the same time, placing too much risk on contractors may be counterproductive if they are not well placed to manage that risk; or to price it, or bear it should the risk be realised. It can also promote an adversarial relationship between the client and constructor that can, in worst case situations, lead to costly litigation and disputes (Professionals Australia, sub. DR142; Regan 2012).

The risk allocation under differing contracting arrangements varies considerably. In general, most design risk (errors or omissions in the design that lead to rework or rebuild) under design and construct and construct only contracts is transferred to the constructor, with risks of changes in works scope the responsibility of the client. Alliance contracting arrangements are used where greater uncertainty exists and a collaborative approach is needed to determine who bears the risks, and how they are dealt with, when adverse circumstances arise.

Conceptually, it appears that in terms of risk sharing, contracts prima facie create the right incentives for cost minimisation for both parties. Contractors have an incentive to avoid variations due to errors/industrial issues and clients have to pay for changes of mind so bear the full cost of doing so. The cost of poorly investigated site risks generally rests with the client so incentives *should be* created for better due diligence up front. This is borne out from Western Australia's experience:

> … projects can be, and often are, effectively controlled once realistic scope, cost and time parameters have been defined. (Office of the Auditor-General Western Australia 2012, p. 6)

However, while at an conceptual level it would appear that effective arrangements are in place, evidence presented to the Commission throughout the inquiry suggest some areas warrant a closer look.

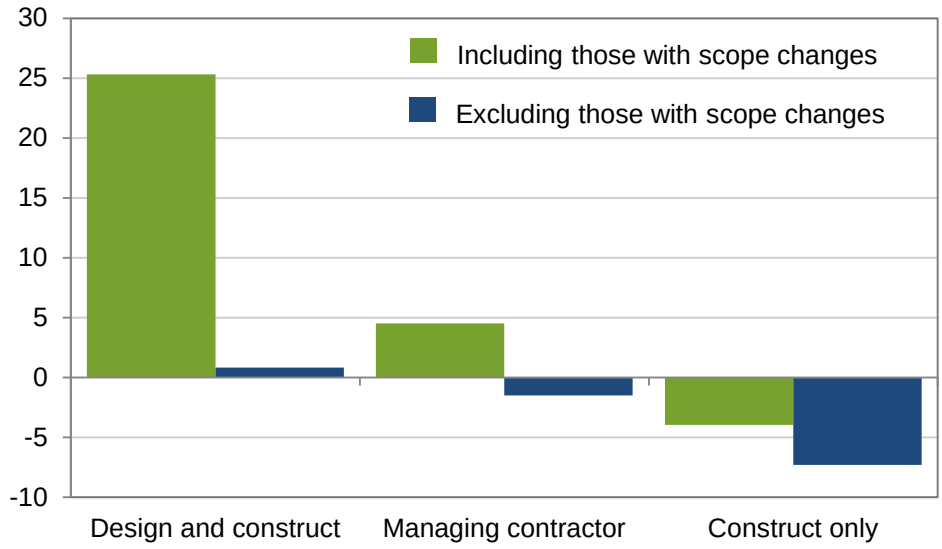
Contract type and post tender cost overruns

It is difficult to ascertain whether different forms of contract perform better than others. Project risk and the resulting choice of contract are interrelated (and thus potential for cost overruns for any given set of management expertise). Where risks and uncertainties are higher, more complex contracting arrangements such as alliance models have been used. In areas where projects can be clearly defined, construct only contracts are more commonly used. For the area in between, there are a raft of different design and construct arrangements along with collaborative contracts.

Available information suggests that contract type does not influence the potential for cost overruns. Information from the Western Australian audit of its major 20 infrastructure projects (Office of the Auditor-General Western Australia 2012) show no clear relationship between contract type and cost overruns. Indeed, when changes in scope by the client are taken into account, all contract types perform similarly well or similarly badly (figure 12.6).

Figure 12.6 **Average cost increases during delivery for major projects in Western Australia by contract type**

Per cent of expected cost at end of project definition phase, 2012



a Costs where applicable for the 20 top non-residential public works construction projects evaluated by the Office of the Auditor-General Western Australia.

Source: Office of the Auditor-General Western Australia (2012, pp. 34–73).

Similar results have been found for Victorian and other government infrastructure projects. In a benchmarking study of the delivery phase of infrastructure projects managed by Major Projects Victoria, Duffield and Xu (2010, p. 8) found that there was no statistical differences in contract outcomes due to contract type.[25]

Ability of the client to assess claims

The effectiveness of the incentives to efficiently manage the risks allocated by a contract will be dependent on how well the clients can manage the project. Issues such as the ability to assess variation claims made by the contractor (and to identify scope changes on behalf of the constructor) are important. The Office of the Infrastructure Coordinator has claimed that the ability of governments to manage projects is poor:

> Governments have not had a good track record of enforcing the risk allocation of design and construct contracts. Much of the necessary commercial expertise does not currently exist in the public sector to analyse and negotiate complex infrastructure transactions. Indeed, as highlighted by the Caravel Group, project governance team members often do not have the skills and capabilities to perform their roles. (sub. 78, p. 15)

[25] The study examined traditional contracts (construct only and design and construct), alliance contracts and PPP delivery.

Similarly, a review of Major Projects Victoria by the Victorian Auditor-General found some areas of concern:

> MPV [Major Projects Victoria] has a generally sound project management framework in place, which adopts most of the principles of better practice project management. However, MPV is not consistently applying the framework, or better practice principles, across its projects. …
>
> MPV does not have effective project oversight mechanisms in place that enable it to quality assure project management practices and learn from projects, and it does not have a sound understanding of the status of its projects at an organisational level. (Victorian Auditor-General 2012, pp. x–xi)

Others have also raised concerns (for example, Central NSW Councils, sub. 37). In a survey of Engineers in 2010, the Australian National Engineering Taskforce (comprised of industry participants)[26] found concerns over the ability of government clients to effectively manage infrastructure projects. Examples from survey respondents stated:

> Respondent 610:
>
> As a government department, we moved from having a large in-house engineering workforce, to outsourcing most functions. We are now largely an administrative/management agency. However with that outsourcing we lost a lot of institutional knowledge and capability. We struggle to remain an informed client and are desperately trying to build technical expertise in key areas that cannot be met through the private sector. The current situation is inadequate to meet current demands, let alone provide a sustainable model to meet future demands. The organisation has not successfully tackled the issue of attraction and retention of engineers and allied technical personnel. …
>
> Respondent 510:
>
> Technical expertise … the organisation is no longer an informed purchaser. My employer does not value my technical skills and capabilities. My employer (a State Government agency) is now an uninformed purchaser of engineering goods and services … this results in poor quality roads and bridges … which then impacts on road safety. (ANET 2010, pp. 4–5)

26 The Australian National Engineering Taskforce is a coalition of Professionals Australia (previously known as APESMA), Engineers Australia, Consult Australia, the Deans of Engineering and the Academy of Technological Sciences and Engineering.

Concerns over a lack of procurement and project management skills of public clients were reiterated in a number of submissions in response to the draft report (for example, by Engineers Australia, sub. DR123; de Valence, sub. DR140; Professionals Australia, sub. DR142; and Consult Australia, sub. DR168).

The lack of management expertise by government clients has the potential to lead to gaming behaviour amongst contractors. A number of claims have been made surrounding the resulting behaviour of market participants. Some have claimed that contractors have deliberately 'gamed' the inability of government clients to enforce the risk allocation of a contract. McLeod Rail, for example, observed:

> The Commissions' background paper refers to major project proponents underbidding, and poor contractual structures. In my observation, this is commonplace, but the adversarial approach of major Australian contractors is two-fold:
>
> - Underbid the work, have opaque terms and conditions – then hit the client with as many variations as possible – one Tier 1 contractor allegedly has a whole team permanently assigned to manufacturing contractual disputes … (sub. 49, p. 4)

If this were to hold, it would be expected that significant cost overruns would occur during the delivery phase of infrastructure projects. However, evidence on this is mixed.

Some studies have pointed to the presence of cost overruns during delivery phases. For projects managed under traditional contracting arrangements, Infrastructure Partnerships Australia (2007) found that between the contract signing and final turnout, government run infrastructure projects were on average around 15 per cent over contract price. The larger the project, the larger the cost overrun:

> … while small value Traditional procurement projects tended to come in under-budget, higher value projects were generally completed over-budget and often by a significant margin. (IPA 2007, p. 22)

Other reports provide counter evidence. As discussed above, in Western Australia there is little evidence to support that significant cost overruns occur during project delivery — except in the case where government clients change the scope of the project. Some case study evidence also points to the enforcement of risk allocation within contracts by government clients. The Tasmanian Government, for example, successfully defended a design related variation in its Hagley and Westbury bypass project (Tasmanian Auditor-General 2009) (box 12.2). However, this came at significant cost.

Box 12.2 **Tasmanian Hagley and Westbury bypass project**

In 1998, the Tasmanian Department of Infrastructure, Energy and Resources appointed Leighton Contractors to design, construct and maintain (for 10 years) 13 kilometres of new highway at a cost of $24.6 million. The contract specified for a section of highway to be cut-in.

Leighton's winning concept drawings included the cut-in requirement, however, the detailed designs had this section of road above ground. When the Tasmanian Government become aware that the road was being built above ground, they contacted Leighton and requested the road be built in accordance with the initial specifications. Leighton subsequently claimed this constituted a variation and argued for an extension of time and payment for additional costs.

The case went to court and subsequently became Tasmania's longest running civil court case. The State eventually won the case.

Source: Tasmanian Auditor-General (2009, pp. 26–27).

However, the presence of cost overruns may not suggest that government clients are relative poor project managers compared to their peers. Work conducted by the University of Melbourne for Major Projects Victoria (Duffield and Xu 2010; Duffield 2009) suggest that government clients manage projects with similar performance to private sector clients. For projects conducted between 2006 and 2010, government clients were able to achieve better outcomes, in terms of lower cost and time overruns, than those seen in the private sector (table 12.1). Further, for the interstate projects examined, the average cost overruns were found to be (statistically) significantly lower than the outcomes for private sector projects. Cost overruns were defined as the difference between the cost at contract signing versus the final cost (therefore not including any change in budgeted costs from inception to tender), and time overruns based on differences between the completion date at contract signing and actual completion date.

Despite these findings, the Victorian Auditor-General (2012) found that for almost all projects for which Major Projects Victoria supplied data during its audit, cost overruns were experienced during the delivery phase. For the 14 projects examined, cost overruns averaged close to 14 per cent. The distribution of projects based on the criteria in table 12.1 also differed (figure 12.7). The Victorian Auditor-General also queried the accuracy of the data supplied by Major Projects Victoria to the University of Melbourne on which they based their analysis. Based on the figures supplied to the Victorian Auditor-General, the distribution of project outcomes is worse than that observed for the private sector in the Duffield and Xu (2010) study.

Table 12.1 **Delivery performance of government and privately managed projects**

Per cent of project sample completed within criteria

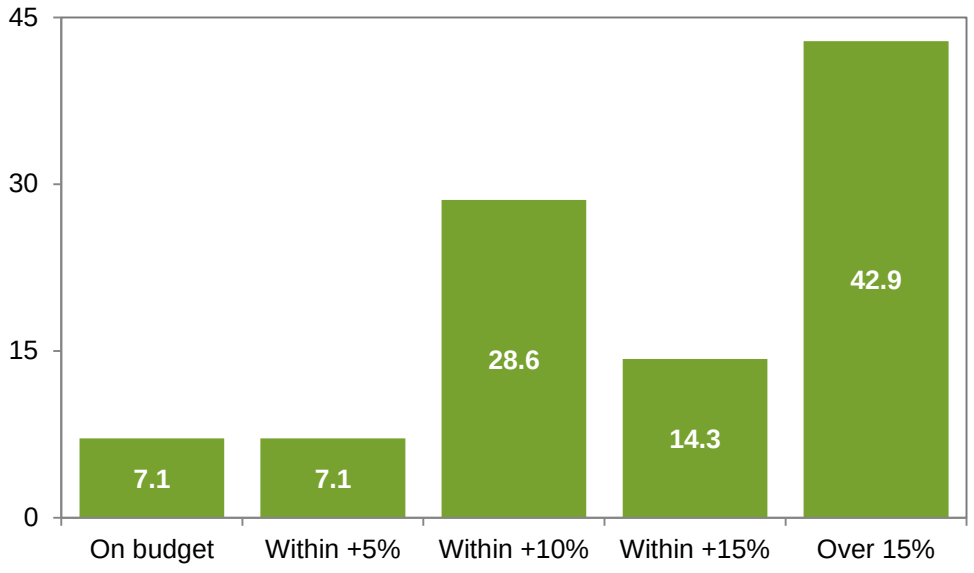
Criteria	*Victoria*	*Other state*	*Private*
		Budget performance	
Within original contract sum	26.9	48.1	17.1
Within +5% of original contract sum	46.2	70.4	48.6
Within +10% of original contract sum	57.7	81.5	65.7
Within +15% of original contract sum	73.1	85.2	77.1
		Time performance	
Within original contract time	63.3	75.0	31.3
Within +5% of original contract time	73.3	79.2	56.3
Within +10% of original contract time	76.7	83.3	68.8
Within +15% of original contract time	80.0	83.3	68.8

a For projects conducted between 2006 and 2010. The sample for budget performance consisted of 26 Victorian, 27 other state and 35 private projects. The sample for time performance consisted of 30 Victorian, 24 other state and 16 private projects.

Source: Duffield and Xu (2010, p. 12).

Figure 12.7 **Cost overruns for projects delivered by Major Projects Victoria**

Per cent of projects examined (cumulative), 2000 to 2009



a Based on the analysis of 14 projects conducted between 2000 and 2009.

Source: Victorian Auditor-General (2012, pp. 38–9).

Other comparisons between public and private clients can be made by making use of project information contained in Deloitte Access Economics' *Investment Monitor*. This data contains information on major projects undertaken by both public and private sector clients. As such, it is not restricted to infrastructure

projects alone. Despite this, given the many parallels between major projects and infrastructure projects it provides a good source of data on which comparisons between public and private sector clients can be made.

Making use of information collected in this publication between 2001 and 2013, the Commission explored differences in both estimated and final costs, and costs during the delivery phase for both public and private clients. Full details of the methods used and analysis are presented in appendix F.

Analysis of the projects in the Investment Monitor dataset reveals:

- Cost overruns in terms of differences in pre-construction estimates to initial construction costs only occur for a relatively small proportion of projects — around 11 per cent of those where data was available. However, for the projects within the sample (which may not be representative of all projects) they are more likely to occur for public sector clients than those in the private sector.
- Cost overruns during the construction phase were more common, affecting around 20 per cent of projects.
- If overruns were to occur (both types), then they were likely to be greater than 15 per cent of the initial project cost estimate (or contract price).
- Cost overruns were also more likely to occur for large projects (those over $50 million) than for smaller projects.
- There is a strong link between cost overruns occurring during the planning stage and those experienced during construction.

In terms of outcomes for public and private clients, however, analysis of the dataset suggests that there are no real differences in average cost overrun outcomes between the two.[27] What appears to be most significant is project size and complexity. For large complex projects, some cost overruns will be inevitable as the nature of project scoping means that as more information comes to hand the better the project is defined. As such, some cost increase is to be expected — especially where the type of project being undertaken is unique, limiting the ability of a client to learn from other projects.

[27] Simple means analysis of the data initially suggested that public sector clients had statistically significantly lower cost overruns compared to their private sector peers. However, once project size and industry was controlled for (industry proved mostly insignificant in explaining cost overruns), differences in outcomes were no longer significant. Full details are provided in appendix F.

There was one exception to the above findings. The size of cost overruns during the construction phase for public clients delivering projects in the telecommunications sector were statistically significantly higher than either other public clients or those in the private sector.

Attempts to assess whether the infrastructure was delivered at least cost through comparisons of cost overruns, however, are not possible.

One reason for the apparent differences between public and private sector clients may be differences in risk sharing arrangements. Private sector clients may be more willing to take on certain risks associated with design errors or materials costs and therefore be more likely to face greater cost increases throughout the delivery phase stemming from variations. As such, the final cost of a similar project procured by a government or a private client could be the same irrespective of one having no 'cost overrun' compared to the other.

However, in the case of the Duffield and Xu (2010) analysis, it could also reflect the benefits that may flow from concentrating expertise within a specialist procurement body such as Major Projects Victoria.

Overall, analysis by the Commission suggests that cost overruns are primarily explained by project size and complexity — a problem shared by both private and public clients.

The common outcome from all studies is that there are gains from better performance in this area. Steps taken to improve project definition will help given the strong link between planning and delivery outcomes, but it is likely that other initiatives to improve the skills of those involved in public sector procurement will yield positive outcomes. The skill base of those responsible for delivering public infrastructure projects can be improved through several avenues. These include the:

- hiring of specialist project management expertise (de Valence, sub. DR140)
- use of specialist agencies (discussed below)
- better development and dissemination of best practice approaches.

In terms of the development of best practice approaches, governments have already taken steps to learn from past mistakes to ensure least-cost delivery of infrastructure projects. The Australian Government Department of Infrastructure and Transport in 2012 released a best practice guide for infrastructure planning and delivery for governments (Department of Infrastructure and Transport 2012a). This guide highlighted that best practice approaches could be found across different contracting approaches and governments. A number of other initiatives are also highlighted by de Valence (sub. DR140).

However, it should be noted that in order for such improvements to occur, governments must not rush to market with potential projects.

Scope for greater use of special purpose agencies

The establishment of specialised agencies to procure and manage the delivery of infrastructure projects provides one means to overcome concerns over a lack of public sector procurement and project management skills. Such agencies also provide a means to retain such skills.

Some state governments have already established such bodies for either general or more specialised infrastructure procurement. Existing examples include the Linking Melbourne Authority, Major Projects Victoria and Queensland's Local Government Infrastructure Services (LGIS) (box 12.3). In some cases, the established body is the client, in others, the agencies provides advice and administrative support including project management.

Box 12.3 **Queensland's Local Government Infrastructure Services**

Queensland's Local Government Infrastructure Services (LGIS) began operation in 2005. It brings together expertise from Queensland Treasury Corporation and the Local Government Association of Queensland.

Established as an infrastructure services company, it seeks to help local governments (and the state if needed) in developing, procuring (through advice and tender administration) and managing the delivery of infrastructure. Its capacity is sufficient to work across local government boundaries and assist councils to procure infrastructure at a systematically lower cost.

Source: LGIS (2014).

Such agencies pool procurement from either a number of different government client types (such as Major Projects Victoria and the LGIS), or deliver an ongoing stream of similar infrastructure development (such as the Linking Melbourne Authority). By pooling procurement they provide an opportunity for knowledge and expertise to be accumulated.

The LGIS noted that there are, however, some impediments to exploiting opportunities for joint tendering arrangements. By way of example, LGIS noted:

> In 2008, LGIS was engaged by a collective of 14 councils (under the Central Queensland Local Government Association — CQLGA) to undertake a joint tender and contract for regional waste services. Each of the 14 councils required services that were similar in nature and believed that they could deliver significant time and cost

> efficiencies through a collaborative arrangement. Legal advice at the time suggested that such an arrangement could be in breach of Section 45 of the *Trade Practices Act* (which prohibits parties from entering into any contract, arrangement or understanding that has the purpose or effect or likely purpose or effect of substantially lessening competition). The CQLGA applied to the ACCC for authorisation to undertake a joint tender. Interim approval was granted by the ACCC, followed by final approval, however the request for authorisation delayed the tender process by six months and incurred legal costs and significant time delays for the councils. (sub. DR155, p. 4)

There are also other means to achieve similar outcomes to those created through specialist agencies. Government clients could instead set up specialist transient agencies that 'bring-in' required skills for particular projects. An example of this is North West Rail Link that has been established to oversee the project development and procurement of Sydney's rail extension. Victoria has also done something similar with the Regional Rail Link.

The relative merits of both approaches are worth further exploration. As such models already exist, the collection of data for benchmarking purposes (recommendation 9.2), plus the addition of information on procurement (recommendation 12.4) should provide governments with information to assess the effectiveness of such approaches.

While such agencies have the potential to improve the skill base of government clients in procuring public infrastructure (de Valence, sub. 16), it is likely that any benefits would not materialise unless these agencies are provided with sufficient time to properly scope and procure infrastructure investments. Post announcement pressure to 'rush to market' could simply lead to the repetition of past mistakes. Further, for those agencies who are more routinely involved in procurement of infrastructure that is not complex, as long as they have qualified staff or the option to hire in specialist skills through the use of a project manager, specialist bodies are unlikely to add value (de Valence sub. DR140).

In deciding to move to the creation and use of a specialist procurement agency, consideration should also be given to the frequency of work that would be undertaken. The establishment of such agencies is not costless and therefore consideration of alternatives, such as the use of a project manager, should be part of the decision. It may be the case that for individual state governments, the numbers of complex projects undertaken are not sufficient for the development of such agencies. That said, there could be scope for such agencies to be created that spanned a number of jurisdictions. This, however, would require cooperation amongst state government and/or some facilitating role played by the Australian Government.

Incentive payments

Government clients often include incentive payments within their contracts to encourage contractors to seek innovations throughout the build that lower costs, shorten delivery timeframes or reduce the disruption caused by the work (generally measured as improvements against key performance indicators). These allow contractors to share in any savings made and, as they represent additional profits for the contractor, can significantly influence returns and therefore provide strong incentives for better performance. When in place, such contracts generally require an 'open book' approach to actual costs, where the contractor provides data on the actual costs incurred over which an agreed premium is paid.

Incentives payments are seen to compliment penalties that exist in most contracts related to non-performance, usually in the form of liquidated damages. Penalties seek to ensure that the agreed contract performance is met, but they do not provide an incentive for constructors to better that performance beyond any ability to reduce their own delivery costs.

The use of incentive payments, however, has been raised as an unnecessary component of a contract. For example a report into contracting reported industry concerns in this regard:

> Incentives and bonuses do not change contractor behaviour. Clients manufacture incentives and bonuses to feel more comfortable that they can influence delivery. If we are providing a client our top people with the aim of producing a top quality project for a fair price, then I don't know why clients need to offer 'incentives or bonuses' to get a great outcome. UK Contractor, October 2012.
>
> The Industry has changed over the years. We work to the highest professional standards and with integrity. Clients do not need to provide us with incentives to deliver on our contractual obligations in full and to the quality and performance levels specified and promised in our tender response. Instead of incentives, Clients should ask bidders to nominate a percentage of their margin to put at risk for non-performance. We certainly would be happy to do this. Australian Contractor, April 2013. (Department of Infrastructure and Transport 2013, p. 11)

It has been suggested that incentive payments should only be used where extraordinary performance is required. Repeat relationships that characterise this market would also support the idea that such payments are unnecessary and may even be counterproductive in terms of the trust relationship between the two parties.

However, those in support of incentive payments suggest that they represent a means for contracts to encourage better performance. When used in conjunction with relationship contracts (such as alliance and managing contractor

arrangements), incentive payments based on a sharing of any savings from reduced costs and/or timeframes can, from a theoretical perspective, provide:

> … mechanisms for sharing the benefits of innovation and new technology. In collaborative contracting, the risk and reward sharing formula encourages full disclosure, innovation and a joint approach to resolving problems at the least cost. (Regan 2012, p. 63)

As with the choice of different forms of contracting, it is likely that the use of incentive payments should be decided upon on a case-by-case basis, depending on the risks and complexity of a project.

13 Industrial relations

Key points

- The industrial relations (IR) environment in the construction industry (broadly defined) has long been seen as problematic, with greater than average levels of disputes, concerns about excessive union control of work sites, unlawful conduct and expedient deals between head contractors and unions to buy IR peace.
- However:
  - many individual constructors did not raise IR issues as a major source of cost pressures in recent years, although most argued for the re-creation of the Australian Building and Construction Commission (ABCC) to address unlawful conduct by unions and others in the industry
  - days lost per employee are higher in construction than in most other industries, but are still very low by historical standards. They fell even further in the early years of the ABCC
  - unionisation continues to fall
  - the more stringent IR regime commencing with the establishment of the Building Industry Taskforce (BIT) is likely to have increased productivity for parts of the industry, but these effects cannot be robustly identified in productivity for the entire industry
  - wage growth is likely to reflect labour shortages, union bargaining power and the effects of the urgency of some government procurement decisions.
- Nevertheless, a sample of enterprise bargaining agreements reveals complex sets of allowances, inexplicable variations in terms and conditions, potentially excessive rights for some union officials, and constraints on workplace flexibility inimical to productivity.
- Similarly, cases prosecuted by the ABCC and Fair Working Building and Construction (FWBC) reveal widespread unlawful conduct and adverse IR cultures that seem to have been resistant to regulation.
- IR concerns appear to be much greater in non-dwelling buildings than civil construction, as is also revealed by the record of penalties imposed on unions.
- Governments should adopt building code guidelines disqualifying contractors from tendering for public infrastructure projects if they have engaged in unlawful conduct or mismanaged their IR. This is likely to significantly improve the workplace relations environment, reduce industrial disputes and avoid excessively generous enterprise bargaining agreements. This would also apply to any 'sweetheart' deals between unions and head contractors.
- The Australian Government should raise penalties for unlawful conduct.

The industrial relations (IR) environment in construction has a long and unfortunate history of unlawful behaviour by employers and unions, poor work practices, adversarial relationships, excessive control of aspects of project sites by union officials, and the use of work health and safety (WHS) obligations as a vehicle for disruption and undue leverage. A succession of reviews from the 1990s to the present suggests that the problems are endemic and persistent, although varying in their severity and prevalence across what is a diverse sector.

The peculiar problems besetting IR in construction arise from more than just an unfortunate history and culture, but also from the market structure of the industry. Many subcontractors in the industry float between projects. In that environment, unions, the major head contractors and employee associations, rather than individual businesses, often determine the content of the enterprise agreements, although they may not have an understanding of the unique circumstances and preferences of the businesses and employees that are covered by these agreements.

This chapter is concerned with the degree to which the conduct of employers, employees, unions and others in workplaces has affected costs and productivity. It aims to identify any systemic flaws of the IR system as it relates to construction, and the measures that could correct these. The chapter covers arrangements at both the Australian and State and Territory Government level.

IR outcomes reflect not only the laws and institutions comprising the IR system but also the competencies and 'cultures' of the various bargaining parties. Many stakeholders told the Commission that, at the project level, workplace relations were often a reflection of the attitudes and capabilities of the people negotiating with each other as much as a consequence of IR law and institutions. Accordingly, to the extent possible, this chapter considers variations in behaviours across different jurisdictions, construction project types and unions.

This chapter's scope does not extend to consideration of the functioning of the IR system as a whole, except in so far as it relates directly to the costs and cost structures of the relevant parts of the construction industry. Nor does this chapter undertake a forensic 'line by line' analysis of the potential statutory powers of any new construction industry IR regulator.

Moreover, the preoccupation of this chapter is on public infrastructure projects and not on IR issues in commercial or residential building construction. However, data inadequacies sometimes make it difficult to disentangle IR issues affecting different segments of the industry. In addition, the segments often use common inputs, such as cement contractors and quarries, and involve common employers and unions. The behaviour of parties in one part of the industry may also be relevant for

bargaining arrangements and behaviour in other parts of the industry given that power demonstrated by parties in one project provides signals about the behaviours they could adopt in other projects.

The chapter considers these issues by examining the:

- scope of IR (section 13.1)
- main features of IR arrangements in the construction industry (section 13.2). These arrangements can strongly influence the conduct of negotiating parties.
- framework for understanding the role of IR in costs and productivity in the construction industry, including the degree to which the characteristics of the construction industry lead reasonably to an industry-specific approach (sections 13.3 and 13.4)
- micro impacts — the practices adopted by the various parties in their dealing with each other, and how these may affect costs and productivity at the project level (section 13.5)
- evidence of the aggregate industry-wide impacts of the IR regime on costs and productivity (section 13.6)
- scope to improve the IR environment for the construction of infrastructure (section 13.7).

13.1 What is industrial relations?

There are many definitions and ways of conceptualising IR (or, its associated terms, 'labour relations' and 'workplace relations'). In this report, the Commission defines it as a system — a complex array of laws, regulations, conduct, norms, actors and institutions. This system determines the relative pecuniary and non-pecuniary returns of the various actors, and their roles, power and behaviour in the workplace. The system exists in not only present laws and practices, but in the accumulation of behaviours and expectations developed over the past 100 or more years. The present legal framework cannot be viewed in isolation from the series of laws and regulations that have been developed and modified over those years.

IR issues need not, and ideally should not, be combative. For example, employers and unions may negotiate better employee conditions in exchange for productivity benefits and flexibility, sharing in the rewards of innovation and new work practices.

However, in the policy arena, the issue of IR and its reform most commonly arises where the outcomes or conduct are perceived as unlawful, unfair, unsafe or

inefficient. In that instance, different dispute resolution processes, regulations, laws, institutions, enforcement arrangements and education may act to restore balance.

13.2 Industrial relations in the Australian construction sector

A history of profound concern

The impact of the IR environment on the cost, productivity and performance of the construction industry has long been perceived as important. Persistent IR problems in the industry contributed to the creation in the mid-2000s of unique statutory provisions and institutional arrangements to govern IR in the industry (box 13.1).

In 1982, the National Construction Industry Conference argued that IR problems were a major issue facing the industry (IC 1991, p. 67). Participants in the Industry Commission's 1991 inquiry into construction costs considered that the IR system was an important driver of costs at that time (IC 1991), as did the 1992 Gyles Royal Commission into productivity in the building industry in New South Wales (Gyles 1992).

While the IR environment had changed by the late 1990s, the concerns had not evaporated. The Productivity Commission's 1999 review of major building projects still found inefficient work practices and impediments to innovation (PC 1999). The 2003 Cole Royal Commission was more severe in its judgment. It identified weak IR management by businesses, inadequate attention to WHS issues, poor work practices, and unlawful union behaviours in the construction industry. Among other consequences, it considered that these practices and impediments had increased costs and reduced productivity.

The Cole report gave impetus to industry-specific regulatory arrangements (box 13.1 and Williams and McGarrity 2008). Since late 2002, oversight of the IR arrangements of the industry has been delegated to three successive specialist regulatory agencies — the Building Industry Taskforce (BIT), the Australian Building and Construction Commission (ABCC) and Fair Work Building and Construction (FWBC) — each with investigative and regulatory powers greater than those available in the generic IR system. In response to concerns from the Cole report about workplace health and safety, the Australian Government created the Office of the Federal Safety Commissioner in conjunction with the ABCC (chapter 15).

Box 13.1 **Key recent milestones in IR policy for the construction industry**

2001–2003: Cole Royal Commission

The Cole Royal Commission into the Building and Construction Industry was established in August 2001 and tabled its final report in March 2003. The Royal Commission found that the building and construction industry was characterised by a widespread disregard for the law, outlining over 100 types of unlawful and inappropriate conduct. The Commission also found that existing regulatory bodies had insufficient powers and resources to enforce the law.

2002–2005: Building Industry Taskforce (BIT)

Following the preliminary report of the Cole Royal Commission, the taskforce was established on 1 October 2002 as an interim body to enforce the law in the industry prior to the establishment of the national agency envisaged by the Cole Report. In March 2004, the Interim Taskforce became a permanent taskforce, operating until the establishment of the Office of the Australian Building and Construction Commissioner in October 2005. It possessed significant investigative and regulatory powers.

2005–2012: Office of the Australian Building and Construction Commissioner

The *Building and Construction Industry Improvement Act 2005* (Cth) (BCII Act) established the Australian Building and Construction Commission (ABCC) as an independent statutory authority. The ABCC commenced operations on 1 October 2005, and had similar powers to its predecessor.

2009: The Wilcox Report

The Australian Government requested Justice Murray Wilcox to design a replacement for the ABCC. The Wilcox Report made recommendations on the structure and powers of the new specialist body. It was submitted to the Australian Government on 31 March 2009 and released publicly on 3 April 2009.

2009: The Fair Work Act 2009 (Cth) *(FWA)*

From 1 July 2009, the FWA replaced the *Workplace Relations Act 1996* (Cth). The FWA is the principal extant legislation for workplace relations laws in Australia and includes rules on the terms and conditions of employment, rights and responsibilities of employees and employers, and compliance and enforcement rules. The FWA combined the government agencies that administered the workplace relations system into two new regulatory bodies, the Fair Work Commission (FWC) and the Fair Work Ombudsman (FWO).

2012: Fair Work Building and Construction (FWBC)

From 1 June 2012, another specialist regulator, FWBC, replaced the ABCC as the building industry regulator. It had generally weaker powers.

The *Building and Construction Industry (Improving Productivity) Bill 2013*, presently before Parliament would, if enacted, re-establish the former ABCC.

The Australian Government announced a Royal Commission into Trade Union Governance and Corruption in February 2014, which commenced public hearings in May 2014 and will report by 31 December 2014.

Source: FWBC (2014a); Royal Commission TU (2014).

The Wilcox report in 2009 considered that poor work practices and industrial unlawfulness had persisted in the industry, particularly in Victoria and Western Australia.

Business group submissions made to the Senate Education and Employment Legislation Committee in late 2013 claimed that work practices and industrial unrest were still problematic in the industry, and that these had raised costs and lowered productivity. They considered that the situation had worsened following the replacement of the ABCC with a weaker regulator, FWBC. Submissions to this inquiry have made similar observations (sections 13.5 and 13.6).

In February 2014, the Australian Government announced a Royal Commission into trade union governance and corruption generally, but with specific concerns raised about 'recent allegations of corrupt behaviour, unlawful kickbacks and standover tactics in the construction industry'.[28] The Royal Commission will also consider unlawful conduct by employers.

Some groups, particularly the union movement, have questioned the degree to which poor work practices and industrial unrest have been prevalent, their impacts on costs and productivity, and the justification for IR arrangements specific to the construction industry. Unions, political parties, academics and others have also contested the nature and reach of the construction IR regime and its regulator (O'Neill 2003).

Moreover, to put the issues in context, unlawful conduct and poor practices in the construction industry are not restricted to unions, but can also involve public officials and businesses outside the IR system, in activities such as collusion, bribery, sham contracting, and billing for unperformed work. Nor are the issues of corruption, with or without union involvement, peculiar to Australia. For example, a recent investigation in the United Kingdom found that one third of construction professionals had been offered a bribe (CIOB 2013, p. 15). In Canada, there is currently a public inquiry into corruption in the Quebec construction industry.[29] The United States has a long history of corruption in the construction industry, with vestiges of these problems surviving in certain union racketeering cases before the courts (Fairbanks 2014). The effects and sources of such corruption in the construction industry are uncertain. Nevertheless, the nature of the sector in Australia and elsewhere, particularly the large amounts of money at stake from winning tenders and from forming relationships between disparate parties in the industry, appears to attract criminal elements.

[28] Joint Press Release by the Prime Minister, Minister for Employment and the Attorney-General, 10 February 2014.

[29] The Commission of Inquiry on the Awarding and Management of Public Contracts in the Construction Industry.

IR arrangements for the construction industry at the Australian Government level

Since the mid-1990s, IR arrangements in the construction industry have diverged from those applying to most other industries, although the degree of their divergence has fluctuated over time (AIG 2013).[30]

Fair Work Building and Construction and the laws it enforces

The institution for enforcing Commonwealth workplace relations legislation in the building and construction industry is the Fair Work Building Industry Inspectorate, known as Fair Work Building and Construction (FWBC). Its roles relate only to 'building work', but this refers to buildings and to other civil engineering, such as rail, road, and airport and port infrastructure, including their maintenance (but excluding mines and single dwellings).[31] FWBC is an independent statutory authority and has significant resources, employing around 150 staff and with an annual budget of around $30 million.

In addition to its roles in WHS and its information provision functions, FWBC has extensive powers to investigate compliance with workplace legislative instruments, principally the *Fair Work Act 2009* (Cth) (the FWA), the *Building Code 2013* (Cth) and the *Independent Contractors Act 2006* (Cth). For example, it can investigate sham contracting, the use of phoenix companies and unlawful industrial disputes and associated conduct. FWBC has incomplete jurisdiction over Western Australia since its government has not referred its IR powers to the Commonwealth. In practical terms, this makes little difference as all corporations and their employees are covered.

FWBC can take matters to court or refer them to other enforcement agencies. Its own enforcement powers relate only to civil matters (as did the ABCC). Up until February 2014, the ABCC/FWBC had formally referred 21 matters to the State or Federal Police.

Data on FWBC's investigations and court actions suggest that it has commonly found breaches by employers as well as employees (or their nominated agents). In 2012-13, out of just over 1100 investigations, its four main areas of investigation related to recovering employees' wages and entitlements (31 per cent), freedom of

30 Previous exceptions are legislation in relation to the coal industry and airline pilots (EWR&ERC 2004, p. xv).

31 Putting aside the transitional Act used to dissolve the ABCC and to create FWBC, the functions of FWBC are set out in the *Fair Work (Building Industry) Act 2012* (Cth) (FWBIA).

association (13 per cent), coercion (13 per cent) and unprotected industrial action (12 per cent). Most investigations have not resulted in actions before the courts. In 2012-13, there were 13 cases before the courts under the FWA, which involved unlawful industrial action (4), wages and entitlements (4), coercion (3), sham contracting (1) and adverse action (1) (FWBC 2013a, pp. 29, 38–39).

The shift from the ABCC to FWBC was associated with the greater alignment of the workplace arrangements for the construction industry with those of other industries, although some unique features were retained. Construction industry stakeholders had varying views about the desirability of this alignment. Some saw it as desirable, while others saw it as undermining the capacity for the regulator to address problematic conduct in the construction industry. The re-orientation followed the 2009 Wilcox review (Wilcox 2009). The shift reduced the powers of the regulator in three major ways.

First, penalties for unlawful conduct by employees, unions and employers were reduced by two thirds to be consistent with the penalty regime under the FWA (MBA 2013, p. 4). Under current arrangements, the maximum penalty for a given breach is $10 200 for an individual and $51 000 for a corporation (FWBC 2013b). Overall, fines may be much greater if there is more than one breach or if a party does not obey a court order (as has occurred). In 2012-13, the total penalties imposed were around $800 000 (FWBC 2013a, p. 37). This is a relatively small amount compared with the resources of unions and employers, with uncertain impacts on the economic incentives for compliance with the law.

Second, although FWBC's coercive powers are greater than those applying in the generic IR regime, they are more constrained than those of the ABCC. The ABCC could unilaterally compel any person to provide information regarding an alleged contravention of the law.[32] It has been suggested to the Commission that parties sometimes quietly urged the ABCC to use its examination powers so that their disclosures would not be seen as those made by a willing informer (although the frequency of this is unclear). The easier and quieter the process, the more willing a party would be to disclose in this way. In contrast, FWBC must go through the Administrative Appeals Tribunal, which must test, among other things, that the notice is well founded. FWBC must notify the Commonwealth Ombudsman of any notice issued (although the Ombudsman cannot overturn a notice). This provision has been rarely used by the agency (FWBC 2013a, p. 35). In 2012-13, FWBC applied for, and was successful in issuing, two notices (for a single investigation).

[32] The substantial contrasts between the two arrangements are set out under s. 52 of the *Building and Construction Industry Improvement Act 2005* (Cth) when the ABCC was the regulator, and under Division 3 of the FWBIA when FWBC became the regulator.

By contrast, the ABCC exercised its compulsory examination notices around 30 times per year over its life (Hadgkiss 2013, p. 4). The difference might also reflect the changing institution's culture and leadership, and not just its capacity to exercise power. In fact, the issue of notices dropped significantly after 2009-10, even though the ABCC was still in place and possessed the same statutory powers (Independent Economics 2013, p. 10).

Finally, where parties were involved in civil litigation and have settled the matter, FWBC must not pursue any further litigation on that matter, even if prima facie, there has been a breach of the law (s. 73 of the FWBIA). This raises the risk that, while unlawful, one party could bring tacit pressure on another party to force a settlement, thus avoiding court scrutiny of the original matter. On the other hand, there is a general principle that it is usually better that private parties accommodate their differences with the least possible involvement of courts. Moreover, it is not clear that s. 73 has been invoked to any great extent.

The Australian Government has proposed a bill that would again widen the differences between the construction-specific and generic IR arrangements (box 13.1).

The Building Code 2013 (the 'Code')

The *Building Code 2013* is a national construction code that uses the power of the Australian Government to limit its procurement to businesses with 'model' workplace relations arrangements. It applies to those construction businesses that lodge expressions of interest or tender for Commonwealth-funded projects (subject to varying thresholds).[33] Once a contractor is subject to the Code, it is required to comply with the Code for all building projects, even those that are funded privately. Most large Australian construction businesses have been involved with projects that would require them to meet the Code if they wished to tender for future Commonwealth projects.

The Code is not a technical code about construction standards, engineering or planning processes. Its role is purely to use government procurement as a carrot and stick for improved workplace relations and WHS.

[33] The Code does not stand alone. It codifies IR and WHS obligations contained in the *Fair Work (Building Industry) Act 2012* (Cth) and generic IR law, principally the *Fair Work Act 2009* (Cth). The Code applies to all building work indirectly funded by the Commonwealth where the value of the contribution (a) is at least $5 million *and* represents at least 50 per cent of the total construction project value; or (b) at least 10 million. It includes BOOT, BOO and PPP projects as well as conventional projects. It applies to all projects (regardless of size) where the Commonwealth has direct financial and administrative involvement.

Among many things, the Code specifies that conduct by a business is noncompliant if there are:

(i) any explicit or tacit requirements by a building constructor or other building industry participant concerning subcontractors' or suppliers' choices about workplace arrangements or wages and conditions. For example, this could include requirements for subcontractors to pay over-award wages or to provide superannuation or redundancy insurance payments to a particular fund

(ii) any barriers to freedom of association (so that it would be a matter of choice for a worker to join a union, be represented by it or participate in any lawful industrial activities), so that there is no discrimination against union delegates, union members or non-members

(iii) 'no ticket, no start' signs displayed (which would imply, in contravention of the freedom of association, that workers must be in a union to perform work on a site)

(iv) 'show card' days (where a person must show whether they are a member of a union)

(v) any requirements for a contractor, subcontractor or employer to employ a non-working shop steward or job delegate; or hire an individual nominated by a union (although a consenting supplier could do this if they wished)

(vi) any barriers to the lawful right of entry by a union official or other permit holder (subject to a variety of additional State, Territory, and other Australian Government provisions)

(vii) any undue influences — either through the tendering process or otherwise — on subcontractors or suppliers to have particular workplace arrangements in place.

FWBC is responsible for monitoring compliance and investigating breaches. It can refer a matter to the Code Monitoring Group (comprising senior officials from several departments), which can impose various sanctions from formal warnings to preclusion of a party from tendering for Commonwealth funded projects for up to six months. Where FWBC finds a breach of the FWA, it can also proceed with litigation.

Construction-industry specific arrangements at the State and Territory Government level

State and Territory Governments also play a role in IR regulation and have their own workplace legislation (although the FWA takes precedence where there are any inconsistencies with Commonwealth law). Various codes of practice and associated guidelines for the building and construction industry also play a critical role. These codes and guidelines link State and Territory Government procurement projects above given monetary thresholds to contractors' workplace arrangements (among other things). The codes and their guidelines are policy documents, not legislative instruments and, thus, are not necessarily binding.[34] For IR matters, the relevant codes refer to the original National Code of Practice for the Construction Industry.

The most powerful instruments for state influence of workplace relations, and the area where the greatest policy development has occurred in recent years, are the implementation guidelines to the codes, not the codes themselves. The most influential of these are the implementation guidelines released in 2012 by the Victorian Government for the *Victorian Code of Practice 1999* (Victorian Department of Infrastructure 1999; DTF (Vic) 2013b). These guidelines:

- set out a more stringent, clearly defined and sometimes prescriptive set of requirements on contractors, unions and other building industry participants than those broadly set out in the national code
- are directed at maximising productivity and reducing cost and time overruns in publicly-procured projects
- have been tested in the Federal Court for their validity against the background of the Australian Government's IR legislation (as discussed later).

The Victorian Code and its guidelines are overseen by the Construction Code Compliance Unit within the Victorian Department of Treasury and Finance — a body similar in role to FWBC.

[34] This is not necessarily a disadvantage. The codes and guidelines can be adapted as any flaws are identified. Moreover, the fact that they are not binding has been an important issue in defending challenges to their validity (as pointed out in *State of Victoria v Construction, Forestry, Mining and Energy Union* [2013] FCAFC 160). In contrast, the national Building Code 2013 is a legislative instrument, replacing its predecessor, the National Code of Practice for the Construction Industry 1997, which like state codes, was a policy document.

Some of the prescriptive features of the Victorian code are:

- specification that provisions in industrial instruments or contracts should not require, or have the effect of coercing or pressuring, a group apprenticeship scheme
- the prohibition of the imposition, or attempted imposition, of a requirement for a contractor to apply project-specific wages and conditions
- the prohibition of clauses that prescribe the number of employees that an employer may engage on a particular site, work area or in the business as a whole
- the prohibition of restrictions on labour. For example, an industrial instrument must not include provisions that require an employer to consult or seek the approval of a union over the number, source, type (for example casual, contract) or payment of labour required by the employer
- that a tenderer provide a Workplace Relations Management Plan (WRMP), which, among a host of other things, sets out the contractor's way of regulating workplace arrangements; selection procedures for workers (for example, in relation to reference checks); approach to management of inclement weather and heat; approaches to relationship management with employees and unions; and identification of IR risks. The Plan also requires contractors to demonstrate that they have a track record of delivering projects on time and within budget (or indicate the actions they have taken that would make them able to do so in the future). If the contractor is the successful tenderer, it must comply with its WRMP.

WRMPs also specify how the tenderer will measure and report labour productivity and performance. If coordinated among jurisdictions, WRMPs will go some way to addressing the current limitations in data on costs and productivity at the project level (chapters 9 and 10; Loosemore, sub. DR116, p. 3).

Some other jurisdictions, most notably New South Wales and Queensland, have drawn on the Victorian Code and Guidelines with the goal of lowering procurement costs (NSW Government 2013b; Qld DoJ 2013).

As discussed later, the existence of multiple state and Commonwealth IR law, codes and guidelines has led to confusion and litigation. The early (but now overturned) cases won by the Construction, Forestry, Mining and Energy Union (CFMEU) before the Federal Court led the Victorian and New South Wales Governments to issue 'practice directions'. These prevented the application of their guidelines to enterprise agreements that had been approved by the Fair Work Commission (HSF 2014; DTF (Vic) 2013a). This avoided concerns about any potential

inconsistencies between the guidelines and the FWA arising from the initial Federal Court case. While the full bench of the Federal Court subsequently found in favour of the legitimacy of actions taken by the Victorian Government under its guidelines, the CFMEU has sought special leave to appeal the decision with the High Court of Australia. Consequently, as of mid-May 2014, the Victorian Government has not withdrawn the practice directions, thus negating the potential impacts of the guidelines. The implications of this are examined in section 13.7.

13.3 A framework for understanding the role of industrial relations in construction

It is important to understand several facets of the IR system in construction that affect industrial unrest, costs and productivity.

Contracting practices and market structure influence the industrial relations environment

Public infrastructure projects typically involve a head contractor (which may involve a consortium of major construction companies) that does not have a large permanent workforce, but instead supervises a large number of subcontractors to deliver a project. Subcontractors often perform 80 to 90 per cent of the total work value of a project.[35]

This employment and contracting model reflects that construction demand is cyclical and that major public infrastructure projects are site-specific and often require different skill mixes from project to project or at different phases of the project. In that context, it is more efficient for a head contractor to manage a site and engage subcontractors on a task-specific basis rather than carry the risks associated with underutilised capital equipment and personnel if it is unsuccessful in its bid for projects.

While this model entails some efficiencies, it can affect the IR environment in multiple ways.

[35] While this figure is from a dated study (Hampson and Kwok 1997), the Commission understands that this is still the norm.

Fleeting relationships and diffuse employment arrangements

Prime contractors and subcontractors employ some of their own workers on a permanent basis, but workers from labour hire firms and individual independent subcontractors (or 'own-account' workers) are an important source of labour in construction. The common absence of a permanent relationship between the head contractor and the personnel working for the subcontractors engaged on a project may undermine the capacity for loyalty between the parties. It also means that many employees see 'the union as the one constant in their work life' (Lend Lease sub. DR201, p. 13).

In 2012, the prevalence of independent contractors was higher in construction (29 per cent) than in all other industries (which averaged 8.5 per cent).[36] After taking into account other forms of employment, only 62 per cent of workers in the industry were classified as employees. Independent contractors typically invoice for their costs rather than receive wages. They would not usually have the same benefits as employees covered by enterprise agreements. Independent contractors and workers covered by labour hire firms typically have low union coverage and there is sometimes an impression that these employment forms are deliberately used by employers to reduce union presence or dilute benefits (ABCC 2010, pp. 34–35).

Given this, depending on whether and what type of agreement is struck at the project site, employees of different subcontractors working on the same site may receive different wages and conditions. Wage flexibility may suit some contractors, for example, as a basis for securing a temporary job between longer-term jobs (Mazzotta 2007, p. 6). Nevertheless, substantive variations provide the fuel for industrial unrest and create incentives for workplace agreements that seek to establish common conditions across subcontractors, even if these are not efficient (PC 1999). In negotiating any such agreements, employers may place greatest emphasis on the terms and conditions of employment for the current project, but neglect the long-term implications for wages and conditions of subsequent projects or for other employers. These long-term implications could be substantial.

Sham contracting is a risk

As employment arrangements are sometimes ill-defined, the industry is more subject to 'sham' contracting. Sham contracting 'involves misrepresenting or disguising an employment relationship as one involving a principal and contractor under a contract for services', which is unlawful under the *Fair Work Act 2009* (Cth) (ABCC 2010, p. 3).

36 ABS 2013, *Forms of Employment*, November 2012, Cat. No. 6359, 19 April.

Regardless of the degree to which sham contracting might sometimes incidentally reduce the inflexibilities in employment relations in the industry, it is nevertheless misleading and represents a breach of the law.[37] The employer pays no payroll tax. The employees affected by sham arrangements are treated like contractors and would generally have no entitlement to paid leave, minimum award wages and conditions, employee-paid superannuation and workers' compensation insurance (DIISRTE 2012). However, this does not necessarily imply that these workers are worse off. Their overall remuneration might be higher, they may gain various tax advantages, and they may otherwise be under or unemployed.

To the extent that sham contractors do not receive higher gross contract payments, this employment arrangement places pressure on the benefits for workers employed under lawful employment arrangements. This occurs directly because of a weakened capacity for bargaining by workers employed under conventional employment arrangements. It can also occur indirectly, as construction businesses using sham contractors may be able to reduce labour costs and win bids ahead of other competing firms. Accordingly, the practice is also attacked by some employers, as noted by the ABCC (2011a, p. 156). Lend Lease agreed that it remained a significant problem, undermining employees' faith in, and commitment to, individual firms (sub. DR201, p. 14). Not surprisingly, unions are hostile to the presence of such contract arrangements and to the parties that orchestrate them, as is the Australian Tax Office (2014) when the arrangement leads to tax avoidance by employees or employers.[38]

The prevalence of sham contracting is unclear, in part because the common law determination of whether it has taken place needs to take account of multiple criteria on a case-by-case basis (ABCC 2011a, p. 88). Nevertheless, employers found to be sham contractors sometimes offer the excuse that they are engaged in a practice that is 'rife' (ibid p. 41). The CFMEU and various other participants also claimed the practice was widespread or, on the basis of incentives, could be expected to be so (ibid p. 91, p. 117 and CFMEU 2011). A recent survey commissioned by FWBC estimated that between 5 per cent and 10 per cent of all workers within the industry were incorrectly classified as contractors, when they were really employees (Elliott et al. 2012, p. 94). Using different methods and data, the CFMEU (2011, p. 27) estimated a comparable range between 9 and 16 per cent. On the one hand, these misclassified workers receive some of the potential tax benefits of independent contracting. On the other hand, they forego the entitlements

[37] In any case, there are legitimate ways of achieving flexibility using genuine labour hire and subcontracting arrangements.

[38] Indeed, the ATO has construction-specific reporting requirements because of the high risks of tax evasion — another aspect of the industry's peculiar labour market characteristics.

of employees. The estimates will exaggerate the prevalence of sham contracting, as some of the misclassification is unintentional and so not legally a 'sham'. Regardless, the estimates serve to highlight the ambiguities of employment relationships in the construction industry, which in turn comprise one source of IR tensions.

It should also be recognised that employers' and employees' use of sham contracting is driven by economic incentives. One legitimate policy approach to sham contracting (and other problematic conduct by any party) is ex post action by FWBC and the ATO against unlawful conduct, which reduces the payoffs from such conduct. Codes of conduct and procurement guidelines can also be important, not just because of the economic penalties they impose on parties that breach the guidelines, but because they may alter the culture that excuses poor conduct. This is part of a broader story about IR in the construction industry and one basis for using government procurement as a source of leverage (section 13.7).

Insolvency risks affect employee security

There are relatively high insolvency rates in the industry, especially for lower tier contractors. The construction industry accounts for around 20 per cent of all corporate insolvencies — eclipsed only by insolvencies in business and personal services (ASIC 2013). Even second tier contractors are exposed to significant risks. For example, Reed Constructions Australia and St Hilliers Construction became insolvent in the last few years, with flow-on impacts on lower tier contractors (Collins 2012, p. 13; Wilkinson 2013). While the Fair Entitlements Guarantee provides financial assistance for employees to cover certain unpaid employment entitlements after the bankruptcy or at the time of the liquidation of a business, these may not be fully recovered as the Guarantee applies thresholds. Accordingly, insolvencies expose employees to some risks in relation to their entitlements, and to considerable uncertainty about re-employment and the terms and conditions they may face when they do get another job. The latter two concerns apply even when a business exit is not a business failure. Business exit rates are high in all segments of the construction industry (table 13.1), although comparatively lower than some other industries.

Combined with other characteristics of the industry, these risks may again undermine trust and loyalty between employees and businesses.

Table 13.1 **Exit rates by business size**

Share of businesses in each industry actively trading in 2008 that were not operating in 2012[a]

	Non Employing	*1–19 Employees*	*20–199 Employees*	*200+ Employees*
Building Construction	50.2	26.2	18.1	30.7
Heavy & Civil Engineering Construction	53.3	26.9	19.7	28.2
Construction Services	49.2	29.9	18.3	33.8
All Australian industries	44.4	29.8	23.2	30.3

a To illustrate the meaning of the numbers, 53.3 per cent of non-employing heavy and civil construction businesses operating in 2008 were not operating in 2012. Business exit rates need not equate with failure. An exit might reflect a voluntary exit, a sale of the business, a merger or takeover, or any factor that leads to the withdrawal of an Australian business number or failure to remit goods and services tax for five quarters.

Source: ABS 2013 (*Counts of Australian Businesses, including Entries and Exits, Jun 2008 to Jun 2012*, Cat. No. 8165.0, 21 May).

Diverse negotiating arrangements for agreements

There is a variety of arrangements for negotiating agreements, each with their own implications for the content of agreements, the manner of their negotiation and their flexibility.

Genuine enterprise bargaining agreements

Individual enterprises may form enterprise bargaining agreements with their employees. This provides flexibility and options, such as productivity bonuses, that are often absent from pattern agreements or greenfields agreements.

Industry-wide pattern agreements

Industry-wide pattern agreements are agreements that replicate terms and conditions across multiple workplaces and over time. They are struck between unions and various state-based employer organisations, an arrangement apparently particularly prevalent in Victoria and some other States (Ai Group sub. DR165, p. 5). For example, Ai Group cited the *ADJ Contracting Pty Ltd Enterprise Agreement 2010–2014* as the first of around 800 identical 200 page enterprise agreements approved by Fair Work Australia/the Fair Work Commission reflecting negotiations between the Communications, Electrical and Plumbing Union (CEPU) and the Victorian Chapter of the National Electrical and Communications Association. These agreements can be problematic in several ways, as noted by Ai Group (sub. SR165, p. 6) and the Australian Constructors Association (sub. DR169, p. 2 and sub. 72, p. 11). As stated by the Australian Constructors Association:

> One of these areas of concern relates to pattern bargaining on an industry-wide basis. Pattern bargaining was identified in the Cole Royal Commission as having a potentially significant effect on the cost of construction.
>
> This form of bargaining was described as a bargaining process in which unions or employers attempt to achieve common outcomes across different enterprises in an industry or sector, for example by the adoption of standard agreements, or a specified wage increase, the effect of which is designed to regulate the employment relationship of a large number of employees and their employers.
>
> Information before the Royal Commission indicated that pattern bargaining displaced, or nullified, the scope for genuine enterprise level bargaining about wages and conditions and increased the cost of projects by from 13 per cent to as much as 20 per cent or higher. (sub. 72, p. 11)

Ai Group recommended that pattern agreements become unlawful. The Commission is not examining this issue as part of this inquiry as it relates to broader industrial relations policy, which will be subject to future review.

Greenfields agreements

A head contractor may negotiate a greenfields agreement with unions for a specific project. As the head contractor manages the project site, but typically employs few people, it is in the interest of unions to negotiate enterprise bargaining agreements through the head contractor that then embrace a large number of workers employed by subcontractors (ACG 2013, p. 5). The agreement reached may have distinctive features, but will often also be influenced by relevant industry-wide pattern agreements (and will also reflect relevant awards and the National Employment Standards). This is why there are so many shared features of agreements.

While it is clear why unions might prefer to negotiate this way, it is not immediately obvious why prime contractors accede. As noted by the Australian Constructors Association (sub. 72, p. 9), head contractors face substantial liquidated damages for delays as well as other high-risk employee relations matters. For instance, one commentator claimed that:

> In the case of the desalination plant it appears that the contractor is obliged to pay severe penalties for failing to finish by the end of December 2011 - $15 million for one day late and possibly as much as $5 million per week thereafter. It has been estimated that if there is a strike it costs between $5 and $15 million per day whilst the site is idle. (Moore 2011, p. 6)

To the extent that this holds more generally, industrial disputes — which typically lead to delay or lost productivity — are potentially very costly for head contractors. As Ai Group indicated: ‘Unions routinely use the commercial risk faced by contractors as a lever to secure industrial concessions’ (sub. DR165, p. 4). As a

result, head contractors face strong incentives to negotiate generous workplace agreements (or to accede to what are implicitly pattern agreements) with unions in exchange for assurances of industrial harmony at the construction site. In effect, the excess costs of the generous agreement are paid for by the client (generally the government), while the head contractor reduces the likelihood of delays. The nature of infrastructure procurement (large, heterogeneous and lumpy),the political desire for rapid progress once announcements are made, and the weaknesses in procurement practices identified in this report make it difficult for government agencies to resist accepting cost increases due to generous agreements. (This issue and recent legal and policy developments are discussed further below.)

Apart from legal and regulatory constraints, the main brake on any such deal struck before tendering would be whether they prejudiced winning the contract. The risk faced by a contractor is that other contractors might negotiate more commercially sound arrangements with employees that help them to win a bid. However, two factors may undermine this countervailing competitive pressure.

- The Commission understands that greenfields agreements are often struck on a contingent basis by unions and competing bidding head contractors prior to tendering.[39] This provides the prime contractor and the client with some certainty about input costs and the IR risks that may emerge if the contractor is the successful bidder. However, competing contractors must all negotiate with the same unions. It would make little economic sense for the relevant unions to negotiate lower wages and conditions with one bidder compared with another, so that there is a risk that all contingent agreements include many of the same features. There are exceptions. For instance, in competition with the CFMEU, the Australian Workers Union (AWU) negotiated a new enterprise agreement for the Victorian Rail Link project, displacing the CFMEU, which was the union party to a prior agreement.[40]
- There are relatively few tier 1 contractors in Australia (chapter 11), so it is easier for unions to set common clauses in greenfields agreements that build on relevant industry-wide pattern agreements. Accordingly, concentration in the

[39] A common feature of such agreements is that they must relate to a genuine new 'enterprise' (which includes a genuine new business, activity, project or undertaking). In many instances, following prior agreement, the multiple unions that may represent workers on a proposed site determine which union will be the negotiating party for employees (to avoid demarcation disputes). Prior to any greenfields agreement, the employer must not have employed any of the persons who will be covered by the agreement and are necessary for the conduct of that enterprise.

[40] John Holland Pty Ltd re Abigroup, John Holland and the Australian Workers' Union - Regional Rail Link Footscray to Sunshine Project Agreement 2011–2015, [2011] FWAA 5724, 3 October 2011.

head contractor segment of the construction market may further facilitate the diffusion of generous conditions throughout the industry (to the extent that this is permitted under the law and building code guidelines). The potential cost burden from this concentration is not relevant to the ACCC's consideration of market concentration.

Moreover, large government construction projects are not exposed to the same level of competitive pressures as many traded good industries or private sector infrastructure providers, and there are at least some concerns about the extent of effective competition for some large infrastructure projects in particular sub-markets (chapter 11). This may enable head contractors to pass on the costs of deals with unions, undermining their incentives for hard bargaining ('sharpening the pencil') in these instances. The same risks may apply if a government elects to fast-track a large project for political or other reasons, diminishing its own bargaining power with bidders. Government guarantees for private construction projects entail similar risks (Knight, sub. DR113, p. 43).

This does not mean that project-specific pattern agreements developed by prime contractors for major projects are necessarily problematic (Australian Constructors Association sub. 72, p. 11). Some sort of assurance about labour input costs and IR management at a project site may be needed before a project client can shortlist head contractors and for provision of finance. The policy issue is whether any such agreements involved coercion of subcontractors or loaded the agreements with excessive wages and conditions.

13.4 Is construction different in other ways?

Quite apart from its contracting practices, the construction industry has other unique characteristics that some see as justification for specific IR laws and institutions. This contention underpinned the creation of the ABCC in 2005 and the persistence of construction-specific laws and institutions after the ABCC was removed. There is partial support for this contention.

Relative IR disputation and distrust is high

While the number of days lost to industrial action recorded by the ABS are now low by long-run historical standards, IR disputes are high for the construction industry compared with most other industries and are likely to generate significant costs for constructors (section 13.6).

As noted earlier, a succession of inquiries has identified a history and culture of distrust and, in some cases, unlawful behaviour by unions, contractors and other parties at levels that are well in excess of those in most other industries. These sentiments have echoed down the decades:

> Observance of the law and law enforcement in general play very little part in the industry. The law of the jungle prevails. The culture is pragmatic and unprincipled. The ethos is to 'catch and kill your own … The effect of illegal activities upon the culture of the industry and upon the commercial and industrial morality of participants in it is, in the long run, greater than the direct economic consequences. Once it becomes acceptable to break, bend, evade or ignore the law and ethical responsibilities, there is no shortage of ways and means to do so. Those who pay and suffer the other consequences of disruption in the end are the public.(Gyles 1992)

Much the same sentiments have reverberated through the Coles and Wilcox reviews. Most recently, allegations of major corruption in the industry involving suppliers and union officials have surfaced, and are being investigated by a Royal Commission under former High Court Justice, Dyson Heydon (section 13.2).

Workplace health and safety concerns are prominent

WHS issues are also much more prominent than in most industries. The industry has much higher rates of injuries and deaths per employee (table 13.2). For example, in 2010-11, the likelihood of a fatality per construction industry worker was three times higher than the average for all industries. These safety issues affect worksites in several ways:

- As representatives of workers, unions play a major role in assessing and responding to risks. They will typically provide the WHS officers on sites, be the first party to consider WHS issues, and can play a prominent role in ensuring safe practices. At times, construction companies have unlawfully refused a legal right of entry for a union official in relation to legitimate WHS issues.[41] Equally, while unions may have sometimes stopped concrete pours on dubious grounds, they have also done so legitimately, with one such incident being in the Australian Capital Territory. The ACT Work Safety Commissioner is reported to have said that concrete pours are one of the most dangerous activities on sites (Knaus 2012). Nevertheless, the claim that reductions in union power under the post-2002 IR regime in the construction industry has increased the fatality risk of workers (Allan, Dungan and Peetz 2010, p. 74) is not borne out by appropriate

41 For example, *CFMEU v Merhis Constructions Pty Ltd* [2010] FMCA 751 (29 October 2010).

metrics. The fatality incidence rate has continued to fall following the creation of the BIT and, in 2011-12, it was less than half that in 2000-01.[42]

Table 13.2 **Work health and safety indicators**
2010-11

	Incidence of serious claims	*Frequency of serious claims*	*Incidence of fatalities*	*Frequency of fatalities*
	Per 1000 workers	Per million hours	Per 100,000 workers	Per 100 million hours worked
Manufacturing	20.9	10.9	3.1	1.6
Health & community services	13.7	9.6	0.3	0.2
Retail trade	8.3	6.1	0.5	0.4
Construction	**17.8**	**8.9**	**6.3**	**3.2**
Property & business services	8.5	4.7	0.9	0.5
Transport & storage	21.7	11.2	9.9	5.1
Education	7.9	5	0.1	0.1
Personal & other services	17.5	10.8	1.4	0.9
Wholesale trade	14.2	7.5	2	1.1
Accommodation, cafes & restaurants	10.2	8.1	0.5	0.4
Government administration & defence	9.6	5.8	3.6	2.2
Agriculture, forestry & fishing	21	10.5	6.5	3.4
Cultural & recreational services	9	6.7	1.8	1.3
Mining	12.7	5.6	4.7	2.1
Communication services	6.2	3.5	2.3	1.3
Finance & insurance	2.9	1.6	0.5	0.3
Electricity, gas & water supply	7.3	3.8	1	0.5
All industries	12.2	7.3	2.1	1.3

Source: Safe Work Australia 2013, *Compendium of Workers' Compensation Statistics, 2010-11*, March.

- Subcontractors under financial pressure may be reluctant to follow all the appropriate WHS processes, creating tensions between unions and employers. It is easier to establish safety cultures in businesses that directly control all aspects of their production, unlike head contractors dealing with multiple subcontractors.
- It is notable that higher rates of industrial accidents tend to result in greater union activism, which may partly explain the increased degree of industrial unrest in the coal, stevedoring and construction industries (Perry 2006).
- Some union members can exploit their WHS powers to exercise their industrial muscle.

[42] Based on various issues of Safework Australia's publications *Compendium of Workers' Compensation Statistics, Australia* and *Key Work Health and Safety Statistics, Australia*.

Consequently, WHS issues are a more potent source of distrust and tension than in many other industries.

Efficient provision of public infrastructure is a critical input to the entire economy

As observed in chapter 1, any inefficiencies in public infrastructure have major economywide impacts. The expected demand for infrastructure construction services over the next few decades is high. The construction industry is a major input into many other industries — especially mining; electricity, gas and water; transport; communications services; and property and business services (ACG 2013, p. 41; Independent Economics 2013, p. 42 and Masters Builders Australia, sub. 88, pp. 4-5). For example, Independent Economics found that a hypothetical IR-related improvement in labour productivity of around 10 per cent increased value added in the construction industry by around 2 per cent, but also increased value added in the mining industry and the electricity, gas, water and waste services industry by 1.2 per cent each.[43]

A male-dominated industry

As one participant put it, the 'blokiness' of the industry sometimes accentuates aggressive attitudes on work sites and during industrial unrest. The construction industry is one of the most male-dominated industries in Australia. Of all the 19 industry divisions making up the economy, construction has the lowest female to employment ratio (at 11.7 per cent compared with 45.8 per cent for all industries in the year ending February 2014). The female employment share of the industry has also declined over the past two decades — against the trend in most other industries. Unions in the industry have low female representation in executive and organiser/field operations.[44] The aggressive nature of some industrial confrontations might be a barrier to greater female involvement.[45]

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[43] While the Commission identifies shortcomings in the estimate of a 10 per cent productivity improvement stemming from IR policy changes initiated in the early 2000s, to the extent that this number is nonetheless correct, the economywide results appear reasonable (and are based on a well-recognised sophisticated general equilibrium model).

[44] The head positions of unions comprise the various state secretaries, vice secretaries, and president, while people in the field comprise organisers and field officers. In the case of the CFMEU, across all the states, females accounted for about two per cent of the above positions (but a higher share of office management functions).

[45] For example, see p. 3 of [2013] FWC 5839, *Crown Construction Services Pty Ltd; John Holland Pty Ltd v Construction, Forestry, Mining and Energy Union (C2013/2848)* and John Holland Pty Ltd v Construction, Forestry, Mining and Energy Union (C2013/5217).

No single factor makes the industry 'special'

By themselves, these features are not always peculiar to the construction industry. For example, in many other industries, there are high costs from delay and the potential for bottlenecks to impose large costs throughout a supply chain. As an illustration, industrial action, lawful and otherwise, by air traffic controllers has large costly impacts for airlines, the traveling public and businesses in a wide range of other sectors of the economy. This provides substantial bargaining power to unions in that area to achieve wages and conditions outcomes above community norms.

However, taken cumulatively, the construction industry — and especially its complex contracting arrangements — is distinctive. If nothing else, the features of the industry suggest that achieving a good quality IR environment is particularly important, and that the regulatory and institutional arrangements need to reflect this (section 13.7).

The industry is diverse

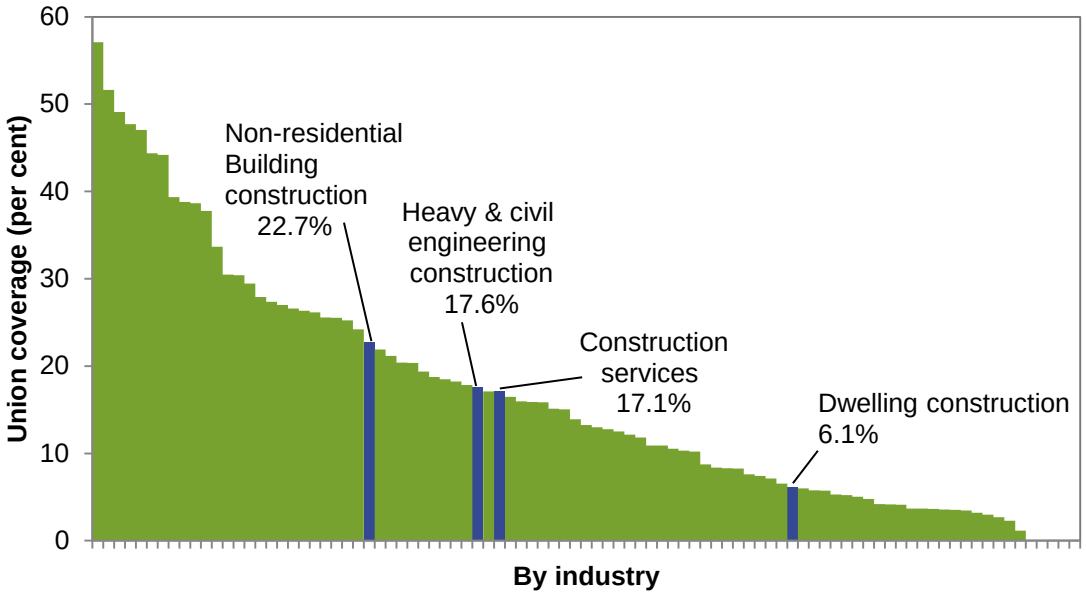
It is important not to overlook variations within the industry from an IR perspective. The varied nature and reach of unions in the industry provide one indicator of this. Aside from the residential building sector, where union membership is low, unions' presence in the construction industry is roughly commensurate with the average coverage of other industries — and so cannot be characterised as unique compared with other industries (figure 13.1).

However, unlike many other industries, the Commission understands from inquiry participants that unions are the principal or even only bargaining agents for employees on major construction projects, and that union membership is high in these instances. (Unfortunately, data from the ABS is unable to substantiate the latter because of high levels of aggregation.)

Variations between the sub-sectors of the construction industry also emerge when the type, organisation and location of unions are considered. It has also been claimed that variations in union-management relationships may vary across Australia, even when the same union and business are involved:

> We have good relations with them [Leighton and Lend Lease] sometimes and very poor relationships with others, and they have different approaches to their industrial relations affairs around the country. (CFMEU trans. p. 191)

Figure 13.1 **Union coverage by industry group, Australia**
August 2012, Share of employees in a union[a]



[a] Based on data on 91 industry groups, but with unpublished data for the 4 sub-industries of construction.

Sources: ABS 2013 (*Employee Earnings, Benefits and Trade Union Membership, Australia, August 2012*, released 17 May 2013) and ABS unpublished data.

While many unions operate in the construction industry, the two major unions are the AWU and the CFMEU. The former is the predominant union presence in the civil engineering construction projects that are the core focus of this report. Most underground engineering or bitumen work would involve the AWU. The CFMEU has greatest coverage of the building construction industry and so would be most relevant to roofed structures such as hospitals, prisons, military barracks and the buildings associated with transport systems (such as railway stations and airport terminals) and, more generally, the erection of scaffolding and crane operations.[46]

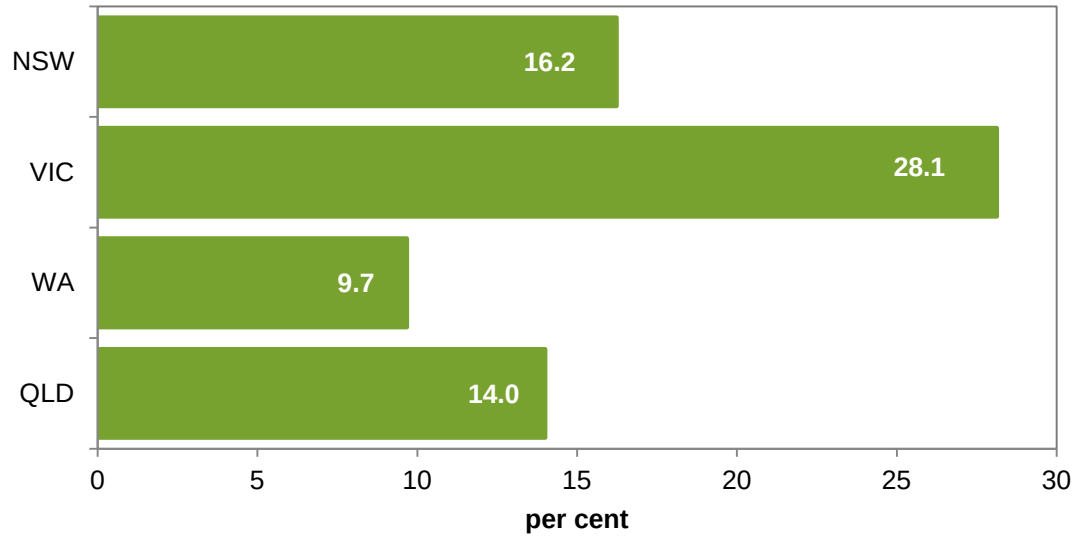
The differences in the unions go further than their relative strengths in different parts of the industry. The CFMEU has more federated and decentralised structure, so that the leadership and culture of the union in one state may vary from the other, without the central control of a fully national union (such as the Community and Public Sector Union).

In contrast, the AWU has a more hybrid structure. It operates federally, but has strong national policies applying across jurisdictions. This suggests that it is more likely to be more culturally similar across borders.

46 This does not always apply. For example, the CFMEU was a major union in the construction of the New South Wales M7 motorway.

Victoria appears to be more subject to unlawful conduct by unions and officials than other jurisdictions. Union membership also appears to be significantly higher in Victoria than in New South Wales or Queensland (figure 13.2), reflecting the importance of historical factors in the power and capacity of unions as bargaining agents.

Figure 13.2 **Union membership rates in engineering services**
August 2012[a]

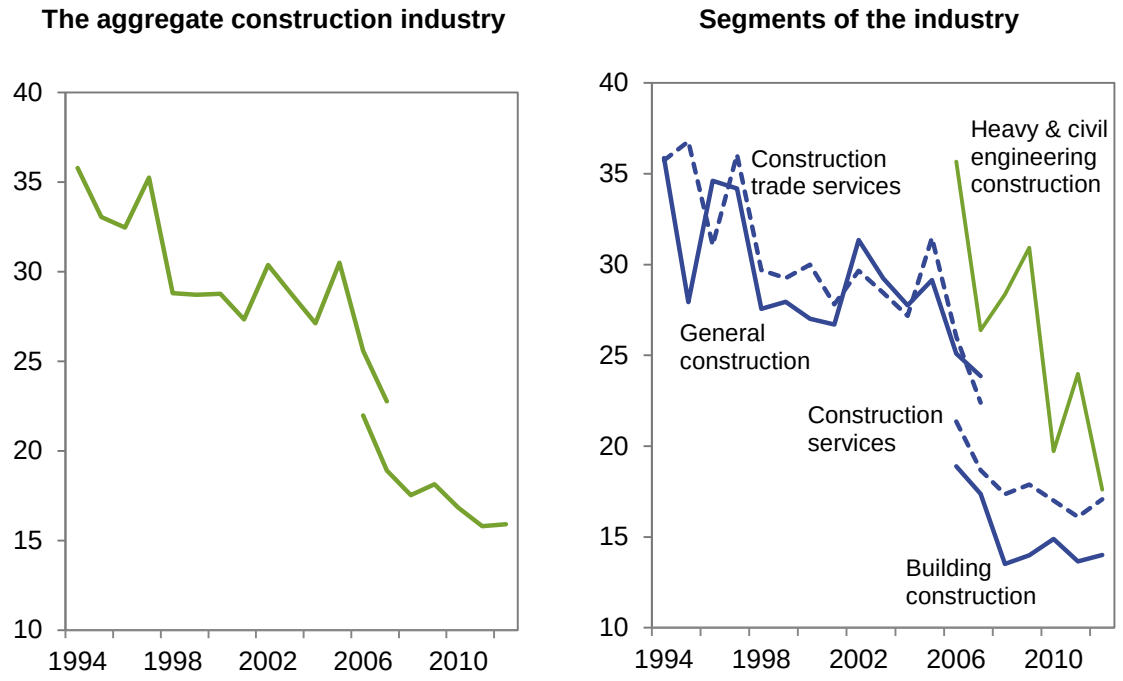


[a] The pattern of the data is similar for heavy and civil engineering, with Victoria having the highest membership rate (at nearly 37 per cent) compared with other jurisdictions (with the next highest rate, that of Western Australia, being half that of Victoria). However, the values for union membership rates are less reliable for heavy and civil engineering.

Source: ABS unpublished data, derived from the August 2012 publication of *Employee Earnings, Benefits and Trade Union Membership*, Cat. No. 6310.0.

Nevertheless, unions appear to be playing a weaker role in all segments of the construction industry, as with other industries in Australia, although clearly still yielding significant power in negotiating enterprise agreements, as discussed later (figure 13.3). So, what holds now may not hold in a decade.

Figure 13.3 **Unionisation has fallen significantly**
1994–2012, share of employees, per cent[a]



[a] Definitions of the sub-industries have changed, creating the break in the series.

Source: ABS (*Employee Earnings, Benefits and Trade Union Membership, Australia - Trade Union Membership*, Cat. 6310).

13.5 The impacts of industrial relations at the project level

The construction industry and business groups have often pointed to problems in the IR environment in major construction projects, particularly in relation to:

- excessive terms and conditions and the creation of a wide range of complex allowances
- unlawful or obstructive activities of some unions or officials
- control over the management of the site, including its WHS regime and monitoring, stipulations about hiring subcontractors and the organisation of rostering
- the disruptive effects of go slows, work to order, overtime bans and strikes on the efficient management of a construction site
- identifying 'dummy' WHS issues as the basis for exercising power and bargaining.

Unions also claim inappropriate conduct by employers that can sour relations on a work site. For instance, the Electrical Trades Union of Australia said:

> Employers often frustrate employee's attempts to meet with unions at work. They even attempt to stagger breaks to make it difficult for workers to have a common break to meet and talk with union officials or make places for union officials to meet inconvenient for their employees. (sub. DR159, p. 13)

In its consultation with construction businesses, the Commission received mixed views about the severity of the impacts of the IR environment on costs and productivity. Some cited major issues, while others said that other factors mattered more for the efficiency and costs of their businesses. Surveys of employers also suggest a diversity of views (section 13.6). When asked about cost pressures, many businesses identified wage costs, although less as a symptom of a poor IR environment than as the broadly expected outcome in a country with rich resource endowments and a high standard of living.

Similarly, other stakeholders have a mixed view about the importance of IR in affecting site productivity and costs (box 13.2). The Electrical Trades Union also observed that what holds for some sites does not hold for all, and that projects in which unions have a major representative function may still come in on time and budget compared with other projects:

> … what's missing is … any analysis of the number of projects that have been completed under the current industrial relations system, which we still think is too interventionist, and the number of union projects that have come in on time and on budget compared to non-union projects. (trans. p. 104)

On the other hand, it is conceivable that cost and time forecasts have already taken into account the influence of unions, so this metric is not conclusive.

It is often hard to obtain objective evidence about these contested issues, but in the following sub-sections the Commission has looked at evidence about wages and conditions and unlawful conduct (and associated case studies) that reveal likely wider problems.

Excessive terms and conditions may sometimes occur

In general, employer representative bodies were critical of current enterprise bargaining agreements (EBAs) and the arrangements that underpinned their negotiations (BCA sub. 39 and Master Builders Australia sub. 88).

Box 13.2 Views on the broad impact of the industrial relations environment in construction

Sadly, building and construction industry unions have a long history of militant and often unlawful behaviour, particularly wildcat strike activities that disrupt workplaces. (Master Builders Australia, sub. 88, p. 12)

Ai Group is very surprised that the Productivity Commission's consultations with individual construction businesses did not suggest that the IR environment was a major source of cost pressures or low productivity. This is in stark contrast to the views which are constantly relayed to Ai Group by project owners, head contractors and sub-contractors. (Ai Group, sub. DR165, p. 7).

AMCA members are the largest employers of plumbing trade labour and the largest employers of on-site labour outside of the labourer category. Therefore, industrial relations and how it is practised is an important factor in the productivity and profitability debate. The Association does agree that industrial relations alone do not hold the key to improved productivity. It is important but not the only factor. (Airconditioning and Mechanical Contractors' Association, sub. DR157, p. 2)

Australia has narrowly focused on industrial relations reform while other countries have moved ahead more aggressively on a broader range of fronts. Construction productivity is determined by a wide range of factors and Australian needs a multi-dimensional strategy to improve it. … The industry should avoid the temptation to focus on wages and industrial relations. While industrial relations is an important ingredient in the productivity debate, it is one of many. Meeting the future's challenges will require trust and genuine collaboration between employers and employees. (University of New South Wales sub. 44, p. 2)

Twenty years ago, the Productivity Commission published a major report into the construction industry. At the time four major issues limiting productivity improvement were: industrial relations, planning consents, Australian participation and project management. The Taskforce believes the major issues confronting the construction industry today are different. The BER [Building the Education Revolution school building] program has been notable for negligible industrial disputation, and we have observed the benefit of the streamlined BER planning approval process. We have however witnessed deficiencies in the quality of workmanship, in project management, in public works capacity and in the framework of private certification. (Chandler 2013b, p. 5)

T&T found that when recent Australian projects were compared to like builds elsewhere, Australia compared well to UK projects and to USA projects in cities where construction is unionised, such as New York. … Other factors that may be significant in other industries (such as labour practices) appear to have been of no material impact in the airport development experience. (Australian Airports Association, sub. 90, p. 11)

The Inquiry Panel [in relation to occupational health and safety issues] heard that site visits and union focus is often concentrated on employers undergoing enterprise bargaining negotiations. (Briggs and McCabe 2012, p. 10)

Some employers expressed similar concerns. For example, McLeod Rail pointed out that:

> Greenfields enterprise agreements negotiated by Tier 1 contractors lead to excessive remuneration costs, reduce productivity and discriminate against sub contractors unless they either "uplift" pay and allowances to the project, or execute an enterprise

agreement that permanently inflates the contractor's labour costs, reduce their margins or both. Subcontractors may provide value-for-money, safety and quality but will be internally assessed as "high" on the IR risk scale if they don't have an EBA, or elect to maintain their current EBA conditions, rather than pay staff according to "project conditions". (sub. 49, pp. 3–4)

The Commission examined EBAs from four perspectives (with the details covered in appendix H), by examining:

- at the detailed level, a small sample of EBAs to highlight the diversity in pay and conditions across individual EBAs
- aggregate data of wage outcomes of all EBAs in construction between 1991 and 2013 (compared with EBAs in other industries)
- the individual records of around 3000 enterprise agreements struck in the civil and engineering industry, covering wages, and a range of other agreement elements
- international comparisons of some provisions of agreements, particularly rostered days off and hours worked.

A sample of EBAs

While many provisions, terms and conditions of EBAs are underpinned by minimum conditions specified in national and other industry awards, a detailed analysis of the sample of EBAs revealed significant differences:

- some provided standard employer superannuation contributions, but others provided for flat payments that were more than 50 per cent more generous for lower-wage employees
- there were variations in income protection contributions by employers
- daily site allowances were $6.25 per hour in one agreement compared with $4.50 an hour for another agreement (for the same year)
- controversial 'jump up' clauses occurred in many, but not all agreements. Under such clauses, all employees on a work site have the same pay and conditions, even if they are already covered by agreements with lower benefits. Jump up clauses were in 20 of the 31 EBAs examined

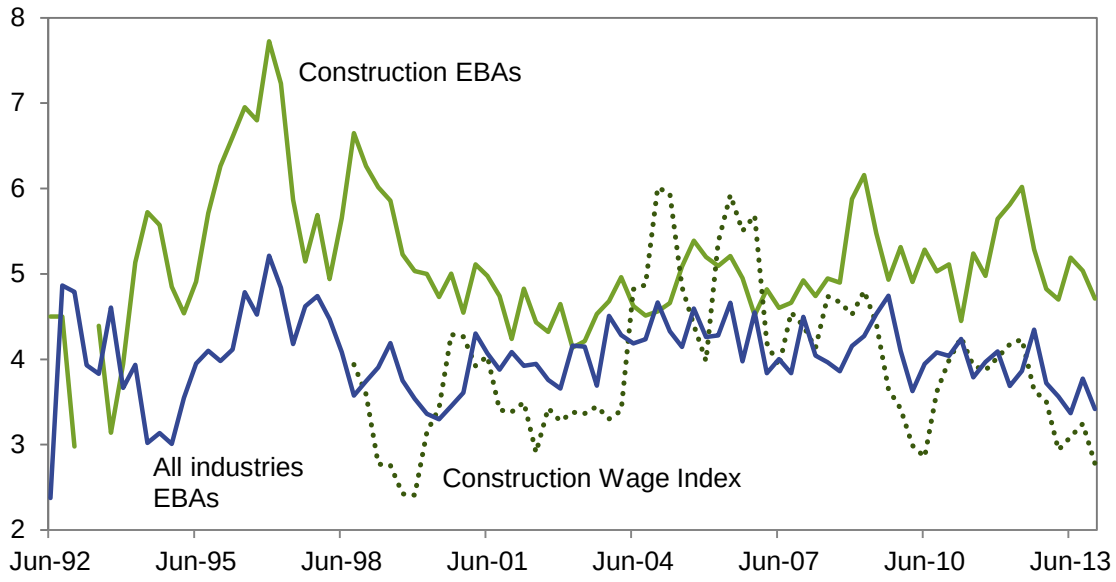
Another clear facet of the agreements are the degree to which add-on benefits, such as redundancy benefits, LAFHA, and site allowances can increase base wages (sometimes by around 60 per cent).

Many agreements ran to hundreds of pages — setting out the complex array of allowances, workers and managerial responsibilities and how businesses were to address exigencies, such as inclement weather. The Commission has not examined whether all of these features are necessary as that goes more broadly to the design of the IR system as a whole, and is appropriately a topic for a general IR inquiry.

The aggregate picture of EBAs

In general, EBAs in the construction industry have provided significantly higher average annual wage increases than in other industries (figure 13.4).

Figure 13.4 **Wage growth outcomes under enterprise agreements**
June 1992 to December 2013, average growth rate per annum, per cent[a]



[a] Relates to agreements current in the nominated quarter. The Construction Wage Index is an ABS measure of the price of labour that ignores the varying impacts of overtime and other factors that depend on the changing patterns of use of labour.

Sources: Department of Employment (2014), *Historical Table on all wage agreements lodged in the quarter December 1991 to September 2013*; ABS (*Wage Price Index, Australia*, Cat. No. 6345.0).

The gap fell from around 1996 to 2003, but has since progressively risen. EBA wage growth outcomes in construction have also outstripped EBAs in the mining sector for much of the period from 1991 to 2013.

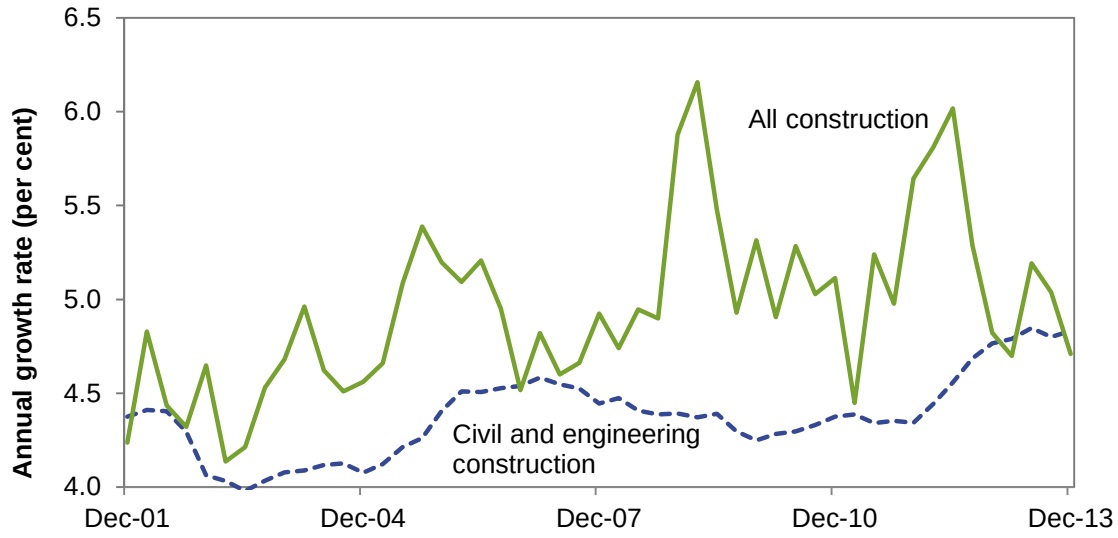
While imperfect, another measure of the impact of EBAs is their relativity to the growth in the wage index in construction generally (which provides both a perspective on union bargaining influence, but also the different kinds of labour and

skills used in different parts of the industry). The wage index has followed much the same time profile as all industries (excepting some peaks between 2004 and 2006).

Wage growth rates in EBAs have also tended to be higher in construction as a whole than in civil and engineering construction, the latter predominating in public infrastructure projects (figure 13.5). On face value, this is surprising as demand pressures appear to have been greatest in the civil and heavy engineering part of the construction industry (appendix I).[47]

However, more perplexingly, some ABS data suggest wage growth has been *weaker* in building construction than in civil and engineering construction (appendix G). Several factors may resolve the apparent contradiction (issues covered in more detail in appendix H). Most particularly, building includes the housing construction sector, which has quite different characteristics and wage dynamics than non-dwelling building construction. One conjecture is that wage pressures in the non-dwelling building construction part of the market have been high, perhaps reflecting the particularly strong bargaining power of the relevant unions in this market segment.

Figure 13.5 **Wage growth rates in parts of the construction industry**
EBAs, 2001 to 2013[a]



a The method for calculating the civil and engineering average wage growth rates results in more smoothing than that used for all construction.

Sources: Department of Employment unpublished data and its *Historical Table on all wage agreements lodged in the quarter December 1991 to September 2013*.

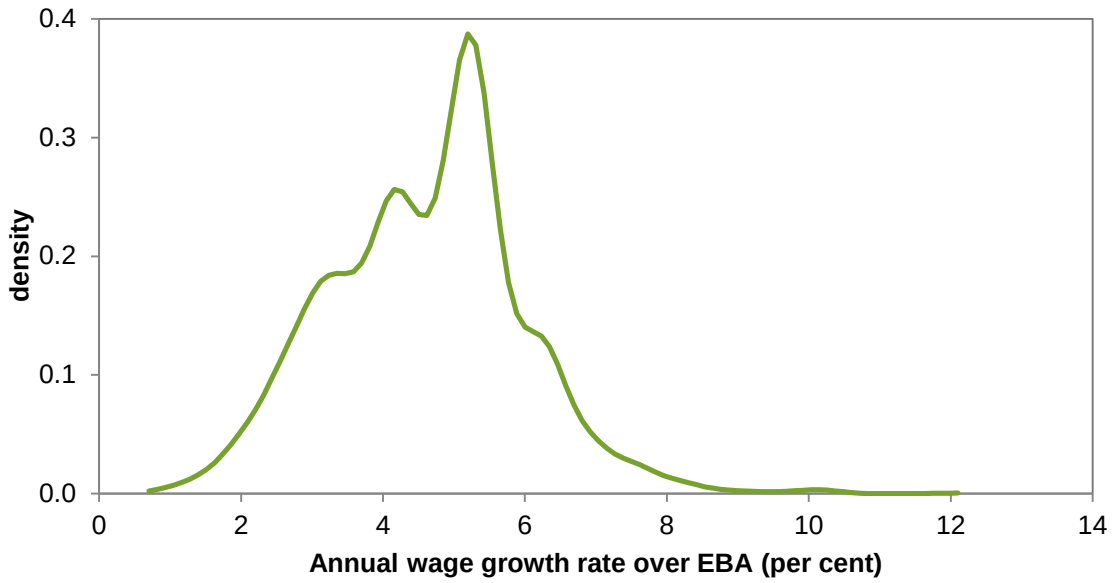
47 Data issues may be one source of the divergence between the EBA results for construction generally and civil and heavy engineering construction.

The Commission has undertaken a detailed study of the nearly 3000 EBAs for civil and engineering construction from 2000–2013. This analysis confirms differences in agreements that are unlikely to reflect typical market factors. For example, the Department of Employment identified very few agreements with specific measures to improve productivity, and there were significant variations in the extent to which agreements allowed constructors flexibility in determining RDOs. The terms on which constructors could engage casuals varied greatly.

Some agreements gave employees very high average annual wage growth (figure 13.6).

Figure 13.6 **The distribution of wage growth outcomes for EBAs in civil and engineering construction**

Certified agreements ending between 2000 to 2017



a Based on 2830 agreements. The wage growth is the average annual wage increase over the term of the agreement. The density is estimated using a Gaussian filter.

Source: Department of Employment unpublished data.

There are many factors explaining wage growth variations between agreements. However, even after taking account of these, some 80 per cent of variations are not explained by the variables considered in the analysis (appendix H). The Commission's analysis suggested that, all things being equal:

- wage growth rates have tended to be significantly higher in Victoria, Queensland and Western Australia than other jurisdictions. The Victorian premium (which is the highest of all jurisdictions) cannot be ascribed to the resources construction boom

- wage outcomes tend to be high when the CFMEU is involved — potentially indicating their capacity to use industrial muscle (the exploitation of which is discussed below). But other unions — most notably the Communications, Electrical and Plumbing Union and the Australian Manufacturing Workers Union — also appear to negotiate higher average outcomes. This may partly reflect project characteristics not adequately covered in the Commission's modelling.
- desalination and dredging projects have been associated with much higher wage growth outcomes than others. It may be that the urgency in the construction of the former contributed to the bargaining capacity of the relevant unions. Dredging projects also appeared to have a higher likelihood of paying higher than the statutory rate of superannuation and having less flexible RDO arrangements
- the average annual wage growth rates are lower in agreements with longer periods
- EBA wage growth outcomes have been rising over time, which may explain why some constructors have expressed concerns about wage pressures (though wage increases should not be seen as inherently problematic)
- once other factors, such as project type, location and union representation is considered, greenfields EBAs do not seem to be associated with higher wage growth outcomes.

While the existing EBA data shows rising wage rates in the construction industry, that picture may change as new agreements are struck, reflecting the impacts of high wages on the viability of construction projects, competition from non-unionised construction workforces and slackening of demand for resource-related construction. For example, the CFMEU draft enterprise bargaining agreement for Western Australia included significant reductions in wage rates (Barrett 2014).

Other evidence also shows escalating labour costs

While EBAs provide a rich source of information about labour costs, they nevertheless only provide a partial perspective. Other evidence also shows that wage increases in the construction industry have been significantly higher than most other industries in recent years (appendix G). They have also outpaced construction prices. In some jurisdictions, wages appear to have risen faster than labour productivity growth, which could reflect a shift in the bargaining strength of unions.

To the extent that targeting of unlawful conduct by the construction-specific IR regulator (most particularly by the ABCC) reduced union bargaining power, then this might have reduced the wage outcomes of negotiated agreements. In fact, wage growth was typically highest during the ABCC period. That might reflect several factors. The premise that there is a significant link between unlawful conduct and wage bargaining power may be wrong. Alternatively, any effect of the ABCC/BIT in dampening wage growth may have been partly masked by the resources boom, which could be expected to have disproportionately affected wage growth in construction compared with other industries (Bishop et al. 2013). Regardless, in any of these results, association is not causation, a problem that particularly besets analysis at an aggregate level.

An international oddity?

Some aspects of Australia's working arrangements in construction seem at odds with those overseas. AECOM compared trade labour force entitlements for Australia with entitlement on six other countries.[48] The factors reviewed include days off per year; ordinary hours worked per week; typical stop work conditions and over time rates. Based on its analysis, AECOM concluded that:

- Australia's labour force agreements are more prescriptive than in any other nation researched
- annual leave and public holiday entitlements in Australia are in line with global trends but, unique to Australia is the accumulation of time rewarded in lieu of Rostered Days Off (RDOs). Including RDOs, trade labour construction working days off in Australia are roughly double the number of days off in other countries RDO arrangements in some agreements may lead to dormant sites during fixed RDO periods, such as during the 10 day break around Easter period that applies in some agreements. On the other hand, RDOs predominantly apply to trades. During RDO days, non-trade labour, such as planners, architects, designers and consultants, do not have days off. The impact of trade labour RDOs across the wider industry is unknown (AECOM sub. DR188, p. 3)
- at 36 hours, ordinary hours worked in Australia are the lowest of the countries reviewed. However, including RDO accruals, ordinary hours worked is 40 hours
- Australia is the only nation with stop work conditions that are triggered by a prescribed temperature. In most other nations, this is at the discretion of the safety representative or the relevant labour force department

48 These were New Zealand, the United Kingdom, the United States, Singapore, United Arab Emirates and South Africa. The latter two are less relevant given their different economic context.

- across all countries reviewed, Australia has the most favourable overtime rates that are incurred after working a 40 hours week (which includes four hours of RDO accrual).

All other things being equal, the above features raise labour costs on Australian construction sites compared with other developed countries.

Unlawful conduct remains a problem

Unlawful conduct continues to be a significant problem in the construction industry. There have been 169 legal matters with penalty proceedings overseen by the ABCC and FWBC since the inception of ABCC in 2005.[49] Of these:

- 131 involved unions directly. The CFMEU was the dominant respondent, accounting for 108 cases (82 per cent of cases involving unions) as the sole respondent, and a further 7 cases (5 per cent) with other unions. The remaining cases were spread evenly across several other unions (which included the Communications Electrical Plumbing Union – 5 cases; Australian Manufacturing Workers Union – 5 cases; AWU – 4 cases; and the Builders Labourers Federation Queensland – 2). Of the 131 matters, 60 involved unprotected industrial action, 25 coercion, 23 unlawful entry to a site and 17 a violation of freedom of association
- 31 involved employers (either on their own or with employees). The dominant matters were sham contracting (9 cases), pay and entitlements (8 cases) and strike pay (6 cases)
- seven involved employees, of which at least three represented actions by employees on behalf of unions (and two of these involved the CFMEU)
- Victoria accounted for just over 50 per cent of cases, Western Australia 16 per cent, and the Australian Capital Territory 4 per cent — much more than other jurisdictions based on their relative sizes. The remaining results were New South Wales (9 per cent), Queensland (11 per cent), South Australia (5 per cent), Tasmania (1 per cent) and the Northern Territory (1 per cent)
- most cases related to buildings, including a mix of commercial, residential and social infrastructure. Very few involved economic infrastructure, the primary focus of this inquiry.

This evidence confirms the heterogeneous nature of the IR landscape in construction. Unlawful conduct is relatively rare, yet clearly some unions and some

[49] Based on information provided by FWBC and covering the period between 1st October 2005 and 7th February 2014.

jurisdictions have higher rates of unlawful conduct. It should not be assumed therefore that all unions engage in unlawful conduct or that, even where a given union is a major source of problems, this conduct is characteristic of all of the officials of that union nationwide.

Several compendiums of finalised cases reveal a diverse range of matters where union officials were involved — such as unauthorised entry to sites; persuasion of particular specialised employees to leave a site; industrial disputes to pressure an employer to renegotiate an agreement or to re-instate redundant workers; contraventions of right of entry provisions; and attempts to pressure a contractor to employ (or not to employ) certain people.[50]An example of the latter is the Peninsula Road Project, which involved action by the relevant union against the head contractor Abigroup (a division of Lend Lease) in an attempt to pressure it to employ particular members of the union. Justice Gordon of the Federal Court concluded:

> The unlawful conduct constituted a concerted and persistent attempt by the CFMEU and the individual named respondents to coerce Abigroup Contractors to employ four identified members on the Peninsula Link Project. It could not be said that the contravening conduct was inadvertent or genuinely believed to be lawful. The respondents' conduct was part of a deliberate industrial strategy. … The unlawful conduct included blockading of sites, directing workers not to perform any further work at numerous sites and a verbal altercation at a site (*Director of the Fair Work Building Industry Inspectorate v Construction, Forestry, Mining and Energy Union* [2013] FCA 1014, pp. 11–12).

Tactics, such as delaying, blockading of sites, bullying, verbal abuse and other coercive conduct have been features of interactions on sites. The disruption itself would also lead to project delays and lower productivity on sites (box 13.3).

However, the degree to which industrial disputes have damaged particular construction businesses is not easy to assess, even for courts. For example, in the Watpac judgment (involving industrial actions over several days and building sites), Justice Collier concluded that:

> No conclusive evidence is before the Court as to the nature and extent of any loss or damage sustained by Watpac (or anyone else) as a result of the respondents' conduct. I note, however, that the respondents concede that the effect on Watpac was not trivial as the results of the respondents' conduct was to cause an unidentified number of workers to leave the projects on two days and a threat that they might leave on another day. (*Director, Fair Work Building Industry Inspectorate v Construction, Forestry, Mining and Energy Union* [2013] FCA 846)

[50] Based on cases finalised by FWBC to 28 February (FWBC 2014b) from the Commission's review of many cases, and the compendium of cases listed by (MBA 2014, attachment C).

Box 13.3 **Delaying tactics**

Disruption of construction sites can take many forms, with formal stoppages and strike actions being only the most visible examples. During this inquiry, the Commission found various cases of less visible, but still highly costly, delays. These included:

- blocking access to work sites through a range of means, including the dumping of debris or materials at work gates, or parking of machinery or trucks for the same purpose
- delaying the delivery or use of materials (including concrete pours), by either preventing access to sites or preventing the further handling of materials once on site
- stopping the removal of waste from sites
- placing 'bans' on the use of critical equipment, such as cranes.

While some instances involved relatively short disruption, others were lengthy, involving multiple days or even weeks.

The estimated costs incurred from such delays vary considerably, but can be substantial and borne by a range of parties (including principal contractors, but also a range of subcontractors). One indication of the possible costs of such delays is related penalties imposed. For example, Alfred v Construction, Forestry, Mining and Energy Union [2011] FCA 556 (2 June 2011) stated:

> The BCII Act commenced operation in 2005. Since then the CFMEU and its officials have been found, in 28 cases, to be liable for contraventions of that Act. Of these, 22 cases have involved the Victorian branch of the Construction and General Division of the union ("the branch"). Pecuniary penalties totalling $2,711,150 have been imposed on the CFMEU under the BCII Act. Of this sum $2,328,550 has been attributable to the unlawful activities of the branch.

The bigger concern is the more general potential to reduce competition from subcontractors that have wages and conditions more commensurate with community norms and productivity. This would lead to higher costs. The Independent Contractors Association (sub. 100) provided various case studies that suggested that bargaining arrangements could lead to substantial increases in costs (citing the Commonwealth Games Village, the City Links Road Project, and the Victorian Desalination Plant as examples).

'Sweetheart' deals and a life easily lived

Most recently, there has been concern that head contractors and unions find it expedient to secure certainty through negotiation of greenfields agreements incorporating excessive wages and conditions before tenders. A major issue is that such agreements have limited the capacity of subcontractors to form their own enterprise agreements with their own employees, and that such agreements have set the standard for subsequent agreements, inflating costs.

McLeod Rail made the observation that tier 1 contractors may not be unhappy with generous greenfields agreements:

> A couple of years ago I heard a senior employee of a major contractor brag about the greenfields project agreement they executed but when I read it I could not see why any employer would think it was a proud day to get in place such an expensive and inflexible employment instrument. Contractors blame unions and unions blame contractors, but it's possible they are similarly culpable in producing high cost / low productivity environments. In seeking industrial harmony "at any cost", along with their obsession with "compliance", Tier 1 contractors are failing to obtain "value for money", with attendant impacts on project costs. (sub. 49, p. 4)

While it is doubtful that head contractors seek harmony 'at any cost',[51] they may be subject to pressure to strike deals that can be inimical to flexibility of work arrangements on sites or to diffuse elements of an enterprise agreement across a wider workforce. For example, the Victorian Government raised concerns that during the tendering process for the Bendigo Hospital project, Lend Lease finalised an EBA with its consortium employees that was in effect union friendly, and did not comply with the Implementation Guidelines for the Victorian Building Code. There were several alleged breaches of the Guidelines, such as a provision that might be seen as discouraging the use of contractors at the expense of the job security of Lend Lease employees, and that Lend Lease engage additional labour on terms and conditions no less favourable than those provided by the relevant CFMEU enterprise agreements.[52] In principle, this could have precluded the Lend Lease consortium from winning the bid, which was the basis for a case successfully brought by the CFMEU before the Federal Court. The full bench of the Federal Court on appeal held the code and its operation to be lawful, thereby providing a legal basis for its use of the guidelines in its procurement decisions (box 13.4).

A crucial difference between the construction of public infrastructure and many other areas of the economy where industrial disruption may be present is that the clients are governments, which tend to be less price sensitive than commercial clients. Accordingly, to the extent that sweetheart deals take place, the costs are ultimately borne by taxpayers or through higher user charges for infrastructure.

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[51] For example, Lend Lease strongly denied strongly that it sought harmony at any cost (sub. DR201, p. 14).

[52] *Construction, Forestry, Mining and Energy Union v State of Victoria [2013]* FCA 445, pp. 16-17.

Box 13.4 The collision of Australian Government and State laws and guidelines

As noted earlier, the Australian Government and various State Governments have codes and guidelines that potentially disqualify contractors from government building contracts if their IR practices are noncompliant. However, variations in the codes and guidelines adopted by different governments raise the risk that one arrangement may be inconsistent with another: This may:

- lead to ambiguity about compliance for purchasers, employers, and employees and their representatives
- create a situation in which a party required to observe an Australian Government statutory provision might breach a State Government guideline, thus making them potentially ineligible for tendering for a State Government building project
- mean that a construction industry participant observing state government guidelines (or the state government that makes an order based on the guidelines) could be legally in breach of national industrial relations law.

These are not academic concerns, as demonstrated in a succession of cases before the Federal Court involving the application of the Victorian Guidelines to two construction projects (the Bendigo State Hospital and the refurbishment and partial demolition of a building for a theatre group):

- *Construction, Forestry, Mining and Energy Union v State of Victoria [2013] FCA 445*
- *Construction, Forestry, Mining and Energy Union v McCorkell Constructions Pty Ltd (No 2) [2013] FCA 446*
- *Construction, Forestry, Mining and Energy Union v State of Victoria (No. 2) FCA 1034*
- *State of Victoria v Construction, Forestry, Mining and Energy Union [2013] FCAFC 160.*

The CFMEU initially won its cases before the Federal Court, primarily on the basis that it was unlawful under the FWA for the Victorian Government to:

- threaten to contract with a party (Lend Lease) whose Fair Work Commission approved enterprise agreement was noncompliant with the Victorian Guidelines application of its Guidelines
- attempt to coerce a sub-contractor (Eco Recyclers) to change its enterprise agreement.

However, the Victorian Government won on appeal. The cases involved several complex issues, but important elements in the appeal were that the neither the Victorian code nor their guidelines had a legislative foundation and that the Victorian Government could apply them with discretion (although the CFMEU has sought special leave to appeal the decision with the High Court of Australia).

13.6 The aggregate effects of the IR environment on the construction industry

IR problems may affect aggregate economic outcomes in several ways. In some instances, they may increase the labour and capital required in the industry above efficient levels, lowering productivity and raising construction costs. In other instances, IR problems may raise labour costs without corresponding productivity improvements. However, in general, the goal of unions would be to achieve higher wages, rather than to reduce productivity.

Prima facie, the previous section strongly suggests that poor IR environments on major project sites will have adverse effects on their productivity and costs (as well as other effects on subcontractors and employees). However, a key concern is whether these adverse effects are great enough to show up reliably in aggregate industry performance data.

Industrial disputes in the construction industry

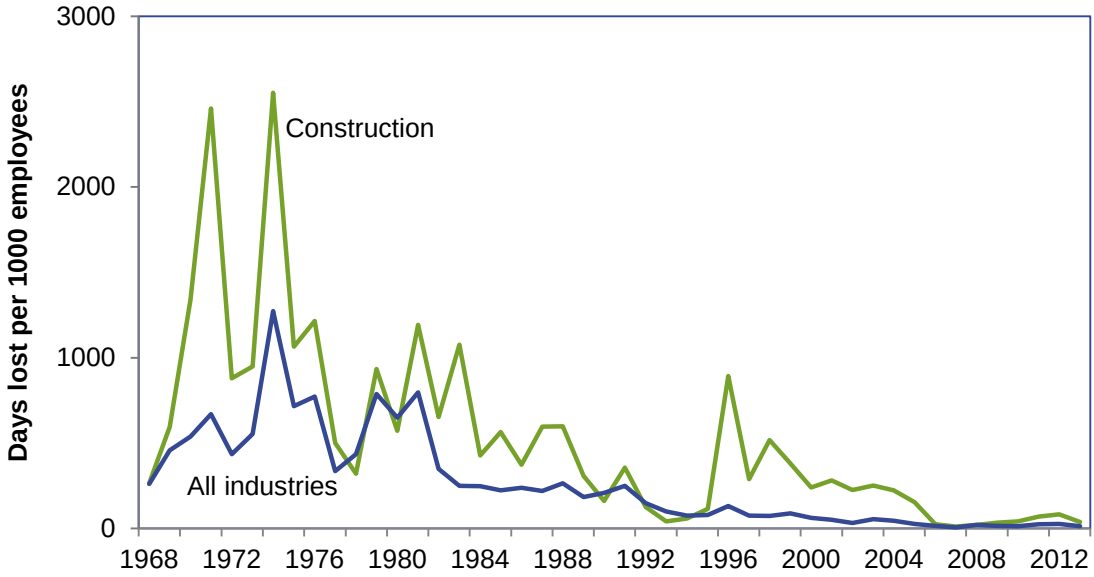
The level of industrial disputes provides one measure of the overall state of an IR system and its potential to accentuate an adversarial culture, frustrate productivity and increase costs. Days lost per 1000 workers is the single most useful measure of industrial disharmony (figure 13.7). Total days lost fails to take account of different employee numbers over time or between industries, while disputes per employee does not consider the average duration of industrial activity.

As emphasised by the CFMEU (sub. DR174, p. 12), a long-run view suggests a significantly improving IR environment in construction. Days lost per 1000 employees in 2013 were around one twentieth of that in 1996 and only 1.5 per cent of the rate in 1974, which was the nadir of IR unrest in the construction industry (and the economy as a whole). Moreover, industrial disputes appear to be only one of many sources of disputes affecting construction site operations, and not one emphasised in the contemporary engineering management literature (McGeorge et al. 2007).

To place some perspective on the apparent economic implications of industrial disputes, in 2012-13, they reduced time worked by employees in the construction industry by around 0.032 per cent or about 40 minutes per employee per year. This is a fraction of unscheduled absenteeism due to sickness each year. Taking account of idle capital on affected building sites, the estimated effect on economic output is around $30 million in value-added terms in 2012-13 in current prices, or around 0.025 per cent of gross value added in the construction industry. As the effects

extend throughout the economy, the economywide GDP loss would be somewhat larger, and is estimated to be around $40 million in that year (using the modelling approach of Dixon and Wittwer 2004).[53] Many of the apparent losses are internalised by the workers themselves, as workers are not paid wages during industrial disputes (and it is unlawful for employers to do so). Indeed, in some instances, industrial action legitimately taken to address a WHS issue can enhance community wellbeing.

Figure 13.7 **Days lost from industrial disputes**
Construction and all industries, 1968 to 2013, calendar years[a]



[a] The data underestimate actual disputes because the ABS does not include industrial disputes in its survey collection if the work stoppages are equivalent to less than ten working days lost. Ten working days lost is equivalent to the amount of ordinary time that would have been worked, for instance, during a stoppage of work by 10 employees for one day, or, by 40 workers attending a two hour stop work meeting (assuming they worked an eight hour day).

Sources: RBA *Australian Economic Statistics 1949–1950 to 1996–1997*, Occasional Paper No. 8; ABS (*Industrial Disputes, Australia, December 2013*, Cat. No. 6321.0.55.001).

Accordingly, set against the size of the construction industry, the apparent economic impacts of industrial disputes are very low.

However, the comparative degree of industrial harmony is still problematic

The relative risk of days lost to disputes per employee in construction compared with other industries tells another story. Industrial relations have persistently been

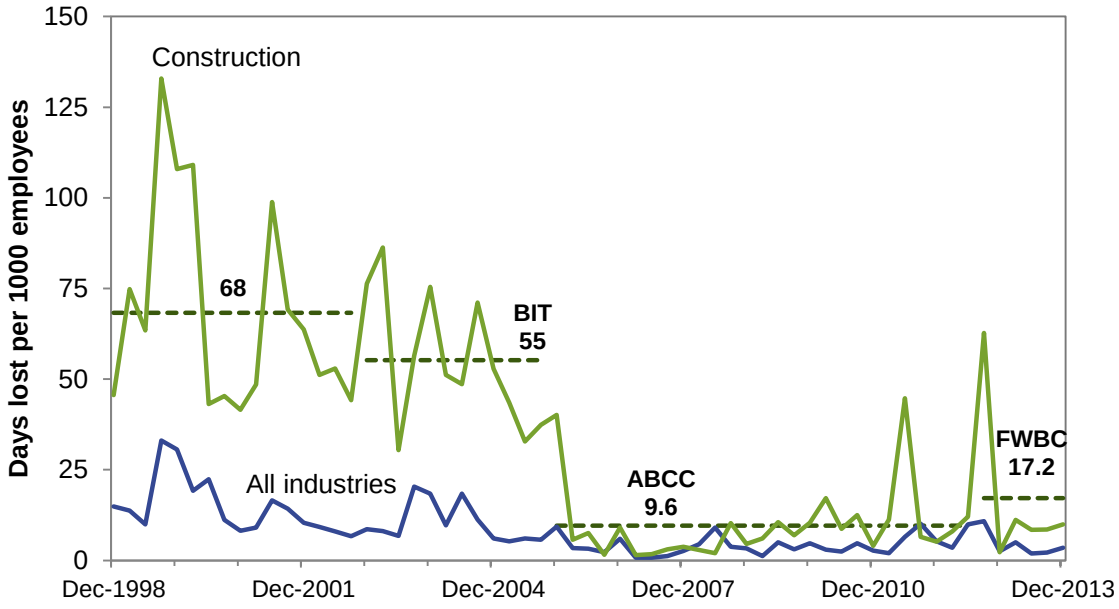
[53] Industrial disputes fell considerably in the last two quarters of 2013, so that on a calendar year basis, the direct economic effects would be roughly half of those above.

more problematic in construction than other industries. Days lost per 1000 employees in construction have exceeded the economywide rate in 39 of the 46 years from 1968 to 2013, on average, by a margin of 160 per cent. That margin has not trended down over time, and indeed has been significantly above 160 per cent in most of the years after 1995. In the December quarter 2013, the days lost per 1000 employees in the construction industry were about three times higher than that for all industries, and for the years 1996 – 2005, more than five times higher on average.

Looking over the past two decades, the share of days lost per 1000 employees was relatively lower during the period of the operation of the ABCC, although outcomes were highly variable (figure 13.8).[54] The single most common source of penalties imposed by the ABCC related to unprotected industrial action, which creates disincentives for such actions. (Secret ballots for voting on industrial action by employees — introduced in March 2006 — may also have reduced disputes.) Accordingly, a direct connection of lower industrial disputes to the operations of the ABCC appears highly plausible.

Figure 13.8 **The recent perspective**

December 1998 to December 2013, working days lost per 1000 employees in construction compared with all industries[a]



[a] Averages are shown for either distinctive periods, where rates were high or low by historical standards or, more recently, for the different IR regime in place in the construction industry.

Source: ABS (*Industrial Disputes, Australia*, December 2013, Cat. No. 6321.0.55.001).

54 The lowest industrial dispute rates occurred during the period when the ABCC was active in issuing examination notices.

On the other hand, the outcomes associated with the BIT, often regarded as the start of a tougher IR regime, were comparatively poor. This may have reflected a lag between greater enforcement and behavioural change, and the use of industrial action to secure agreements prior to the introduction of WorkChoices (Electrical Trades Union, trans. p. 101).

In addition, days lost per employee rose steeply after the end of 2008, despite the existence of the ABCC, raising questions about the extent to which it had produced enduring changes in workplace cultures. However, the increase was from a low base, and one-off strikes and the industrial action that can precede finalisation of enterprise agreements may well explain the change. On balance, it is likely that the ABCC reduced industrial disputes (and survey evidence discussed later supports this). Nevertheless, some unlawfulness has persisted, as identified by Justice Wilcox in his review of the ABCC (Wilcox 2009, p. 3). While still low, days lost to disputes nearly doubled after the establishment of FWBC, although again one-off events may have contributed to this.

Indirect effects suggest that the aggregate costs of IR disputes may be higher

The apparently low economic impacts of industrial disputes estimated earlier do not take account of several aspects of industrial disputes in the industry, a point made by several business participants (for example, AMCA, sub. DR157, p. 2).

Interruption of a particular task by even a single group of workers — such as crane operation, concrete delivery and form work — can bring a whole site to a stop. The Housing Industry Association (2013, p. 5) has claimed that 'the interruption of a concrete pour remains a stock standard industrial tactic'. Certainly, various court cases reveal that it has been a tactic,[55] although systematic evidence about its overall prevalence and cost is not available.

Whatever form it takes, industrial disruption exposes contractors to major delay penalties, the costs of idle capital and payments of wages for employees not involved in industrial disputation. It also damages the reputation of the constructor in subsequent contract bids, with risks for long-term bidding success rates and, thereby, its commercial returns. As noted above, this may provide an incentive for the contractor to agree to generous and unreasonable terms and conditions in enterprise agreements, but does not excuse it.

[55] For example, FWBC (2014) and *White v CFMEU & Anor* [2010] FMCA 693 (21 September 2010) (in Victoria).

The costs of disputes extend beyond those immediately apparent from underutilised labour and capital. Works scheduling and critical paths — especially important on large construction sites — can be disrupted, and subsequently, work may need to be accelerated and more overtime paid to employees. Acceleration of works (whatever the source of the delay) creates a new set of risks:

> Accelerating works can lead to increased working hours, which requires changing shift patterns and can lead to increased stress, which can translate into absenteeism and reductions in productivity. Construction methods may have to be changed and additional plant and equipment may be required. Because of the increased pressure to complete the works there is greater potential for people to commit errors, which can manifest as rework. Additional time is required to rectify the error, which may leads to de-motivation, reduce productivity and subsequently a claim and dispute. (Love et al. 2009, p. 8)

Given the importance of the sector to many other industries, higher costs or delays in the provision of construction projects have widespread effects on the economy as a whole (section 13.4).

The small average amount of time lost per year among all construction employees also belies the fact that much of the construction industry is not exposed to disputes (most particularly, dwelling construction), and most project sites do not experience industrial action. Unlike unscheduled absenteeism, disputes involve the simultaneous absence of a whole group of workers, so that they are more disruptive on any site affected. In 2008-09, there were 52 disputes in the construction industry with 22 300 days lost and just under 13 000 employees involved (ABS 2010). In that year, the estimated *direct* GDP effect of the industrial disputes in the construction industry was around $12 million in 2011-12 prices, or $230 000 per dispute.[56] Therefore, *where* a dispute occurs, it has the potential to impose significant costs on the relevant employers, independent contractors at these sites, any associated suppliers, workers and the customers of the affected projects. However, in some case, especially where there are serious WHS issues involved, the benefits of the industrial action may outweigh these costs, although clearly industrial action is not the preferred solution.

Moreover, the resource wastage of the particular disputes recorded in official statistics fails to take account of their wider incentive effects. The fact that workers do not generally get paid wages while on strike suggests that they believe they will ultimately recover those lost wages in better wages and conditions or lower WHS risks. Occasional strikes and other forms of industrial action credibly signal the capacity for a union to damage an employer significantly, and thereby to extract

[56] The ABS has not published more recent data on dispute numbers in the industry, and does not distinguish between protected and unprotected actions.

pecuniary and other concessions more generally, without the need for continuous recourse to industrial actions. The capacity for leverage is increased because it is often hard to prove the threat of industrial disruption (HIA 2013; Independent Contractors Association 2012).

The statistics gathered on industrial disputes by the ABS can also miss some aspects of industrial disruption on a work site. The ABS does not measure the effects of disputes in locations other than where the stoppages occurred, such as stand-downs because of lack of materials, disruption of transport services and power cuts, despite these having effects on the utilisation of labour and capital. Nor does the ABS have estimates of other potentially costly union-initiated industrial action (WorkplaceInfo 2014), such as:

- employees refusing to undertake certain types of work; to work with certain managers, employees and third parties; or to work overtime ('work bans')
- working at a slower pace than usual ('go slows'). However, Lend Lease argued that the construction industry does not has a problem with go-slows and overtime bans: 'When action is taken, it is more often overt in nature' (sub. DR201, p. 14)
- inflexible working, such as a worker who usually helped out on other tasks outside their normal duties, refusing to do so ('work to rule')
- picketing to prevent other workers from entering a site to perform their jobs. In some instances, unions may attempt to reduce the risk of penalties for unlawful pickets through community pickets (Kellock, Iverson and Firedman 2013), although there have been few recorded cases of this.[57]
- stop work meetings (whether authorised or not)
- secondary boycotts that affect suppliers of an employer.

The available industrial dispute data may therefore underestimate the prevalence and severity of IR disharmony, a point that MBA has made:

> Master Builders notes that in the industry there are now fewer strikes but more disruptive tactics and where the official ABS statistics do not reflect the disruption to work. This is in part facilitated by clauses which permit stoppages which are at the boundary of what may or may not be lawful. (MBA 2014, p. 8)

Moreover, the veiled threat of industrial action may result in work practices and other conduct inimical to productivity, costs and business performance. For

[57] An exception was a community protest relating to the City West Waters West Werribee Dual Water Supply Project (*Director of the Fair Work Building Inspectorate v Automotive, Food, Metals, Engineering, Printing and Kindred Industries Union* [2013] FCA 82).

example, it may lead to the diffusion of high-cost enterprise agreements, overmanning, and the selection of subcontractors favoured by a union even if they are not as productive as alternative suppliers.

The implication is that it is hard to discover the overall costs of industrial disputes using the existing highly aggregated industry data. Even statistical methods that seek to associate observed industrial action to productivity and costs struggle to be robust. For example, were the additional costs of industrial disputes to be ten times the direct economic impact estimated above for 2012-13, it would amount to a 0.25 per cent loss in construction output. This represents substantial losses in absolute terms (some $300 million annually), but not losses that would readily show up in any aggregate statistical analysis, despite their significant adverse effects.

Unfortunately, beyond particular case studies, the data that could explore the consequences of industrial disputes for the affected construction projects, businesses and employees is absent. It is not even known in any systematic sense why disputes have arisen. If the pattern in 2012-13 for all industries applied, the three most common causes of dispute numbers would be industrial action for remuneration (17 per cent), other employment conditions (31 per cent) and health and safety concerns (12 per cent), but these may not be typical of the construction industry (ABS 2014).

Construction productivity

Master Builders Australia (MBA) have emphasised the importance for productivity growth of the creation of the BIT and then the ABCC:

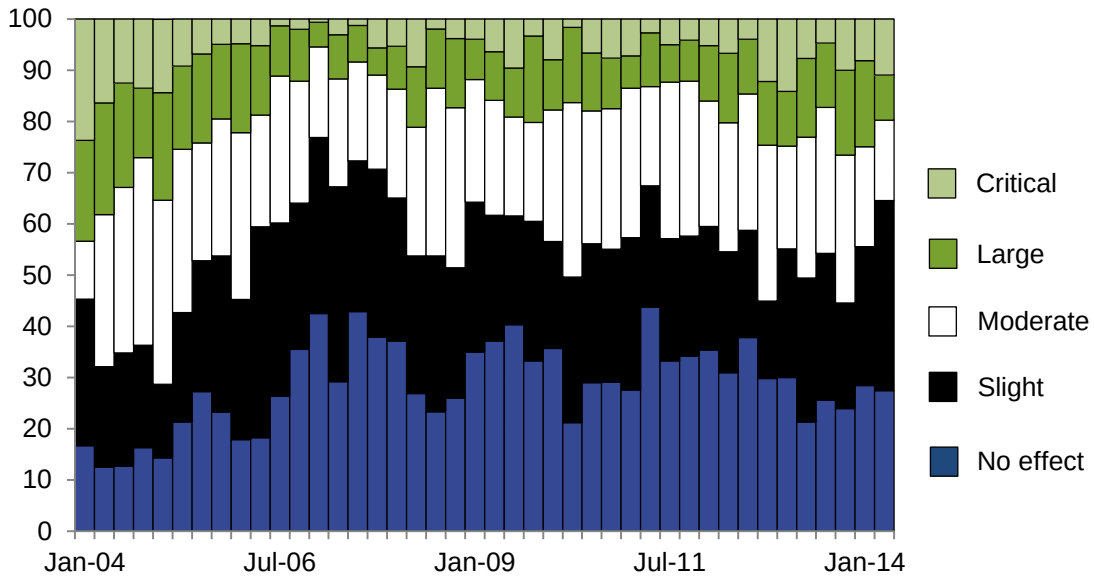
> Research on total factor productivity shows that productivity in the building and construction industry grew by 13.2 per cent between 2003 and 2007, whereas productivity grew by only 1.4 per cent between 1998 and 2002.
>
> While these productivity indicators are not directly comparable, they all indicate that the timing of improvements in the building and construction industry coincides with the timing of improved workplace practices … (sub. 88, attachment 1, p. 6)

The micro evidence supports the contention of a net positive effect. A large survey of business managers, on-site supervisors and workers suggested net gains (Chant 2008). While around 50 per cent of supervisors thought the ABCC had made no difference to productivity levels, nearly one quarter considered it had improved it somewhat, and just above 15 per cent said the effect was significant. Much the same result was apparent for supervisors' perceptions of their capacity to do their job. Around 40 per cent of workers — whether union-affiliated or not — also said that their relationship with management had improved with the creation of the ABCC

(although a higher share said it had made no difference). Very few interviewees thought workplace outcomes had worsened. Another smaller opinion survey of industry managers and supervisors found results consistent with the larger survey (Jackson Wells Morris 2007). Justice Wilcox, who was sceptical of much of the evidence about the impacts of the ABCC, thought this qualitative evidence had genuine weight (Wilcox 2009, pp. 54–55).

MBA survey data over the decade from 2004 show that concerns about the constraining influence of industrial relations on business activity weakened rapidly until the end of 2006, and have been relatively stable since (figure 13.9). In January 2004, more than 40 per cent of businesses perceived IR as a critical or large constraint, while at the other scale of severity, 45 per cent saw it as of slight or no effect. In April 2014, 20 per cent of the businesses considered IR to have a large or critical effect, while around 65 per cent perceived no or slight impacts.

Figure 13.9 **Is industrial relations constraining activity?**
January 2004 to April 2014 (percentage share of respondents)



a The survey is an independent survey of construction businesses undertaken on behalf of the MBA. The IR question is among many other questions about factors influencing businesses, which increases the credibility of the results.

Source: MBA (sub. DR211, p. 19) and MBA unpublished data.

However, notwithstanding the likelihood that the BIT and the ABCC had net positive productivity and cost impacts, the degree to which their impacts did, or even reasonably could, show up as large improvements in aggregate construction industry productivity is another matter.

Various studies by Independent Economics (IE), previously Econtech, comprise the most detailed stream of systematic empirical research in support of the wider *economic* benefits of the changes to IR arrangements in the construction industry (Econtech 2007, 2008; Independent Economics 2012, 2013; KPMG-Econtech 2010). Its series of studies have been highly influential in debates about the effectiveness of the ABCC on construction productivity and, by inference, are relevant to various conjectures about the degree to which diminished union power affects productivity at the macro level. Many umbrella groups representing construction and other businesses have highlighted the studies and claimed that they are valid (ACCI 2013; Department of Employment 2013b; MBA, sub. 88 and sub. DR211; HIA 2013), while others have questioned their relevance (Allan, Dungan and Peetz 2010; Peetz 2014; Australian Council of Trade Unions sub. 95, pp. 14–21; Wilcox 2009). The validity and interpretation of these studies are therefore key issues.

The Commission has carefully reviewed the studies and the empirical evidence on aggregate productivity (appendix I). This assessment covers the evidence from IE and MBA (sub. DR211), and the Commission's own synthesis of studies and data.

The Commission's view is that given the case studies, industry surveys and other micro evidence, there is no doubt that local productivity has been adversely affected by union (and associated employer) conduct on some building sites, and that the BIT/ABCC is likely to have improved outcomes. However, when scrutinised meticulously, the quantitative results provided by IE or others do not provide credible evidence that the BIT/ABCC regime created a resurgence in *aggregate* construction productivity or that the removal of the ABCC has had material aggregate effects. Indeed, the available data suggests that the regime did not have a large aggregate impact.

This is neither surprising, nor inimical to the need for further reform. By its nature, it is hard to isolate numerically the effects of workplace arrangements, including industrial relations, from all the other factors shaping workplace productivity, especially given small and inadequate datasets and statistical noise. In an entire study devoted to this issue in the construction industry, an earlier report by the Commission observed:

> Data are not available to enable sector-specific estimates of labour productivity or unit labour costs. Interactions among work arrangements make it impossible to quantify how individual work arrangements affect the partial performance indicators or performance overall. As well, other factors such as design, project planning, building regulations, tendering practices and the behaviour of clients affect workplace performance. For these reasons, the impacts of work arrangements can be assessed in terms of direction only. (PC 1999, pp. xvii–xix)

The empirical challenge has not changed much in the intervening period. Indeed, the concern of all parties — including the Commission — attempting to quantify productivity gains from policy changes, is to acquire data relevant to that task. The Commission's benchmarking and data collection proposals (recommendation 9.2 and 10.1) could allow for the collection of a significantly better range of data that could allow such assessments in the future.

However, limitations in the evidence of the existence of an IR effect do not equate to proof that *no* effect exists. It is quite possible that an important effect could exist but would be undetected given the confounding influences of unobservable factors and the likelihood that the biggest effects of the policy changes were for non-dwelling building construction (such as commercial buildings, hospitals and prisons), which is only a part of the construction industry. Lend Lease agreed that the focus of problems was by no means uniform throughout the industry, identifying commercial CBD projects as the worst area for disputes, followed by major projects (sub. DR201, p. 14).

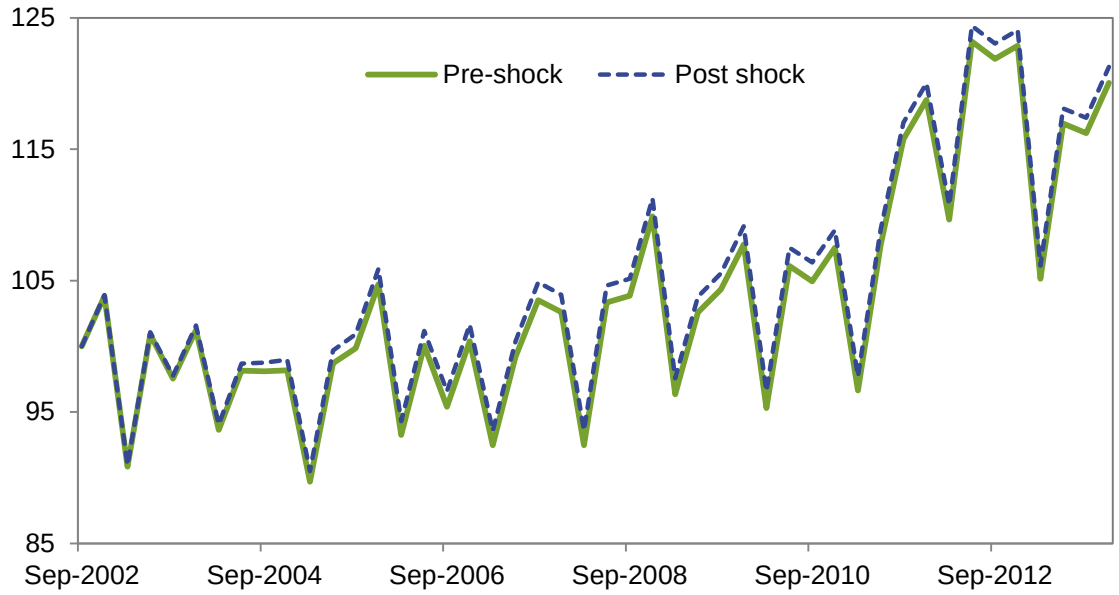
As an illustration of the capacity for significant problems in one part of the industry to almost vanish in statistics for the industry as a whole, the Commission examined the aggregate impact of a hypothetical gradual improvement in non-dwelling building construction productivity levels of five per cent[58] following changes to the IR environment after 2002. This would have gradually increased aggregate construction productivity by a nearly indiscernible one per cent above the counterfactual (figure 13.10). Yet a five per cent improvement in the productivity of the relevant industry segment would be an important effect — indeed, by the standards of many microeconomic reforms, an extremely positive outcome.

The debate about the effects of the BIT/ABCC and various other IR policy changes occurring after 2002 also obscures a more important point — the IR arrangements and outcomes in the construction industry remain problematic. The ABCC may have partly remedied some problems, but it did not remedy all of them. The likelihood is that restoring it will not be sufficient to address the IR environment as a whole, a subject as much exposed to cultural factors and boom and bust cycles noted earlier, as it is to poor behaviour.

58 The productivity improvement is assumed to start in December 2002 at 0.3 per cent and reach the full 5 per cent by September 2006.

Figure 13.10 **Effect of hypothetical 5 per cent productivity shock for non-residential building on productivity for construction as a whole**

Productivity index, September quarter to December quarter 2013[a]



[a] The chart takes account of the fact that the 'trade services' part of the construction industry contributes to the three remaining segments: residential building, non-dwelling construction, and civil and heavy engineering. The ABS 2009-10 Input-Output tables are used to allocate trade services to these industry segments, and the value-added for the three industry segments are then estimated for 2009-10 from known national accounts data for aggregate construction industry gross value added. The value-added estimates for years prior to 2009-10 and after are initially estimated by using the growth rates of building activity for the three industry segments. Other than for 2009-10, the sum of the resulting value-added estimates are only approximations to the observed national accounts total. They are then re-scaled to add to the correct total. The calculations are 'back of the envelope', but are intended to show that even large productivity shocks to an important part of the industry can be hard to find in the aggregate data. The pre-shock productivity series is the currently observed series for ease of calculation.

Source: ABS 2013 (*Construction Activity: Chain Volume Measures, Australia*; Cat. No. 8782.0.65.001); ABS 2013 (*Australian National Accounts: National Income, Expenditure and Product*, Dec 2013, Cat. No. 5206.0); ABS 2013 (*Australian National Accounts: Input-Output Tables, 2009-10*, Cat. No. 5209.0.55.001).

FINDING 13.1

There is no robust evidence that the new industrial relations environment specific to construction had significant effects on the costs and productivity performance of the construction industry as a whole. There is likely to have been more important effects for the non-residential building segment of the industry, but any such effects would be hard to discover in the aggregate construction productivity data.

Regardless, for some segments of the industry and specific project sites, there remains evidence of unlawful conduct, overly generous enterprise bargaining arrangements, and other problematic industrial relations arrangements that are inimical to productivity and costs.

13.7 The scope for improving the IR environment

While analyses of aggregate statistical information is at best inconclusive, evidence from case studies, surveys, case law and the nature of enterprise bargaining agreements suggest that the current system is far from adequate and that, based on past experiences, IR policy interventions can have positive impacts for some projects and segments of the construction industry.

Multiple reviews have found criminal conduct and intimidation as a feature of certain projects, and this appears to be a continuing feature of the industry. As noted above, a Royal Commission is currently considering fresh allegations of unlawful conduct by employers and unions in the construction industry.

Cases in the Federal Court and Federal Circuit Court have revealed industrial tactics designed to secure common and generous conditions across project sites and to unduly pressure employees to join unions. The nature of construction projects provides unions with significant leverage, which they sometimes abuse. Businesses are exposed to large delay penalties, and high costs if construction work is interrupted (such as during a concrete pour). Bargaining pressures have increased some project costs, particularly in the building construction segment of the industry (as revealed by the excessive pay and conditions in some projects).

Legal cases and survey evidence show that employers also sometimes engage in unlawful conduct — such as sham contracting, underpayment of vulnerable workers poor safety practices and adverse actions under the Fair Work Act.

The nature of the project, the relevant union and delegates, the negotiating competencies of parties, and the incentives of the head contractor can lead to costly, combative and problematic outcomes for particular projects. While many projects may not be dogged by problems, some have involved toxic relationships and egregious conduct.

Further, the capacity for parties to negotiate enterprise bargains that suits the circumstances and preferences of individual businesses and their employees has been partly subverted. Pressures by various employee associations and the principal unions can lead to the implicit adoption of pattern bargaining, which leads to the same agreements across relevant parts of the entire industry. Greenfields agreements for a particular project struck between a union and a head contractor can also stifle the potential for subcontractors to negotiate EBAs suited to their own circumstances.

Overall, there is significant scope to improve the industrial relations environment in construction to boost productivity and restrain costs, especially on an individual project level.

Using procurement policy

The most promising policy approach is for Australian governments to use their substantial purchasing power as a countervailing measure against conduct that leads to high costs, 'sweetheart' deals, coercion, sham contracting and poor WHS practices. Governments could achieve this through adoption of guidelines modelled on those of the Victorian Government, which covers all of the above undesirable conduct. While controversial, these are not at odds with the thrust of the pre-existing national guidelines, but have the benefit of being more specific about undesired conduct, and give a more explicit and accountable emphasis on productivity achievement as a goal of workplace agreements (contra the CFMEU trans. p. 182).

As non-statutory provisions, they have the advantage that governments can use them proportionately and amend them as necessary. Using governments' procurement in this way mimics normal market competition, in that businesses and workforces that strike costly bargains would lose out to others that are more closely aligned productivity and labour costs. The prescriptive nature of the guidelines and their documentation requirements might raise concerns about compliance costs for employers. However, employer groups, such as Ai Group (sub. DR165, p. 4) and the Australian Constructors Association (sub. DR169, p. 15) have not identified this as a concern, and endorsed the adoption of the guidelines.

The Commonwealth could encourage the Australia-wide adoption of building code guidelines similar to those of Victoria in several ways:

- where the Commonwealth is the procurer, it would apply a code similar to the Victorian code to its tenderers
- where the Commonwealth is a funder of State and Territory Government projects, it would require compliance with a code embracing the Victorian principles as a precondition for funding.

Greater penalties

Equally, there are grounds for greater civil penalties for unlawful conduct than those imposed under the generic FWA, especially given that the construction industry has long been a disproportionate source of industrial unrest and problematic conduct, and some parties have been repeat offenders.

While affected parties can seek common law damages against a union (or other party), that process is slow, and fraught when there is a risk of industrial reprisal. In any case, there is the potential for substantial economic damage from unlawful

conduct that extends beyond the applicant. The costs of disputes and excessive bargaining power ripples throughout the various tiers of the construction industry (and associated suppliers) and ultimately results in higher contract prices and resource wastage. Higher prices must be borne by taxpayers or infrastructure users.

Setting a higher maximum penalty would signal to judges how seriously society considers the worst level of unlawful conduct (Judicial Conference of Australia 2007, p. 7). The Commission examined multiple cases before the Federal Court of Australia involving breaches of IR law by various construction industry parties. This revealed that judges tended to rank an offence by its seriousness and, then based on that ranking, set penalties along a scale from low to the maximum available penalty. In many cases, the judge applied a percentage of the maximum, suggesting that the maximum penalty provides the yardstick for setting other penalties. Therefore, while there have been few Federal Court cases where the maximum penalty has been applied, this does not mean that this is because the existing penalty regime is 'right'. A legal expert consulted by the Commission drew attention to the High Court on this matter, which has said:

> [C]areful attention to maximum penalties will almost always be required, first because the legislature has legislated for them; secondly, because they invite comparison between the worst possible case and the case before the court at the time; and thirdly, because in that regard they do provide, taken and balanced with all of the other relevant factors, a yardstick. *Markarian* [2005] HCA 25

A higher ceiling would provide the Federal Court with a signal about the seriousness of some of the unlawful conduct apparent in the industry, and give it greater discretion to differentiate by the severity or impacts of the unlawful conduct — whether it is a union, employer, employee or other party.

It may be that the relevant statute determining penalty levels could also specify matters that courts should consider when settling on a penalty, or even specify minimum penalties for certain breaches. However, the relevant courts already consider many factors in determining penalties, such as the costs of any conduct, whether the conduct has been repeated, the extent of cooperation of the respondent with the regulator, and the degree to which penalties might encourage specific and general deterrence.[59] Courts can also consider the views of the regulator, and can be

[59] For example, in a case involving sham contracting, the Federal Magistrates Court of Australia (now called the Federal Circuit Court of Australia) set out a wide range of matters determining the scale of the penalties that the relevant courts may imposes within the constraints of the regulated ceiling (*Fair Work Ombudsman v Bedington* [2012] FMCA 1133 (29 November 2012). The case was outside the construction industry, but still typifies courts' approaches to penalty setting. A recent Western Australian case involving the CFMEU also drew out the relevant factors, but to a less comprehensive extent (*Brookfield Multiplex Engineering and Infrastructure Pty Ltd v McDonald* [2014] FCA 38).

guided by an explanatory memorandum attached to the relevant legislation. Given this, there does not appear to be strong grounds, at this stage, to provide legislative stipulation of the level of penalties for given types of unlawful conduct, beyond the imposition of a ceiling on penalties. Judicial discretion allows consideration of the sum of a multitude of factors, the so-called 'totality' principle, a flexibility that should not be relinquished lightly.

Better information on the total costs of unlawful conduct — including those more generally felt by the community at large — may help judges determine appropriate penalties within a given penalty range. Accordingly, there may be grounds for FWBC, or the proposed new ABCC, to attempt to enumerate the full costs of unlawful conduct as one basis for the periodic re-calibration of penalties and as information to the judiciary. A further advantage of this would be to provide a better evidence basis for assessing whether the regulatory and compliance regime is working well. The practicality of this would need to be tested before implementation.

The role and powers of a specialist construction industry regulator

The appropriate form and powers of the specialist IR regulator has been an enduring and contentious issue. The reaction to the ABCC has been polarised, as shown in two recent Senate reviews and their associated submissions (Senate Education and Employment Legislation Committee 2013; Senate Education and Employment References Committee 2014). Many business groups have called for the re-establishment of the ABCC, while unions have been strongly hostile to any such initiative. A number of participants in this inquiry have indicated that the issue is 'neither here nor there' when it comes to infrastructure construction.

The key issue is whether the powers, structure, governance and resourcing of the agency efficiently achieve the desired goals of an IR system. The goals are widely agreed upon — the even-handed maintenance of industrial harmony and the associated prevention of unwarranted disputes, the protection of employees, and the discouragement of unlawful conduct by employers and employees. As much as possible, a regulator should forestall problematic conduct that is adverse for employers or employees. As observed by the Australian Constructors Association:

> … it's important to send a message to the people or organisations that would take advantage of others in the industry that they are not going to get away with it. Why it has to work in a way where quick action can be taken is that it's all over when a court comes along in 12 months, 18 months, two years or longer and makes a pronouncement. Everything has all happened before then, so it needs to be an industry where early and effective regulatory processes can be put in place and whether they are small, medium or large organisations, they ought to know that they can't get away with inappropriate practices. (trans. p. 287)

Adequate resourcing is a particularly important element of effective enforcement as it enables timely interventions on sites, detailed investigations and the rapid application of penalties where these are justified (Lend Lease sub. DR201, p. 13). During the time of the ABCC, it was not unusual, apparently, for an inspector to be at the site of a dispute within an hour, and for the dispute to be rapidly resolved when the parties' legal obligations were explained to them (Wilcox 2009, p. 14). This degree of responsiveness can only be achieved if the regulator has adequate funding — a requirement to give genuine teeth to higher penalties.

Regardless, establishing nationwide building code implementation guidelines creates strong incentives that will reinforce the capacity of any specialist regulator to control unlawful conduct and monitor the IR practices of contractors and unions.

Finally, policy initiatives are not a cure all for problematic IR in the construction industry. Many employers, employees and unions bargain in good faith and without hostile relationships. A critical aspect of the IR system is the competence of the parties to negotiate with each other.

RECOMMENDATION 13.1

Australian, State and Territory governments should adopt codes and guidelines with an essentially similar framework to the Victorian Code of Practice for the Building and Construction Industry for their own major infrastructure purchases.

The Australian Government should require compliance with these guidelines as a precondition for any infrastructure funds it provides to State and Territory Governments.

RECOMMENDATION 13.2

The Australian Government should:

- ***increase the ceiling of penalties for unlawful industrial relations conduct in the construction industry.***
- ***ensure that the specialist regulator has adequate resources to give genuine and timely effect to the enforcement regime.***

Implementation issues

There are no barriers to the immediate implementation of increased penalties through an amendment to the relevant Act (chapter 16).

The adoption of consistent implementation guidelines for the various building codes involves several complexities, though these are not intractable and should not unduly delay their introduction.

Governments need to remove the practice directions that currently prevent the application of the various guidelines. From a practical perspective, this needs to take into account the outcome of the application of the CFMEU's leave to appeal the decision of *State of Victoria v Construction, Forestry, Mining and Energy Union* [2013] FCAFC 160 to the High Court of Australia. As noted above, the CFMEU's case is premised on the view that the guidelines are contrary to the FWA, and in particular to the sections that prohibit various kinds of adverse actions (such as discrimination against an independent contractor or employee). Regardless of the decision of the High Court, it may be necessary to modify the guidelines to increase certainty for governments, employers and unions, so long as the fundamental objectives of the guidelines are still achieved. As noted by legal experts:

> The State's [Victorian Government's] cautious approach [to the Practice Direction] seems warranted, given that the Lend Lease and Eco Recyclers appeals were successful on their specific facts. The Full Court held that the State was not immune from prosecution for a breach of the general protections provision of the FW Act – in other circumstances, an adverse action claim might well be established. (HSF 2014)

It may also be necessary to amend the FWA to underpin the broader applicability of the guidelines and its underpinning code. Any such changes would need to take account of any wider and unintended implications of changing the relevant provisions of the part of the FWA relating to 'adverse actions'.

There should be a general acceptance by the Australian and State and Territory governments that guidelines should be harmonised across Australia to reduce compliance burdens for buyers, businesses and unions, and to minimise risks of inconsistencies where a single project might involve several jurisdictions. The NSW, Victorian and Queensland guidelines are effectively identical — so much of the work has already been done.

14 Workforce skills

Key points

- The evidence on skills shortages and their effects on infrastructure construction is patchy. While survey results are common, they are not conclusive. As such, it is generally only possible to infer the effects of skills shortages on construction costs.
- One of the most important drivers of skill shortages in infrastructure construction has been the intermittency of construction projects. Intermittency results in difficulty in retaining staff, leading to a lack of staff with significant industry-relevant experience. It can also reduce the employer's incentive to provide training beyond immediate needs.
  - Prospective improvements to intermittency would be possible if the Commission's suite of recommendations (see Recommendations and findings) are adopted — this could have a significant indirect effect of improving incentives for employers to provide training and for employees to remain in the industry.
- Nevertheless, the ramping up of major construction projects in the last decade could not be considered to be a typical reference period for major infrastructure. Temporary shortages in such conditions are unsurprising.
- Several occupations relevant to infrastructure construction, including engineers, technicians and operators, have been in apparent shortage at various points since the early 2000s. However, the most recent data suggests shortages are decreasing.
- The persistence and severity of the shortages have varied across occupations; levels of experience and seniority; and jurisdiction.
  - Most occupations require some years' experience before reaching proficiency. The shortage of engineers has been most acute for those with 14 to 18 years' experience.
  - Major projects have a relatively greater need for experienced staff.
- Evidence suggests that skill shortages are unlikely to account for a large proportion of overall construction costs. About 11 per cent of respondents to a survey of engineers had observed cost increases or delays caused by skill shortages. Around 3 per cent saw projects that did not proceed due to skill shortages in 2012 — down from 8 per cent in 2008 and 2009.
- As construction projects become less intermittent, better projections of labour demand will be possible. Such projections should be used to inform both private and public investment in training, as well as the levy rates and conditions of training funds.
- Apprenticeship arrangements are worthy of a separate comprehensive review.

The importance to this inquiry of skill shortages, skill gaps and recruitment difficulties rests equally on two factors: the extent to which they are apparent in infrastructure construction; and the extent to which they are significant drivers of construction costs. Several other inquiries, past and present, have investigated and are investigating skill shortages in their own right.[60]

This chapter examines skills shortages relevant to infrastructure construction, based on previous analysis, contemporary statistical evidence and stakeholder submissions. It considers the:

- evidence for skill shortages in occupations relevant to major public infrastructure (section 14.1)
- evidence regarding the impact of skill shortages on infrastructure construction costs (section 14.2)
- drivers of skill shortages (section 14.3)
- the scope to which further government action on skills could benefit the long-term productivity, cost and efficiency of public infrastructure construction (section 14.4).

14.1 Evidence of civil construction skill shortages

An initial question for this chapter relates to whether the availability of specific *skills* is more relevant to infrastructure construction than the availability of *labour* more generally. A priori, specific skills are likely to be highly relevant to public infrastructure construction as the workforce on major construction projects tends to be made up of specialised occupations (box 14.1). This specialisation may come in the form of education and certification, but it is also likely to come in the form of knowledge and experience gained on the job. In fact, much of the specialisation is industry specific — engineers and technicians are unlikely to be working on roads one day and gas pipes the next day. While there are still potentially labour shortages in the industry at many less skilled occupations, shortages applying to specialised and skilled occupations are better characterised as skill shortages.

60 Inquiries into skill shortages include: NSW Legislative Assembly inquiry into skill shortages currently being undertaken by the Economic Development Committee (currently being undertaken); Senate Education, Employment and Workplace Relations Committee *Inquiry into the Shortage of Engineering and Related Employment Skills* (2012); Victorian Education and Training Committee, *Inquiry into skill shortages in the rail industry* (2010); Queensland Legislative Assembly Public Accounts Committee, *Addressing Skill Shortages in Queensland* (2008).

A lack of workforce skills will also require different policy responses than would an overall shortage of labour. As Richardson (2007) points out, free working markets are capable of dealing with labour shortages by attracting new applicants through higher wages. However, if there are shortages in particular skills, it is less likely that wage movements could quickly resolve them, as it would take time to build up or develop such skills. Addressing skill shortages may, therefore require policy intervention. Even where governments avoid direct intervention, they already have ongoing involvement in areas affecting skills through policies relating to education, training and taxation.

It is also useful to make the distinction between skill shortages, skill gaps and recruitment difficulties (box 14.2). The available empirical evidence is often better at exposing skill shortages and recruitment difficulties rather than skill gaps.

Box 14.1 **Infrastructure construction workforce**

Infrastructure construction projects require several types of specific occupations. While an exhaustive list would be difficult, most occupations could broadly be classified as: managers; engineers; surveyors; technicians; tradespersons; plant operators; constructors; or labourers.

These occupations are generally specialised according to the types of infrastructure constructed. For instance, this inquiry is mainly concerned with the construction of:

- transport infrastructure such as road, rail, ports, airports
- water and sewerage networks
- energy networks including gas pipes and electricity lines
- telecommunications networks.

Further specialisation exists within each broad category of infrastructure — for instance, within road networks, some engineers, technicians or constructors might have specific experience in building bridges or tunnels.

Engineers tend to be specialised both in their education and their on-the-job experience — there are several separate engineering occupations relevant to infrastructure construction, for example, chemical and materials engineering, civil and environmental engineering, and electrical and electronic engineering. The CFMEU (sub. DR174) suggests that some plant operators (such as those involved in tunnelling) are also likely to be specialised only in their specific field, whereas most other occupations should be quite able to transfer between projects and sectors.

Box 14.2 **Shortages, gaps and recruitment difficulties**

A *shortage* occurs when the demand for workers for a particular occupation is greater than the supply of workers who are qualified, available and willing to work under existing market conditions, and if the supply is greater than demand then there is a surplus. Over time, the market might adjust in a number of ways, including price and/or quantity adjustment, and the imbalance clears.

A *skills gap* refers to a situation where employers are hiring workers whom they consider under-skilled or that their existing workforce is under-skilled relative to some desired level.

Recruitment difficulties refer to the situation when employers cannot fill vacancies in spite of an adequate supply of workers. The reasons for this are varied. They could include such things as relatively low remuneration being offered, poor working conditions or image of the industry, unsatisfactory working hours, commuting difficulties, ineffective recruitment effort by the firm or skills needs that are very specific to the firm.

Source: Shah and Burke (2003).

Trends and evidence of skill shortages

Given that this inquiry focuses on infrastructure construction, which spans several distinct construction activities (such as road, rail, ports, airports, telecommunications and energy infrastructure), collecting a comprehensive dataset on the relevant workforce is challenging. The ABS (2013b) estimates the Heavy and Civil Engineering Construction workforce at around 67 000 in 2012-13. Skills DMC (2014) provides a similar estimate of 68 000 people (p. 29), and this is also supported by CFMEU (sub. DR174). Other reports, such as Skills DMC and the Civil Contractors Federation (2010) have estimated the civil construction workforce as being several times larger.

A further issue is that much of the available workforce data are classified according to the Australian and New Zealand Standard Classification of Occupations (ANZSCO), which is often too broad to pinpoint particular occupations of interest like ‘road constructor’ or ‘bridge constructor’ (Skills DMC and Civil Contractors Federation 2010).

As such, official data on skill shortages is necessarily supplemented by other sources including industry surveys and stakeholder comments. The comments and submissions of stakeholders to this inquiry and to other inquiries on skill shortages suggest that there have been some significant skill shortages in the industry in the last few years (box 14.3).

Box 14.3 **Stakeholder comments on skill shortages**

It is well recognised by governments, employers, academics and the unions that the building and construction industry is facing a shortage of skilled workers. (CFMEU 2010)

Over the six months to September 2012, a higher proportion of firms expect major or moderate difficulty in the recruitment of qualified labour (69.7%), sourcing of subcontractors (54.5%) and the hiring and purchasing of equipment (36.3%). (Australian Constructors Association and Australian Industry Group 2013, p. 3)

Engineers are globally in short supply, with Australian higher education providers producing only around half of the graduates needed to fill domestic demand, and in this environment systemic cultural issues, low numbers of women in education and in the workforce and an ageing workforce have produced widespread issues with retention and sustainability.

The problem is not just qualified engineers but those generally involved in civil construction and infrastructure renewal. (Institute of Public Works Engineering Australia NSW 2013, p. 4)

The Issues paper for this inquiry rightly acknowledges a shortage of civil engineers. But demand depends on experience, so from a graduate engineer's perspective the opposite problem exists – the barriers to entry are so high that some have quit the industry completely while others are reliant on Centrelink. Because so much depends on tenders (which are hard to win at the best of times) the prospect of future income is uncertain, therefore small engineering firms are often reluctant to take on more staff, and starting a successful engineering business is very difficult. (Stanger, sub. 71, p. 3)

In a highly competitive environment where clients invariably choose the lowest tender, SMEs are reluctant to spend scarce funds on up-skilling their staff, except in the areas of compliance such as OHS. (Victorian Civil Construction Industry Alliance sub. 28, pp. 7–8)

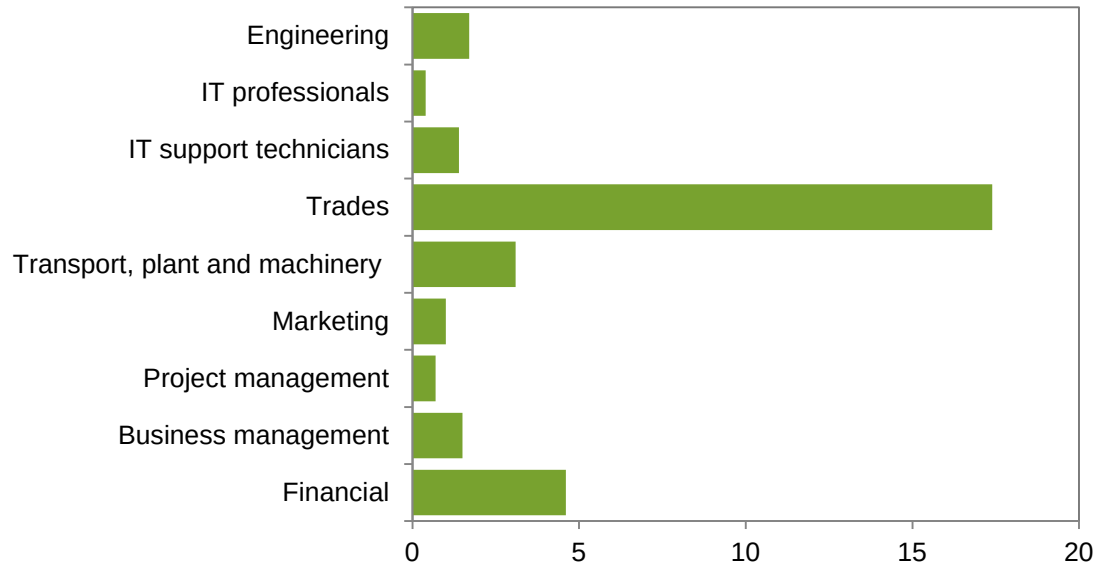
Shortages in specific occupations

Evidence for skill shortages can differ slightly according to the scope and timing of the data. A snapshot by the ABS shows that in 2011-12, the difficulties in hiring trades were particularly widespread in the construction industry (figure 14.1).

Several occupations relevant to infrastructure construction have shown persistent skill shortages over the past ten years at the national level (table 14.1). This represents situations where employers have 'considerable difficulty' filling vacancies or skill needs for an occupation at current levels of remuneration, conditions, and in accessible locations (Department of Employment 2013a, p. 5).

Figure 14.1 **Skill shortages and deficiencies in construction**

Per cent of respondents who observed a shortage or deficiency



Source: ABS 2013 (*Selected Characteristics of Australian Businesses, 2011-12*, cat. no. 8167.0).

Table 14.1 **Skill shortage ratings for selected construction occupations[a]**

Shading denotes an observed skill shortage

ANZSCO title	*1986-2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Construction Project Manager									■	■	
Engineering Manager						■	■		■	■	■
Surveyor					■	■	■	■	■	■	■
Urban, Regional Planner				■		■	■				
Civil Engineering Professionals		■	■	■	■	■	■	■	■	■	■
Quantity Surveyor[b]	■				■	■	■	■	■	■	■
Civil Engineering Draftspersons Technicians					■	■	■		■	■	■

a The shaded cells denote an observed skill shortage. **b** For Quantity Surveyors, skill shortages were observed for some years between 1986–2002 but not all. There were four such years with observed skill shortages for Quantity Surveyors — 1986, 1987, 1988 and 1990.

Source: Department of Employment unpublished data.

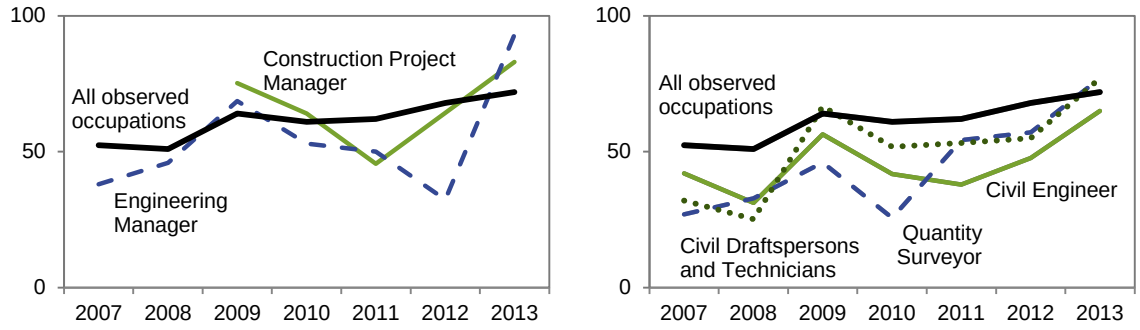
Some occupations that have had persistent shortages in the past ten years did not have any observed shortage in the preceding sixteen years (table 14.1). Hence, for

many occupations, skill shortages of this magnitude have not been a regular occurrence that could be predicted easily according to cyclical factors.

The recruitment experiences of employers gives some insight into how skill shortages have fluctuated over time. The Commission analysed Department of Employment data showing the proportion of job vacancies that were filled within four weeks (for trade occupations) or within six weeks (for professional occupations) (figure 14.2). For several relevant occupations, the rate at which these vacancies were filled has tended to be lower than the average of all surveyed occupations between 2007 and 2012, though it appears to have changed in 2013.

Figure 14.2 **Proportion of vacancies filled[a], selected construction occupations**

Per cent



a Vacancies were observed to be 'filled' if they had been filled within a six week period for professional occupations or a four week period for other occupations.

Source: Department of Employment unpublished data.

As mentioned earlier, shortages in some occupations are more difficult to observe, as they may be obscured by the ANZSCO classifications. For instance, industry data shows that occupations such as road and bridge constructors are currently seen as 'priority occupations' in some areas (table 14.2), consistent with what the Commission has heard anecdotally.

Table 14.2 **Priority occupations to 2012**

Number of workers

Occupation	*Total new and additional workers required from 2010 to 2012*
Leaders and supervisors	8 478
Bridge Constructors	1 413
Pipe Layers	2 862
Plant Operator	8 080
Road Constructor	7 572

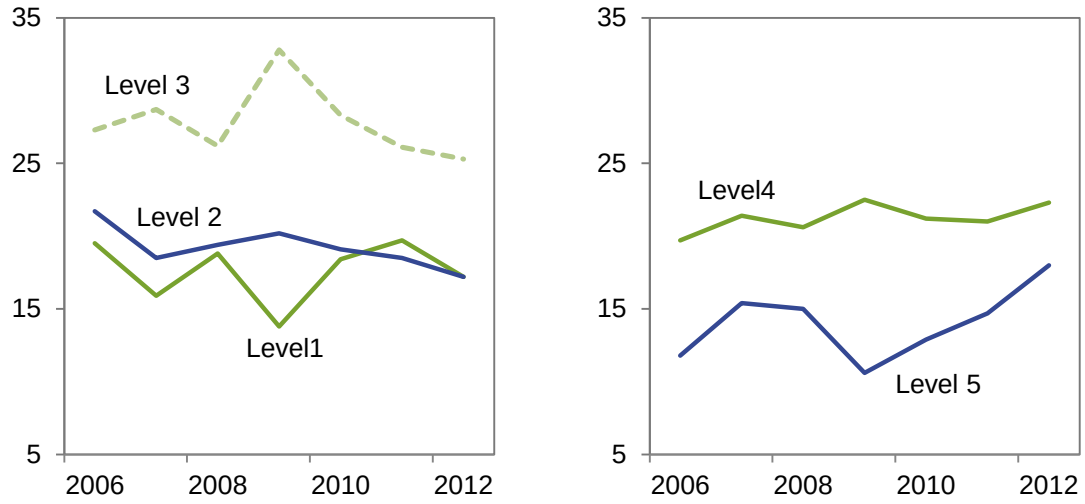
Source: Institute of Public Works Engineering Australia NSW (2013, p. 5).

Shortages of experience

Some industry studies have highlighted skill shortages at particular levels of seniority. Different levels of seniority generally reflect differences in years of on-the-job experience — a fact not well reflected in ANZSCO skill levels (Skills DMC and Civil Contractors Federation 2010). As such, skill shortages observed by the Department of Employment are unlikely to account for different skill levels within each occupation.

Engineers Australia (sub. 26) showed that recruitment difficulties between 2006 and 2012 were worst for 'level three' engineers (figure 14.3). Engineers at this level are able to both 'independently exercise engineering decisions' and 'supervise other engineers' (Engineers Australia, sub. 26, p. 11).

Figure 14.3 **Engineering Responsibility Levels and Recruiting Difficulties**
Per cent by responsibility levels (engineer level 1 to 5)



Source: Engineers Australia (sub. 26, p. 10).

Shortages by jurisdiction

Neither the demand nor supply of skilled labour are uniform across jurisdictions, with recruitment difficulties and skill shortages occurring separately in the various States and Territories (table 14.3). Nonetheless, shortages may also be widespread, as with civil engineers in 2012.

Table 14.3 **Skill shortages by jurisdiction in selected occupations, 2012-2013**

Shortage | Regional shortage | Recruitment difficulty | No shortage

	Civil Engineering Draftspersons and Technicians		*Civil Engineering Professionals*	
	2012	2013	2012	2013
New South Wales	Shortage	No shortage	Shortage	Recruitment difficulty
Victoria	Recruitment difficulty	No shortage	Shortage	No shortage
Queensland	Regional shortage	No shortage	Shortage	No shortage
South Australia	No shortage	No shortage	Shortage	No shortage
Western Australia	Recruitment difficulty	na	Shortage	Recruitment difficulty
Tasmania	Shortage	Recruitment difficulty	Shortage	Shortage
Northern Territory	Shortage	No shortage	Shortage	No shortage
Australian Capital Territory	Shortage	No shortage	Shortage	No shortage

Sources: Department of Employment (2013, ANZSCO 2332 Civil Engineering Professionals; 2013, ANZSCO 3122 Civil Engineering Draftspersons and Technicians).

14.2 The impact of skill shortages on infrastructure construction costs

While shortages in the supply of some construction occupations have occurred in recent times, an important further question for this inquiry is whether these shortages have had any significant impact on the cost and efficiency of public infrastructure construction.

A shortage in any critical occupation can be expected to have impacts on several aspects of construction projects. In the extreme case, it has been suggested that the shortage of engineers was a contributing factor to serious incidents such as the Lane Cove Tunnel collapse (Senate 2012, p. 49). More commonly, the concerns are that a lack of workforce skills will reduce the quality or quantity of output; increase input costs; lead to time overruns; or increase the risk of future incidents. In an industry survey, engineers noted that the underutilisation of their skills within their organisation had several consequences:

- 34 per cent identified an impact on efficiency and effectiveness
- 25 per cent identified an impact on productivity
- 17 per cent identified a loss of organisational capability
- 11 per cent identified an impact on cost and project delays

- 9 per cent identified a loss of morale or demotivation as a result. (ANET 2010, p. 7)

While these survey responses do not provide information on the quantum of cost increases or number of delays caused by engineer shortages, it is significant that 11 per cent of engineers responding to the survey had observed such impacts. Moreover, this survey relates only to shortages of engineers — if shortages of technicians, operators and constructors were to have similar impacts, then many more organisations could be expected to have experienced increased costs or delays.

This section considers three main areas where skill shortages are likely to affect the cost and efficiency of construction projects: wage cost increases; project delays; and the decision not to bid for or continue with a given project.

Wage pressure

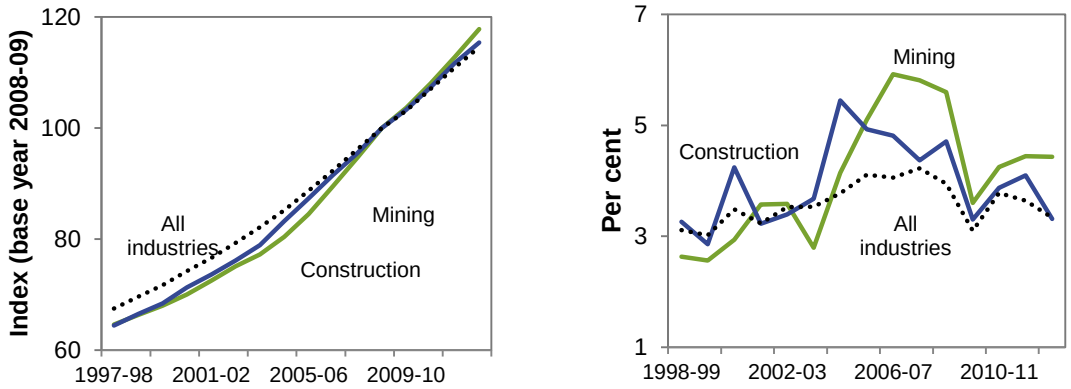
The Commission has heard anecdotally that shortages in some occupations have led to upward wage pressure, although quantifying this is difficult because of the classification of relevant data and difficulties in disaggregating those data. For the various tradespersons, technicians and labourers covered by enterprise agreements, this wage pressure can be difficult to disentangle from the influence of various factors of the industrial relations system (discussed in chapter 13). For instance, enterprise agreements have at times involved annual improvements in wages or conditions for up to four year terms (Australian Constructors Association sub. 72), whereas both skill shortages and recruitment difficulties have been shown to change from year to year (table 14.1, figure 14.2). Moreover, from discussions with a number of market participants, the Commission considers it unlikely that wages fell in subsequent enterprise bargaining agreements, even if skill shortages were no longer apparent.

The overall wage costs of the construction industry can be approximated by the ABS Wage Price Index (figure 14.4). The data shows that from around 2003, construction wages began to grow at a faster rate than the average of all industries. While this is broadly consistent with the existence of skill shortages observed at the time, it does not show how much wage growth is attributed to skill shortages.

GHD Meyrick (2011) point out that the growth in the construction wage index was slowing around 2007-08 (figure 14.4, right panel), at the same time there was a peak in construction costs (figure 9.1). As such, GHD Meyrick argue that wages growth was unlikely to be a major driver of the construction cost increases observed at that time and that skill shortages are unlikely to be one of the major overall cost drivers of construction. While skill shortages alone may not have caused a peak in costs in

2007-08, certainly the increase in wages that began in 2004 had contributed to ongoing cost increases, which was consistent with the timing of skill shortages in some occupations.

Figure 14.4 **Construction and mining sector wage costs**
ABS Wage Price Index; Annual growth in ABS Wage Price Index



Source: ABS 2013 (*Wage Price Index, Australia*, Cat no. 6345.0, table 5a).

More detailed data is required to consider the true impacts of particular skill shortages. Aggregate data does not address differences from year to year in what kind of infrastructure is being constructed; the project mix in terms of size; and the occupation mix of each project. Neither does the data show how particular occupational shortages may have contributed to wage costs, or how annual fluctuations in wage costs were caused.

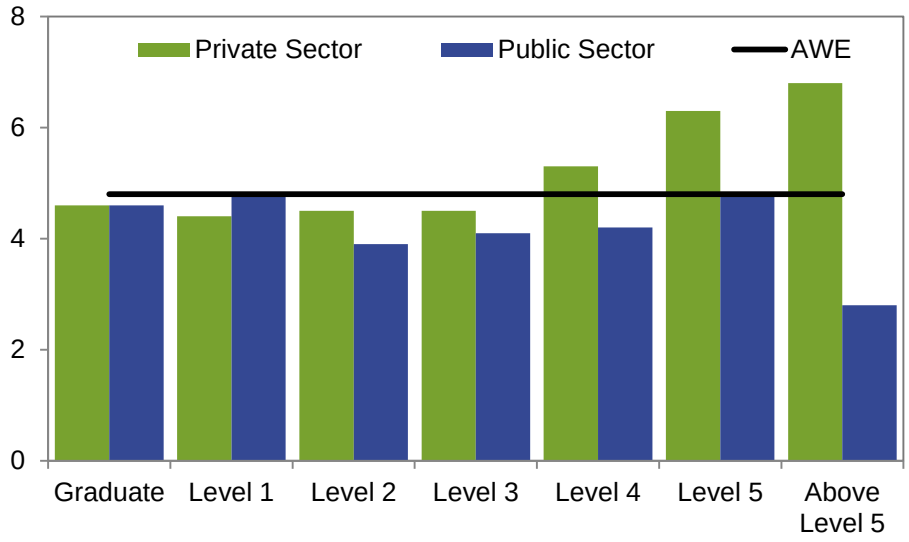
Wage increases have also varied within particular occupations. For engineers, who are more likely to have contracts separate to the predominant enterprise agreement, wage growth has differed both according to managerial level and between public and private sectors (figure 14.5). Those employed as graduates up to level 3 have seen lower wages growth between 2000 and 2012 than the Average Weekly Earnings (AWE). Those employed in the private sector at level 4 or above have seen their wages grow faster than AWE. As these are general findings for engineers and are not constrained to the construction industry, more detailed data would be useful.

The general wage growth for engineers from 2000–12 appears to be consistent with the presence of skill shortages in the private sector at levels 4 and above. However, the main recruitment difficulty for engineers from 2006–12 has consistently been in level 3 (figure 14.3). This raises the question of whether the apparent recruitment difficulties or skill shortages for these engineers could be partly attributed to slow wage growth rather than skill shortages. Aggregation may be a problem here, as

those with persistent shortages for level 3 engineers may not be a large enough minority to influence the average wage.

Figure 14.5 **Average annual growth in professional engineer salary packages, 2000–12**

Per cent



Source: Engineers Australia (sub. 26, p. 13).

There is some evidence that those firms who have had difficulty recruiting engineers have had to pay higher wages. An Engineers Australia survey showed that among firms who had difficulty recruiting engineers between 2006 and 2012, between 69 and 82 per cent could not recruit a specific skill set (table 14.4). Between 32 and 58 per cent paid higher salaries than expected.

Table 14.4 **Specific experiences of firms who had difficulty recruiting engineers**

Per cent of survey respondents who had recruitment difficulties

Difficulty	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Could not recruit required skill set	82	80	80	72	77	76	69
Paid higher than expected salary	42	58	58	32	31	43	32
Recruited different skill set and retrained	18	28	28	20	24	23	20

Source: Engineers Australia (2013).

Delays, termination and competitive pressure

Information provided by Engineers Australia (sub. 26) shows several projects either being delayed or abandoned due to a lack of the appropriate workforce skills (table 14.5). Again, these figures do not relate specifically to civil construction. However, they are consistent with other evidence citing skills shortages as the cause of delays for rail projects in New South Wales (Australasian Railway Association sub. 58).

The Commission also heard anecdotally from subcontractors that a lack of a particular skill set has been enough for them to decide not to bid for a project. Similarly, contractors also stated that some areas of subcontracting become much less competitive at times when there are concurrent projects.

Table 14.5 **Reported consequences of difficulties recruiting engineers**
Per cent of survey respondents

Consequence	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Major problems, including delays & costs	43	42	33	28	29	28	31
Did not proceed with available project	6	7	8	8	4	6	3

a Results from the Australian Engineers Skills Survey 2006–12. Survey respondents were engineers.

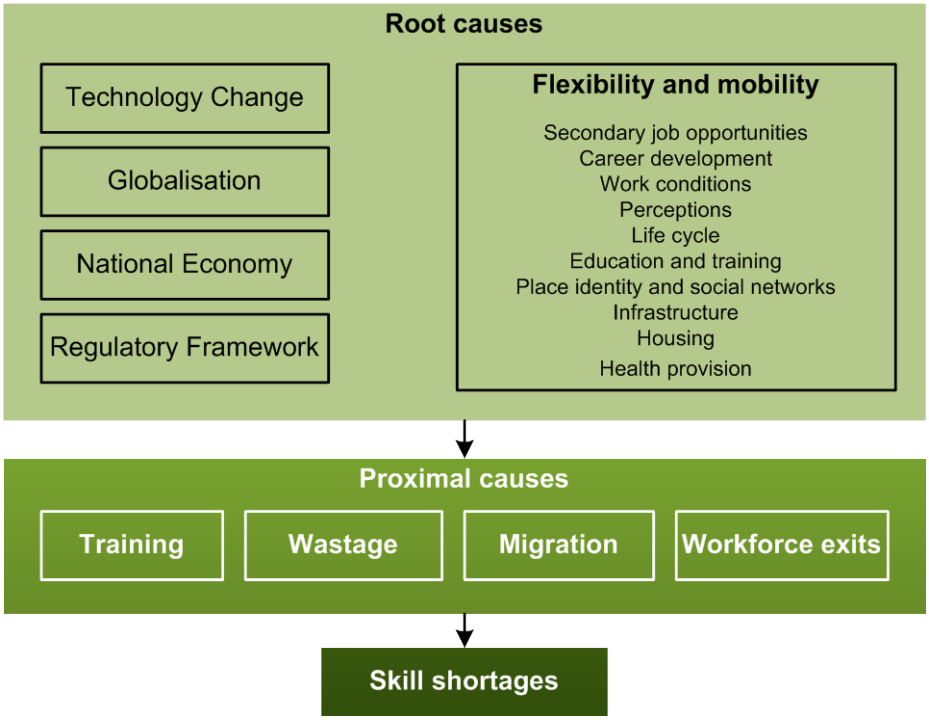
Source: Engineers Australia (sub. 26, p. 13).

14.3 The causes of recent skill shortages

Many factors can contribute to skill shortages. The then Bureau of Transport and Regional Economics (2006) classified some of the most common drivers into broad categories of *proximal* causes, which are immediate and direct, and *root* causes, which are underlying causal factors (figure 14.6). This separation reflects that while some drivers may be observed, quantified and addressed at the industry level, other underlying factors may not be.

The empirical and anecdotal evidence suggests that some of these drivers are more relevant than others to the construction industry, particularly regarding the most recent skill shortages observed. In broad terms, this includes training (including on-the-job experience), exits from the industry, technological change, and migration issues. Exits from the industry are affected by both push factors (issues within the infrastructure industry) and pull factors (opportunities in competing sectors).

Figure 14.6 **Drivers of skill shortages**



Source: BTRE (2006, p. x).

Training and formal qualifications

At one end of the scale, there are some occupations that benefit from specialist experience or training but do not involve any formal qualifications. For example, around 51 per cent of plant operators had no formal qualifications in 2009 (Skills DMC and Civil Contractors Federation 2010, p. 4).[61] The informal nature of training can have implications for people's career progression, access to government training grants, and labour mobility. This is an inevitable part of some occupations, as formal certification may not be always appropriate. On the other hand, it is possible for some occupations to expand their skill needs over time such that certification becomes more appropriate.

Many construction occupations do require formal training, which can vary from apprenticeships and trade qualifications to other tertiary education and professional accreditation. These qualifications vary in the time taken for completion and the depth of training.

61 The lack of formal qualifications is not particularly unusual. Nationwide, around 52 per cent of people did not have a formal qualification at Certificate III or above in 2006, dropping to around 42 per cent in 2012 (PC 2012b).

Apprenticeships

Some construction occupations involve apprenticeships and traineeships. Recent experience also suggests that the willingness of employers to employ apprentices and trainees has varied over time and is likely to be affected by business expectations and general business conditions. For example, while there had been an increase in apprenticeships during the first years of the mining boom (box 14.4), the global financial crisis had a negative effect in subsequent years. A joint report between Skills DMC and the Civil Contractors Federation noted that:

> … the GFC has clearly had an impact as in the previous survey 65 per cent of the businesses surveyed intended to take on an apprentice or trainee in the period to 2007 to 2009 but the actual figure was some 58 per cent. (Skills DMC and Civil Contractors Federation 2010, p. 53)

Ai Group (2013) suggested that apprentice numbers are recovering after being significantly affected by the global financial crisis. Its survey showed that in 2012-13, more companies were planning to increase their apprenticeship numbers and fewer planned to reduce their numbers compared to three years earlier. Among companies with apprentices in 2012, 60.5 per cent intended to maintain their apprentice numbers in the next year, while 4.3 per cent of companies planned to reduce their numbers and 35.2 per cent of companies planned to increase their numbers. This compares to 2009–2010 levels, when 36.8 per cent of companies planned to reduce apprentices and 24.5 per cent of companies planned to increase apprentices.

Another issue is that many people who are hired as apprentices do not complete their apprenticeships (table 14.6). Data on completion rates suggests that around half the apprentices in the construction industry complete a full trade — this is true of both employers with large and small apprenticeship programs. The reasons for non-completion are varied, and can include apprentices' perceptions of poor commitment to training from their employers (McDowell et al. 2011). There is also evidence that many apprentices lack basic work skills — around 30 per cent of survey respondents were dissatisfied with the basic literacy of school leavers (AIG 2013, p. 10). In addition, 42 per cent of employers had difficulty recruiting technicians and trades workers with sufficient skills in Science, Technology, Engineering and Maths (STEM skills).

Box 14.4 **Recent trends in apprenticeships**

The CFMEU (sub. DR174) points out that apprenticeship numbers are historically low when compared to the early 1990s. In 1990, there were roughly 32 700 apprentices out of 582 500 people in the construction workforce (p. 16). Currently, there are around 43 000 apprentices out of around 1 037 000 people in the construction workforce.

The National Centre for Vocational Research (2011) outlined broad changes from 1999 in the use and administration of Australian apprenticeships:

> National training packages progressively replaced the course and module curricula developed by the states as the specifications for the content and outcomes needed for recognised VET programs, including apprenticeships and traineeships. Schofield and Macdonald (2004) subsequently recommended refinements to improve the conceptualisation, development and implementation of training packages.
>
> This reduced the influence that RTOs have on training programs and increased the role of industry skills councils (ISCs) and employers. More recently, a tendency towards excessive proliferation of units of competency and qualifications has been controlled.
>
> 2000–2008
>
> Apprenticeship and traineeship commencements increased during the economic boom, and also stretched the capacity of the apprenticeship system to supply the required numbers of qualified tradespeople in key industries such as mining, building and construction.
>
> This prompted debate about whether skill shortages are inevitable during economic booms, or could governments do more to ameliorate the problem (Richardson 2007) … It also prompted COAG to accelerate reforms such as moving from time-based to competency-based completion of apprenticeships.

Sources: NCVER (2011, p. 12 Table 1); CFMEU (sub. DR174); ABS (Cat. no. 6291.055.003, Cat. no. 6227.0).

Table 14.6 **Apprenticeship completion rates in selected industries**

Per cent

Industry/ employer	*Number of apprentices at the workplace*					
	1	*2-10*	*11-25*	*26-50*	*50-100*	*100+*
	%	%	%	%	%	%
Construction	50.9	51.7	54.3	52.5	51.7	49.3
Electrotechnology	54.2	56.9	64.0	69.8	72.2	73.6
Engineering/ ICT/ Science	58.5	64.5	67.5	72.1	69.4	68.4
Automotive	49.1	50.9	56.3	60.5	61.0	59.9

Source: McDowell et al. (2011).

Pay rates are also a significant concern for apprenticeship retention, particularly for younger apprentices. For those beginning apprenticeships after 1 January 2014 who are aged under 21 years and have completed year 12 of school, a typical wage structure would be 55 per cent of the equivalent tradesperson classification in

year 1, and then 65, 75 and 90 per cent for the next three years of the apprenticeship respectively (Fair Work Commission 2013).[62] For example, a first year apprentice welder could expect to be paid $10.68 per hour including an industry allowance. While these current wage rates reflect increases in first and second year wages implemented on 1 January 2014, it is still likely that many apprentices would be attracted to better paid entry-level positions in other industries.

Higher wages are available for people who begin their apprenticeship after the age of 21 years (referred to as 'adult apprentices'), as they are entitled to the pay rate of an entry level adult worker (Fair Work Ombudsman 2014a).[63] If adult apprentices are already employed when they begin their apprenticeship, then they are entitled to the rate of pay for the classification of work they had undertaken prior to the apprenticeship. However, wages may still be a concern for the retention of adult apprentices, particularly if their alternative wage (based on experience) were much higher than the entry level wage.

Engineering graduates

In terms of engineering graduates, there is little evidence of an overall shortage. While the number of *domestic* graduates has stagnated in recent years, this has been compensated for by international students in Australian universities (figure 14.7). And as with many professions, a large proportion who graduate with engineering degrees do not work in that specific field (Engineers Australia, sub. 26). It is possible that specific engineering fields will vary in terms of the supply of graduates, or that the number of working graduate engineers may not be sufficient to meet the future demand of experienced engineers. However, much more detailed data would be required to establish this.

Moreover, the number of *working* graduates in specific fields and industries will also depend on the opportunities afforded to them upon graduation. Anecdotally, the Commission understands that graduate intakes in various industries can fluctuate markedly with business expectations. The willingness of firms to hire graduates likely reflects their needs in the near, foreseeable future — it is unlikely to 'shield' them from sudden spikes in labour demand.

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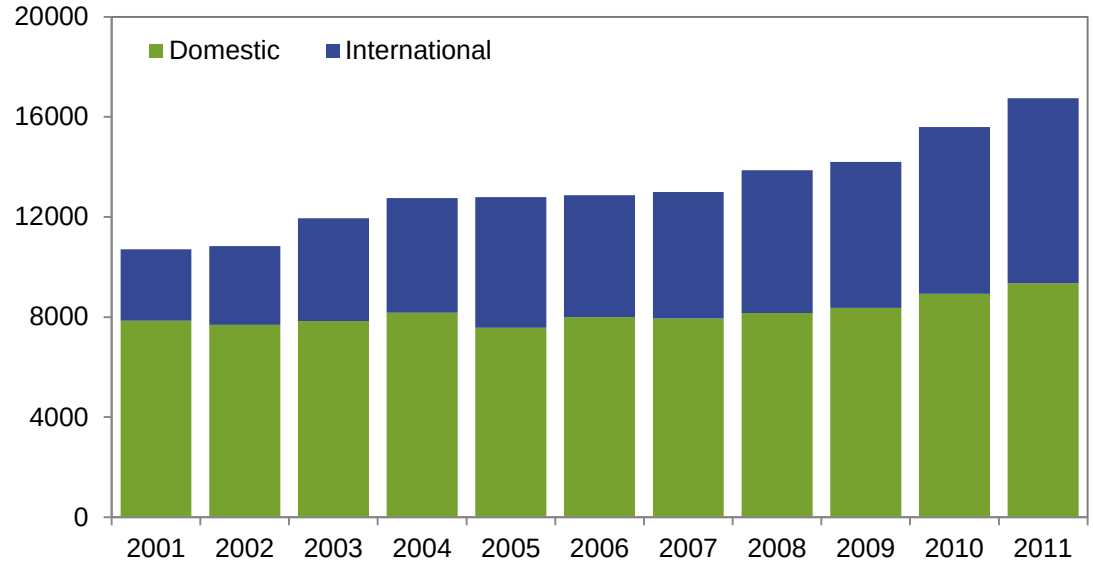
62 For those apprentices who have not completed year 12, the corresponding wage relativities are 50, 60, 75 and 90 per cent for years 1 to 4 respectively.

63 If it is higher than the apprentice wage rate, adult apprentices are entitled to the Award level for commencement in the industry is CW/ECW 1 (level a).

Figure 14.7 **Engineering graduates from Australian universities**
Number of graduates



Source: Engineers Australia (2013 Tables 5.9, 5.10).

It is worth noting that historically, private firms were not the only avenue for engineering graduates to enter the profession. Government departments and agencies had been a significant employer of engineers, creating a further pool of talent for private firms to draw on during boom times. The numbers of engineers in the public service began declining markedly in the early 1990s, as outsourcing increased (Yates 2000b). While this would have increased the pool of available engineers at the time, it has increased the reliance on the private sector for hiring graduates, meaning that graduate intakes are more likely to be affected by the immediate needs of businesses: the public sector is no longer a buffer employer.

Technological innovation leads to retraining

Technological change has a significant relationship with workforce skills. Any innovation in design and construction could require retraining to enable workers to properly use the technology. Innovations may include new types of materials that require a particular method of installation, or new methods of installing the same materials (say, laying asphalt). In this sense, even in the absence of any other significant drivers, it can be expected that some retraining will be required to keep up with ongoing improvements in technology in the infrastructure construction sector, as is the case in many other sectors.

PriceWaterhouseCoopers (2013a) stated that the need for retraining that resulted from new technologies was one of the two principal skills-related challenges faced by the construction industry. It reports that 24 per cent of surveyed industry stakeholders identified reskilling as a major concern.[64]

This is a particularly important factor when considering the timing and implementation of policies which either encourage or mandate particular technologies, such as the mandating of Building Information Modelling (BIM) by the UK Government (discussed in chapter 12). While such policies will necessitate retraining, they may still be worthwhile given appropriate implementation.

Attracting and retaining staff in the industry

Major infrastructure projects span urban, rural and regional areas. As such, geography presents one potential challenge to attracting and retaining a workforce (particularly because for many relevant occupations, telecommuting is not a feasible option for most workers in the sector). Both fly-in-fly-out and drive-in-drive-out are have long been common modes of work in the sector (CFMEU, sub. DR174). The Australian Government provides a Living Away From Home Allowance (LAFHA) in order to facilitate the attraction of workers to regional sites. Some stakeholders have raised the issue of the administrative burden associated with such schemes. In principle, such schemes should not be overly burdensome, though there should also be sufficient oversight to prevent abuse of the system. Other issues such as rostering practices may be just as important in attracting and retaining commuting staff.

The issue of geographic labour mobility is the focus of a recent Commission study that was released on 6 May 2014. The Commission found that the main factors driving geographic mobility are personal factors that were unlikely to be responsive to policy (PC 2014). However, issues such as training, licensing and regulation were all found to be important to labour mobility.

For the civil construction workforce, there appear to be several factors driving attraction and retention other than geography. In a workforce survey undertaken by Skills DMC and the Civil Contractors Federation (2010), 12 per cent of respondents cited relocation as a major reason for leaving the civil construction, whereas 42 per cent said either career progression or money were important factors (Skills DMC and Civil Contractors Federation 2010, p. 54).

64 Results from the Construction and Property Services Industry Skills (CPSISC) 2013 Stakeholder Survey. The results reflect the broader construction industry, including such major technological advancements as prefabrication for residential buildings.

The importance of experience

As outlined earlier, the infrastructure construction workforce is split not only across a number of occupations, but also types of construction (such as bridges, pipelines, tunnels, ports among others). It has been consistently noted by stakeholders that the skills required in construction occupations rely on industry-relevant experience and on-the-job training. Skills that are developed through experience have been among those lacking in recent years, and pose a real challenge to policy.

The importance of specialisation and experience is also well illustrated in the shortage of engineers. The discipline of Engineering is comprised of many specialisations, each of which with a relatively distinct labour market and, potentially, with their own particular skill shortages. To some degree, this specialisation begins during formal study, although Engineers Australia states that:

> The main way in which specialisation occurs is through post-graduate professional experience and practice. In most engineering specialisations there are only limited degrees of substitutability. While it may be true to suggest that a civil engineer who has specialised in bridge construction could also in theory build steel framed sky scrapers, a move of this nature is generally not possible because in this example the engineer can claim expertise and thus status in his/her area of specialisation but not in the second area. Few engineers would see such a move as feasible. (Engineers Australia sub. 26, p. 10)

It is useful to think of engineers as people who have learned to perform a particular engineering role, as opposed to people who have earned engineering degrees. BIS Shrapnel (2009) point out that graduate road engineers typically take between four and five years to reach a point of high competence, which, anecdotally, is similar for other fields of civil engineering. As such, it is important to retain engineering staff in the relevant industries for several years in order to avoid shortages.

Where people leave their industry or specialisation instead of moving up to senior positions, this can lead to shortages in senior positions — as shown earlier in figure 14.3, recruitment difficulties for engineers were consistently present for engineers with around 14–18 years' experience (Engineers Australia, sub. 26, p. 11).

Similarly, other technical occupations generally require a period of on-the-job learning before a level of competence is reached. For example:

> … a plant operator may be 'qualified' after 4-6 months but in most instances 24–36 months has been identified as the minimum time required on the job for an operator to be competent, and therefore, of value to the business. (Skills DMC and Civil Contractors Federation 2010, p. 5)

The requirement for experience may be especially relevant for major infrastructure projects:

> As infrastructure projects are potentially more complex than commercial projects there has been a tendency to employ only those persons with the necessary skill levels to undertake the work within project programs and safely. As there are a finite number of persons with the requisite skills they have been more costly to employ, although this is moderating following the slowdown in resource projects. (Australian Constructors Association, sub. 72, p. 13)

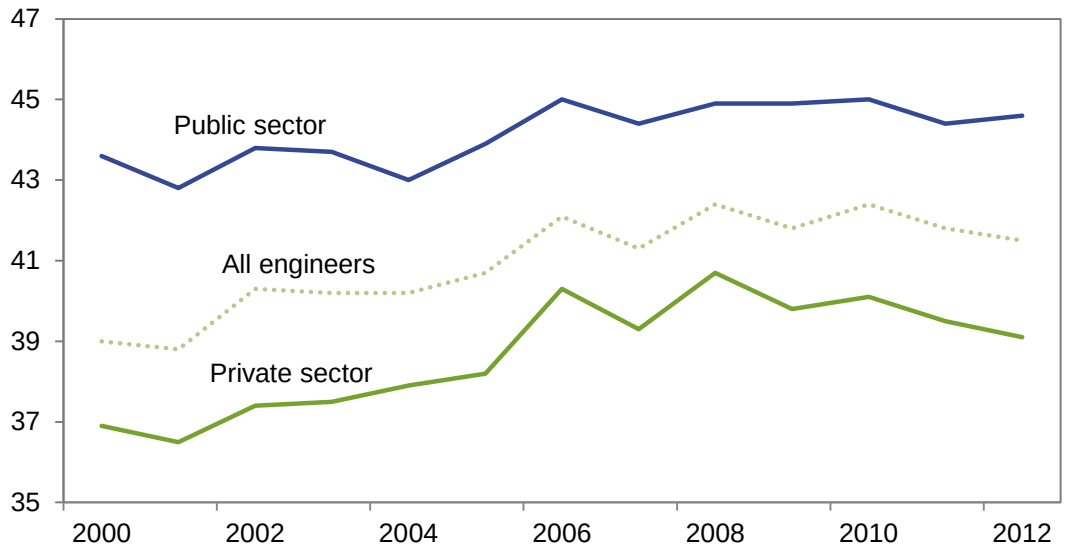
It is unlikely that the requirements for on-the-job training could suddenly be changed, unless there were changes to the competency levels expected of various occupations. To some extent, many of the recent skill shortages are likely to have been caused by an insufficient number of people staying in their occupation or industry, leaving a shortage of experience. It is also clear that any policy action would have to occur well in advance of any skill shortages.

Workforce ageing

There is some concern in the industry about the ageing profile of the workforce. In a survey by the Construction and Property Services Industry Skills Council, 12 per cent of respondents identified the ageing workforce as a major skills-related concern (PwC 2013a, p. 6). For engineers, as is likely for other occupations due to an ageing Australian population, workforce ageing is apparent (figure 14.8).

Figure 14.8 **Average age of engineers**

Age in years



Source: Engineers Australia (2013).

An ageing construction workforce can be attributed to several drivers, such as a reduction in the number of younger people entering the workforce; extensions in the length of careers, such as from delays in retirement; or changes in organisational structure such that more senior staff are required.

More generally, the Australian workforce will continue to age along with the changing age profile of the population (PC 2013a). In the future, this may affect several construction occupations, such as those involving more physical labour.

Competition from the resources sector

Although many occupations in infrastructure construction are relatively specialised, stakeholders have noted that many people have left the industry to work in other sectors, particularly mining. As discussed earlier, several skill shortages relevant to infrastructure construction occurred in the early to mid-2000s during the construction boom in the resources sector. The Senate inquiry into the Shortage of Engineering and Related Employment Skills investigated this issue, finding that:

> The mining boom in Queensland and Western Australia has driven up demand for workers with engineering and related skills which, because of the skills shortage, have been recruited to a significant extent from the manufacturing, power and traffic sectors. This demand exacerbates skills shortages in other engineering sectors, and creates frustration when recently trained apprentices depart for the mines.
>
> The committee heard that a large number of engineers were migrating from the eastern states to Queensland and Western Australia. The Chamber of Minerals and Energy Western Australia observed that 11 per cent of population growth in Western Australia was from interstate migration, and this 'historically is a very, very high number'. (Senate 2012, p. 54)

Not all data analyses showed a clear link between construction skill shortages and the mining boom. GHD Meyrick (2011) note that the growth in mining wages does not, at the industry level, appear to have sparked competitive wage growth in construction. Wage growth, as measured by changes in the Wage Price Index, was strong in the mid–2000s for mining and declining for construction (figure 14.4), suggesting that the growth in mining did not drive skill shortages in construction. However, GHD Meyrick also note that there is a 'striking difference' between what is observed in aggregate statistics and the anecdotal evidence:

> There are regular anecdotes of young workers being enticed by the extremely high salaries on offer to go and work in the mining firms in the north-west of Western Australia (the Pilbara region) and Queensland. The difference between the statistical evidence and anecdotes suggests there may be scope to explore this issue in more detail. (GHD Meyrick 2011, p. 31)

It seems very likely, therefore, that some proportion of the civil construction workforce has been affected by competition from the resources sector in recent years, although the effect is likely to differ across occupations and skill levels. In some cases, such as road or rail construction, it is very likely that some subcontractors would have had a choice between mining and civil projects.

It is also very likely that any impact the recent mining construction boom has had on civil construction skill shortages is ending. Reports suggest that the severe shortage of engineering graduates during the mining construction boom is no longer apparent, due to changes in business conditions in Western Australia and Queensland (Diss 2013).

Project intermittency and career uncertainty

Stakeholders have also raised the issue of project pipeline uncertainty (discussed fully in chapter 7), and its effect on careers in construction. When several similar projects coincide, the immediate effect is a sharp increase in labour demand, which can result in short term skill shortages:

> During the period between Christmas 2013 and early January 2014, we expect to deploy around 50 people on rail work, including many casual employees. Through January we would expect the majority of the casual employees to be unemployed or underemployed. (McLeod Rail, sub. 49, p. 3).

In the longer term, this unpredictability is a significant issue for building depth of experience in the workforce. The Australian Constructors Association stated that:

> The unreliability of continuity of employment is a mitigating factor for long term commitment to the industry and the consequent lead times to undertake university studies and trade apprenticeships means that potential employees cannot be guaranteed jobs when they complete their training. (Australian Constructors Association, sub. 72, p. 14)

Similarly, Engineers Australia reported that ‘an absolute majority’ of respondents to a 2013 survey agreed that the intermittency of infrastructure projects was detrimental to engineers’ employment and careers (sub. 26, p. 9).

The connection between project pipelines and skills is well summarised by Infrastructure UK:

> Attraction, retention and training of key talent in engineering and management is hampered by the stop-start nature of the pipeline, as is the ability to keep high-performing teams together. Sectors with stable pipelines progressively up-skill over time. (Infrastructure UK 2010, p. 18)

The particularly intermittent timing of major infrastructure projects not only provides incentives for workers to leave the industry, but it also changes the incentives for employers to hire and train staff. When contractors face a 'feast or famine' scenario, it may not be efficient for them to train staff for one project without knowing if they will need the staff on the next project. Due to the time it takes to train new employees to a competent standard, it may not be a cost-effective option for meeting current needs. On the contrary, it is likely to use up the time of more qualified staff in the short term, only producing a fully competent employee some years later.

The Australian Constructors Association stated that as a result of the inconsistent timing of projects, employers are less likely to employ workers directly, and more likely to rely on the 'general pool of workers' as needed (sub. 72). This involves attempts to hire people who need no or minimal amounts of training who can 'hit the ground running'. As a result, skill requirements for vacancies have become more specific, narrowing the pool of talent and exacerbating skill shortages.

14.4 Policy options for skill shortages in infrastructure construction

The above section outlined several drivers of the recent skill shortages that should help inform any policy intervention. However, governments should mainly direct policy at *efficiently* minimising future skill shortages. This should not only take into account what could have been done in the last decade, but also what would be appropriate given forecasts of future demand and the associated uncertainties with these.

There are several areas where policy interventions can take place — for example, governments are already heavily involved in education and training; infrastructure planning; and migration policy.

Addressing project intermittency and the 'people pipeline'

Many inquiry participants argued for policy measures to address the impacts of project intermittency on skill formation (box 14.5). As discussed in chapter 7, prospective improvements to the predictability of major infrastructure projects would occur if the Commission's suite of recommendations were adopted.

In this way, the intermittency of major projects would not be eliminated, but could be minimised and made more predictable. This would go some way to improving career stability and, thereby, to the depth of crucial workforce experience in infrastructure construction. In this sense, one of the most important contributions to addressing skill shortages would not come from direct government intervention in the labour market, rather it would result from a host of reforms that improves both the functioning of the sector and the predictability of likely future demands.

Fluctuations in labour demand will still be influenced by activity outside major infrastructure projects, including activity in the resources sector; private construction; minor public infrastructure construction; and infrastructure maintenance. As such, a more predictable pipeline of major projects would be a very significant though partial solution to addressing skills shortages.

Projecting labour demand

If the timing of major infrastructure projects were to become more predictable, this would help improve the ability of stakeholders to plan for future labour demands. The importance of such planning has been discussed in relation to the resources sector:

> As one mining executive put it: 'We understood the project pipeline concept very well; what we didn't do was invest in a people pipeline to go with it.' (PwC 2012, p. 6)

The planning of training investment by both businesses and governments would be greatly helped if credible projections of the future demand for skilled labour were available. Such projections would, in turn, become more feasible in an environment where major infrastructure projects were more predictable. Skills Australia (2011) currently undertakes such projections in the resources sector for the Australian Government, that aim to:

> … better inform industry forward planning for future major projects, assist in better meeting industry skill needs, and to inform further policy responses to the emerging needs of the resources sector … (Skills Australia 2011, p. 2)

It would be useful if a similar exercise were completed at appropriately regular intervals for the various forms of civil infrastructure. Projections of labour demand would provide a timely indication of the risks of future skills shortages, which would be key given that many of the relevant policy and business decisions (such as those related to training) would take time to take effect. It would be particularly useful for projections to be ongoing, given that stakeholder interest in skill shortages tends to be highest while the shortages are occurring, with much less interest when conditions change.

Box 14.5 **Stakeholders comments on pipeline management**

As a first step in developing stronger tripartite arrangements, the Taskforce invites Skills DMC to take up the lead role and, working with the appropriate Industry Skills Councils, engage with employers and unions and relevant organisations to develop an all-embracing workforce development plan for major resource projects … In addition, the Commonwealth should provide purpose funding and support services to Skills DMC and the Industry Skills Council Group. (AWU 2010, p. 3)

… there is a need for industry to more effectively coordinate its activities on a broader basis to ensure that an appropriate pool of skilled workers is available both now and into the medium to longer term. This will require cooperation between industry leading organisations representing industry sectors such as construction, mining, resources and related activities, clients and government agencies to develop the necessary processes for fast tracking skills development and targeting the occupations based on a more reliable pipeline of work than has previously been available. The ACA has already established a working party of member companies to assess this strategic approach. (Australian Constructors Association, sub. 72, p. 14)

… perhaps a better model for 'major shut'[65] coordination could be trialled in NSW and Victorian rail maintenance and construction activities over, say three years, and if successful in terms of reducing labour and plant shortages, and improving costs, this could be rolled out to the broader construction market. The same 'pilot' approach for the management of a national, long term major infrastructure project pipeline, which has been talked about for years by contractors and governments alike, would also be extremely useful in smoothing the supply and demand size peaks and troughs which apply to major project delivery currently. (McLeod Rail, sub. 49, p. 3)

With targeted intervention, there is an opportunity for governments to enhance productivity and moderate the extremes of the boom/bust cycle that has characterised infrastructure investment in years past. In the longer-term this will lower construction costs for future investment when an upswing in demand will require skills lost in the downturn. (Consult Australia, sub. 23, p. 2)

I think where industry can observe a constant flow of infrastructure projects, there's a better ability to prepare and maintain a steady workforce. I think that's fairly common sense. I think most of our members would consider that. (IPWEA, trans. p. 224)

The projections would provide a useful perspective of future industry needs, which would complement the information obtained from ongoing industry consultation.

Projections of infrastructure construction labour demand would first require credible data on future major infrastructure projects. This data would need to be supplemented by data on construction activity related to: maintenance; private infrastructure; minor works and subdivision; the resources sector; and local councils. Relevant data should be made available for Skills Australia and other

65 Refers to situations where rail lines are shut completely for maintenance purposes. The alternative would be for maintenance to occur after the passage of the last train of the night and before the passage of the first train in the morning.

stakeholders to make such projections, including data from cost benefit analyses of public infrastructure projects.

RECOMMENDATION 14.1

The Department of Industry should make and publish regular projections of labour demand from public infrastructure construction. Information collected and produced as part of the proposed benchmarking activities (recommendation 9.2) should support this activity, as should data held by Infrastructure Australia. The Department should also seek agreements with all private sector infrastructure providers and State and Territory Governments to provide data pertaining to their expectations of future need.

Training provision and funding

Industry training funds

Given that individual firms will vary over time in terms of their incentives to train workers, and that there is some potential for firms to capitalise on the training programs of other firms, one policy solution would be to partially centralise the funding of training. That is, to have all firms pay into a centralised levy that is used to fund training. To a large degree, this has been well institutionalised in the construction industry (aside from in New South Wales) (table 14.7). While some aspects of the training funding framework have only been implemented for a short time, such as the National Workforce Development Fund, many of the funds and programs are longstanding.

There may be issues regarding the allocation of funding, particularly since a number of specialised jobs do not have any recognised certification and may therefore be ineligible for grants. As mentioned above, it may be appropriate for some occupations not to have standardised formal qualifications. At the same time, it should be considered whether training funding should still be made available for those occupations if there is considerable specialist training required. As technology progresses and specialisations develop further, and as the flow of infrastructure investment becomes less intermittent, it is also important that the coverage of formal qualifications is kept up to date. There may also be merit in expanding the skill sets of current civil construction workers by providing training in related specialities.

Table 14.7 **Construction industry training funds**

Fund Authority (State)	*Levy/ funding*	*Levy applicable projects*
Construction Skills Queensland (Qld)	0.1 per cent of the contract price	All construction work $80 000 or more
Construction Training Fund (WA)	0.2 per cent of the contract price or $200 in every $100 000 of project value	All construction work valued over $20 000
Construction Industry Training Board (SA)	0.25 per cent of the contract price	All construction work valued over $15 000
Tasmanian Building and Construction Industry Training Board (TAS)	0.2 per cent of the estimated value of construction work (up to 0.5 per cent at Minister's discretion)	All construction work $12 000 or more
Building and Construction Industry Training Fund Authority (ACT)	0.2 per cent on all construction work	All construction work $10 000 or more
Incolink (VIC)	Varies	Employers subject to CFMEU and CEPU agreements
State Training Services (NSW)	NSW Government funding	
National Workforce Development Fund (AUS)	Australian Government funding	

Sources: The Australian Forum of Construction Industry Training Funds (2014); Building and Construction Industry Training Fund and Levy Collection Act 1990 (WA); Construction Industry Training Fund Act 1993 (SA); Building and Construction Industry (Portable Long Service Leave) Regulation 2013 (QLD); Building and Construction Training Fund Act 1990 (TAS); Building and Construction Training Levy Act 1999 (ACT); Incolink (2013, p. 29); NSW Government (2012); SkillsDMC (2012).

This follows a more general principle that such agencies need to keep abreast of industry needs. Lend Lease noted that the debate around skill needs often appears to focus on the preferences of teaching institutes rather than the needs of industry, suggesting that a change to the institutional structure around industry skills bodies may help (sub. 46). In any case, it would be of paramount importance that the prevailing bodies maintain a connection with the industry's needs. As such, Skills DMC (and where relevant, the Construction and Property Services Industry Skills Council), should continue to improve their responsiveness to changing industry needs.

To some extent, this process is already taking place. For instance, the CFMEU (sub. DR174) notes that the administrators of training funds regularly review their funding allocations. New South Wales does not have an industry training fund, and it is not clear whether a state funded training fund would be as responsive as one that is closely linked to industry. In either model, stakeholder engagement will be key to ensure that future needs are met, particularly in an environment where there is a more continuous flow of infrastructure investment.

Facilitating apprenticeships

As noted above, apprenticeship is an area of unresolved policy conflict. Firms have strong incentives to seek out and employ skilled workers, but their incentives to train inexperienced or unqualified worked (through apprenticeships) are far weaker. This can lead to skill shortages during periods of industry expansion.

Apprentices are often relatively poorly paid for extended periods. This is usually due to absences to undertake training (that is, time not of immediate value to the firm) and the diversion of skilled resources to support on the job learning.[66] The incentive to undertake an apprenticeship for an individual thus requires, in comparison with other job opportunities, that person to take a long-term view. Given the relatively poor pay in the short-term, the willingness of individuals to enter into apprenticeships can be dampened during periods of strong employment alternatives.

Further, unlike other long-view 'training' choices, such as university courses, the training must generally have a strong link to a workplace. This suggests some role for public support, but necessarily one that involves employers making adjustments to their workplace. It is not the role of this inquiry to solve this policy conundrum; however, this issue is of relevance to skills shortages and construction costs.

Lend Lease (sub. 46) suggested that as clients, governments could encourage the hiring and training of apprentices by 'giving preference' to contractors that made a commitment to apprenticeships. However, such an incentive is likely to be obscured given other important factors considered in the procurement process (discussed in chapter 12). Moreover, given that a large proportion of employment in infrastructure construction occurs at the subcontractor level, governments could not simply use their tendering process to implement such a policy.

The CFMEU (sub. DR174) argued that the arrangement suggested by Lend Lease would be a similar use of government influence as the approach of building guidelines adopted in Victoria. The building guidelines tend to prohibit or require certain practices as standard *prerequisites* for the tendering process — as opposed to being a further criterion to be weighed up against others. Apprenticeships could potentially be encouraged in this way, though it would seem to involve setting minimum standards for all firms (essentially a quota system). For this, governments

66 The CFMEU (sub. DR174) point out that all qualifications in the Skills DMC and CPSISC training packages are competency based, and do not prescribe a set number of years required for completion. Notwithstanding, it is likely that most apprentices would still take several years to be fully qualified.

would need to develop a view as to what the skill needs of the sector were (recommendation 14.1).

Another alternative would be to directly subsidise the employment of apprentices. To some extent, the pool of skilled tradespersons has some aspects of a public good, in that firms could potentially hire only fully trained workers and let others invest time, resources and risk in providing training. As such, there is an argument for some form of intervention, whether it be through government policy or through industry led programs (both of which occur currently to a limited degree).

Several separate funding schemes already exist to facilitate apprenticeships, including State and Territory based travel and accommodation assistance, as well as direct funding and other programs (box 14.6). Some programs have been implemented specifically to address skill shortages, such as the National Apprenticeships Program (NAP) and the temporary Kickstart program. However, evidence suggests that payments to employers only have a marginal effect on hiring decisions (McDowell et al. 2011).

Another option is to reduce the length of apprenticeships. To this end, apprenticeships are now generally competency-based or have options to have competencies recognised. Competency-based vocational training is also supported by programs such as the Accelerated Australian Apprenticeships Initiative and the NAP (box. 14.6). Some of these, such as the NAP, focus more on upskilling existing employees rather than changing the incentives to employ more staff.

The CFMEU (sub. DR174; sub. DR206; transcript. p. 188) noted that programs such as the NAP could detract from employers' interests in hiring young apprentices. This is particularly likely to affect first and second year apprentices:

> Our fear is that if the NAP is the preferred model for the infrastructure construction sector then it will diminish the job opportunities for young people who wish to take up an apprenticeship in the industry. Our position is that the NAP should be in addition to and not a substitute for the employment of people, especially young people, in full apprenticeships. (sub. DR206, p. 4)

However, the Commission considers that while a program like the NAP is not a panacea for all problems associated with apprenticeships, they could play a useful role in improving apprenticeship numbers, particularly given the ageing population. Other policies should be used to encourage the employment of younger apprentices, particularly first and second year apprentices. As such, if the NAP is pursued with regard to infrastructure construction, it should not be used to subsume other apprenticeship programs.

Box 14.6 **Examples of government programs to facilitate apprenticeships**

There are a number of government incentives available for employers to hire apprentices in those occupations listed on the National Skills Needs List. Incentives (generally cash-based) include Commencement Incentives; Recommencement Incentives; Completion Incentives; Rural and Regional Skills Shortage Incentive; Declared Drought Area Incentives; Mature Aged Workers Incentives; Australian School-based Apprenticeship Incentive; Assistance for Australian Apprentices with Disability; Support for Adult Australian Apprentices.

The Australian Government also provided a direct subsidy for new apprentices in 2012-13 as part of the temporary Kickstart program. The program duration and scope was extended, funding apprenticeships in building, construction and engineering.

The National Apprenticeships Program (NAP) was designed to address skill shortages in the resources and energy sectors by offering an expedited accreditation for mature age workers, which involved formally assessing prior knowledge and using this as the basis for the apprenticeship (sub. 9). It extends to applicants who already have at least 40 per cent of the skill requirements of a specific trade, and aims to produce certified tradespeople in an 18 month timeframe (as opposed to four years for a traditional apprenticeship). PriceWaterhouseCoopers evaluated the financial case for the scheme in 2013 and found it produced savings for employers and governments when compared to traditional apprenticeships.

Sources: National Apprenticeships Program, sub. 9; Australian Government (2013); Australian Business Apprenticeships Centre (2013).

It is beyond the scope of this inquiry to determine the appropriate level of government payments and subsidies for apprenticeships or the most effective program to facilitate their uptake. To better understand these issues and possible solutions, a complete review of apprenticeship policy would be of benefit.

RECOMMENDATION 14.2

The Australian Government should request the Productivity Commission to conduct a public inquiry into Australia's apprenticeship arrangements. The inquiry should include, but not be limited to, an assessment of:

- ***the deficiencies of the current system, how these arise and who they affect***
- ***the role of the current apprenticeship system within the broader set of arrangements for skill formation***
- ***factors that affect the supply and demand for apprenticeships***
- ***the structure of awards for apprentices***
- ***potential reforms to improve the efficiency and effectiveness of Australia's apprenticeship arrangements.***

Registration/ accreditation of engineers

Registration and accreditation of engineers currently exists in various forms:

- An engineer can become a Chartered Professional Engineer (CPeng) in a particular specialisation based on an assessment of work experience. The process of becoming chartered takes between one and three years, and is usually initiated after three or four years of professional work. The accreditation is audited every five years and requires ongoing completion of professional development.
- Alternatively, engineers can register their competence in a particular specialisation on the National Professional Engineers Register (NPER), based on a similar assessment of work experience to the CPeng (though not requiring membership to the governing body).
- Another similar assessment of work experience to the NPER or the CPeng is needed to become a Registered Professional Engineer of Queensland (RPEQ). To work as an engineer in Queensland, it is compulsory to either register as a RPEQ or to work under the supervision of an RPEQ.

These processes are indicative of the amount of further learning required by engineers after university. Although the RPEQ is specific to Queensland, it recognises the CPeng and NPER as proof of equivalent competence.

The accreditation/registration of engineers in itself is valuable to both employees and employers. It acts as a signal of skills and/or experience obtained, much like a university degree for entry level engineers. It acts alongside other signals — for instance, senior roles are likely to require several years of relevant experience beyond that required for initial accreditation.

Should registration then be mandatory?

Where registration or accreditation is made mandatory, this aims to provide two benefits: the prescription of a minimum standard of skill or experience for particular occupations; and the ability to de-register engineers as a means of disciplinary action.

Alternatives for the former include prescriptive standards in legislation (such as state building acts); prescriptive procurement guidelines; or the incentives faced by employers associated with legal liability. Alternative means of remedy for affected consumers (as a de facto means of disciplinary action) would include legal action through common law; or state sanctioned ombudsmen or other bodies where they exist. However, with the exception of legal liability, these alternatives are rarely used in practice.

While Queensland has mandatory registration for all unsupervised engineers regardless of which sector or field of specialisation, most states have a system of registration for engineers working in the building industry. For example:

- Tasmania requires engineers in civil, fire safety and building service fields to be accredited. For civil engineers, accreditation[67] may come from the NPER, CPeng, a post graduate qualification, or five years of design experience attested to by a practising senior engineer.
- Victoria registers 'building practitioners' across a number of occupations including engineers, and has a board that is capable of disciplinary action (Victorian Building Authority 2014).
- Western Australia does not register engineers, and NSW generally only requires accreditation for building certifiers (Engineers Australia 2014; NSW Government 2014a).

There are tradeoffs between the different approaches taken across jurisdictions. For instance, in a report for the Queensland Department of Public Works (2000), PriceWaterhouseCoopers found that:

> The use of associated legislation rather than direct restrictions on the practice of all engineering services increases the level of complexity of the regulatory environment but also provides the ability to specifically prohibit or allow certain practices which may be competently practiced by persons other than just engineers. (p. 60)

That is, a benefit of having registration requirements contained 'associated legislation' (such as a state building act) is that standards, requirements and disciplinary action can be levelled to a wider set of occupations than just engineers. This is could be particularly relevant to construction, where several occupations may require similar levels of scrutiny.

One of the dangers of state-based systems is that they may develop independently and, over time, create barriers to geographic labour mobility. A national system of registration would be preferable as it would ensure labour mobility is not constrained. A national system of mandatory registration is currently being considered by a working group National Engineering Registration Board (NERB), and several peak engineering bodies have affirmed their favour for a national registration system for professional engineers.[68] However, such a system should be considered in light of its costs and benefits relative to alternative regulatory approaches.

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[67] In addition to a bachelor's degree in engineering.

[68] Including Engineers Australia, Consult Australia, APESMA and IPWEA (Institute of Public Works Engineering Australia NSW 2013, p. 11).

ACIL Tasman (2011) undertook a cost benefit analysis of a national mandatory registration scheme for the NERB. In the first three years of rollout, the analysis suggested the national scheme would double the total costs of all current schemes, from $300 million in year one to $640 million in year three. These costs would be borne by engineers and their employers.

The assumed safety-related benefits of national registration were not based on any measured safety benefits in Queensland, nor any measured safety deficits in other jurisdictions.[69] The estimated value of the reduction in large engineering failures was around $13 million per year.

ACIL Tasman (2011) estimated that the majority of the estimated benefits were attributed to a reduction in the value of 'botched' projects ($207.08 million pa); a 5 per cent increase in the numbers of migrant engineers (leading to a proportional rise in engineering activity of $185.58 million pa); and the increased mobility of engineers leading to efficiencies of 0.25 per cent of project values per year ($207.60 million). In calculating these estimates, the quantitative impact of national registration was assumed but in reality, the effect of registration would be complex and difficult to estimate.[70] Still, given the different regulatory regimes in place across different jurisdictions, it would be a worthwhile exercise to make quantitative comparisons of the relative experiences.

Principal-agent problem in screening engineers?

Conceptually, mandatory registration would only be relevant where a principal-agent problem exists — for lumpy transactions or where potential costs of a bad decision are high (for example, health), and where consumers cannot judge the quality of the practitioner. Businesses that hire engineers are able to screen them

69 The ACIL Tasman (2011) report made three main assumptions regarding the benefits of national registration: it would prevent one large engineering failure every four years; each such failure would have resulted in one fatality and five serious injuries; the average response and rectification costs associated with each of these failures is $50 million. It also assumed that national registration would result in a reduction in 'botched' construction projects equivalent to one per cent of all construction projects, with the associated savings assumed to be 25 per cent of the value of those projects.

70 Several high profile engineering failures have been mentioned by participants (Board of Professional Engineers of Queensland, sub. DR135; Professionals Australia, trans. p. 140). However, the causes of these failures are often complex and may not have been averted by engineer registration alone. For example, the senior engineers on the West Gate Bridge construction were accredited engineers (Royal Commission 1971); the Piles Creek culvert collapse of 2007 was due to issues that were raised by engineers both in 1984 and 2004, but work was not carried out due (NSW State Coroner's Court 2007).

during the hiring process, and to dismiss them if they are not proficient. In this sense, the conceptual grounds for mandating registration do not appear strong.

Engineers Australia (sub. DR123) note that some engineers are hired by non-engineering managers, and that in such circumstances, some level of principal-agent problem exists. Were this the case, it would assume that:

- normal hiring processes (which may involve the use of resumes, interviews and the checking of references), were insufficient for the hiring of engineers
- firms may not have senior engineers available to further screen new applicants
- firms may have senior engineering staff, but may still allow non-engineering managers to hire new engineers

Engineers who report directly to management are likely to be at very senior levels, where direct experience is likely to be given more weight than their accreditation alone. As such, it is not clear how much additional benefit would be achieved through mandatory registration.

There may still be benefits of mandatory registration, notwithstanding the existence alternative mechanisms:

> Although similar results can be achieved without registration, registration provides a framework for greater consistency in outcomes and possible sanctions for taking undue advantage of the asymmetry. (Engineers Australia, sub. DR123, p. 4)

Registration may also make the screening of engineers easier for employers — for example, it could provide useful signals to non-engineering managers when trying to hire appropriate senior engineers. Though, this is likely to be the case even in jurisdictions where they are not mandatory.

Risky firms?

It is possible for firms to knowingly hire people who have insufficient skill or experience for a particular occupation in order to reduce wages or due to a lack of better candidates. The incentives for firms *not* to do this are twofold: having better qualified staff would help them to compete in the marketplace; and by ensuring that their work is sound, they would avoid the legal liability associated with engineering failures. These incentives are likely to be strong, though not perfectly binding. However, they may be important in considering why firms might hire similar staff regardless of differing regulatory frameworks — a proposition that should be studied empirically.

In the case of major infrastructure, even though transactions are 'lumpy', consumers are generally sophisticated and should have sufficient processes to screen potential contractors. This may not always hold in practice — there are various criticisms of the skills available in government procurement (chapter 12). Yet, given the existence of voluntary national accreditations, procurers appear to have every opportunity to hire appropriate contractors.

When poor procurement decisions are made, the costs can be high. Fatal incidents such as the Canberra Hospital implosion failure were attributed in part to poor tendering processes which resulted in a poorly qualified contractor being chosen (Yates 2000a). The project was in contravention of the Demolition Code of Practice, which required an independent structural engineer and explosives demolition expert. Mandatory registration is unlikely to supplant the need for better procurement practice.

The Queensland experience

The impacts of the Queensland scheme are somewhat unclear. A review of Queensland's Professional Engineering Act was undertaken in 2000 in relation to the National Competition Policy, in order to determine whether the mandatory registration of engineers was anti-competitive. It was undertaken by PriceWaterhouseCoopers for the Queensland Department of Public Works (2000). The review provided a largely conceptual discussion of the potential impacts of removing mandatory registration, and involved the consultation of major stakeholders. It was not a quantitative assessment of what had been achieved in Queensland, and did not discuss whether Queensland's scheme had achieved superior results to other states. The report recommended to maintain the status quo, and that 'a review of the necessity of the restriction continuing' be performed within 10 years (p. 22).

In 2012, the Board of Professional Engineers conducted a further review of the Professional Engineering Act, including an open engagement of stakeholders. It was clear from the discussion paper that the review was not intended to review the necessity of mandatory registration, nor did it consider relative safety performance. And while most stakeholders in Queensland were in favour of the status quo, this provides little guidance for other States and Territories in terms of how effective the regulation has been.

It is also difficult to consider its effectiveness given that non-compliance remains an issue. According to the Board of Professional Engineers of Queensland:

> While the practise of direct supervision over nonregistered engineers would work if properly undertaken the reality is many organisations are not properly implementing

> the requirement for direct supervision. A lot of engineers do not work in a properly supervised environment. (2012, p. 9)

This highlights the difficulty in considering whether mandatory registration has led to superior outcomes in Queensland than in other jurisdictions.

Enforcing compliance to the Queensland scheme is a complaints-based process. If the last six years are to be taken as an example, Queensland had an annual average of 3.7 disciplinary proceedings for unsatisfactory conduct, and 2.7 prosecutions related to a lack of registration.[71] Certainly, these numbers in themselves do not appear to be capable of avoiding 'botched' projects to the value of 1 per cent of all construction, as estimated by ACIL Tasman (2011). For this to be true, either the likelihood of breaches must be higher among higher value projects, or the benefit of registration must lie in having better qualified engineers for each role rather than in its disciplinary functions.

The way forward for other States and Territories

Anecdotal evidence suggests there may be serious problems regarding engineering practice in some jurisdictions. The ACT Government inquiry into its construction industry found anecdotal evidence of poor practice:

> There were comments that appropriately qualified engineers can be difficult to access here in the ACT … Concerns were also expressed about inappropriately qualified or poorly experienced engineers 'signing off' on certain types of structures outside their field of expertise or beyond their experience. There was even anecdotal evidence from credible and experienced industry participants to suggest that there have been instances of some engineers having signed off on work they have not personally sighted, or of signing off on complex structures based on visual observations alone. All of these represent potentially significant concerns. (Briggs and McCabe 2012, p. 45)

While on the face of it, such practices are serious enough to warrant regulation, it is uncertain whether mandatory registration of engineers would be the best recourse for the issues cited above. For instance:

- management practices may be as important as technical proficiency. Yet, mandatory registration of engineers (as it is currently structured in Queensland, for example), does not imply any recourse for managers or employers who encourage poor practice (Board of Professional Engineers of Queensland 2012).

[71] In the last financial year, there were 38 complaints regarding the practice of engineering (Board of Professional Engineers of Queensland, sub. DR135). Since 1 January 2008, the Board of Professional Engineers of Queensland has brought 22 disciplinary proceedings for unsatisfactory conduct, and 16 prosecutions against engineers for practicing without registration.

Rather, broader legislation may be required to cover other occupations in the construction industry other than engineers

- the difficulties experienced in accessing qualified engineers in the ACT may require new incentives or addressing barriers. Mandatory registration is not in itself a strategy designed to attract experienced engineers into the region; indeed, if the requirements are state-based, this might reduce the number of experienced engineers in a region
- engineers signing off on work unseen is not leading practice and could be addressed directly through guidelines and expectations on ethical behaviour
- there is no underlying market failure rationale to justify mandatory registration.

Overall, the Commission considers that further evidence would be required to conclude that mandatory registration has provided a net benefit to Queensland and should be expanded to other jurisdictions.

Should State and Territory Governments adopt mandatory registration, perhaps for selected engineering occupations, the Commission considers that the requirements should include the recognition of existing national standards and accreditations. Where feasible, accreditation in one jurisdiction should be sufficient for accreditation across jurisdictions, subject to an objection and hearing process (such as what occurs in Queensland through the Queensland Commercial and Administrative Tribunal (Board of Professional Engineers Queensland, trans., p. 164)).

Occupational licensing

The licensing of trades is another area of regulation that is of clear relevance to public infrastructure construction projects. Trades are currently licensed in each State and Territory. Many trades, such as electricians and plumbers, are often hired directly by individuals who may not be able to properly screen applicants for the relevant skills. As such, licensing serves a clear purpose of overcoming principal-agent issues. Other trades, such as welders, are more likely to be hired by firms who should be able to better screen for appropriate skills. Yet, licensing is still likely to be appropriate given the immediate safety and physical risks, perhaps most particularly for those with little work experience.

The potential impact of the licensing regimes for trades was brought up by the Ai Group (sub. 47), who noted:

> Industry continues to face significant challenges finding skilled labour and struggles with an arcane system of state-based licensing of trades which does not meet the needs of today's workforce or construction companies. We urge the Productivity Commission

> to recommend that all levels of government recommit to a timely harmonisation of licensing along the lines already agreed by COAG. (p. 3)

The lack of progress over the years has been attributed to a lack of consensus on several issues. The National Occupational Licensing Authority described the lack of consensus in its submission to the Commission's inquiry into labour mobility:

> Current governance arrangements hamper the policy development for national licensing and timing for its introduction. There has been confusion about final approval of policy decisions. Jurisdictional and industry interests have competed on different levels: some policy issues that have been negotiated and resolved on one level have subsequently been elevated to another level or revisited through another forum and at times reversed. (submission to PC (2013d), sub. 17, p. 10)

On 13 December 2013, COAG decided not to pursue the National Occupational Licensing Scheme reform, and to begin the disestablishment of the National Occupation Licensing Authority from early 2014 (COAG 2013). Rather than committing to the existing state-based system, States and Territories will work together via the Council for the Australian Federation (CAF) in order to develop other options for minimising licensing impediments. In its commissioned study on Geographic Labour Mobility, the Commission recommended that State and Territory Governments should urgently progress this action, but to avoid the difficulties of the past, governments must specifically emphasise efficient communication and cooperation between regulators in different jurisdictions (PC 2014 Recommendation 12.5).

In any case, it is important in principle that interstate barriers be kept to a minimum. The disestablishment of the National Occupation Licensing Authority has meant that such an outcome will be further delayed and remains subject to uncertainty.

FINDING 14.1

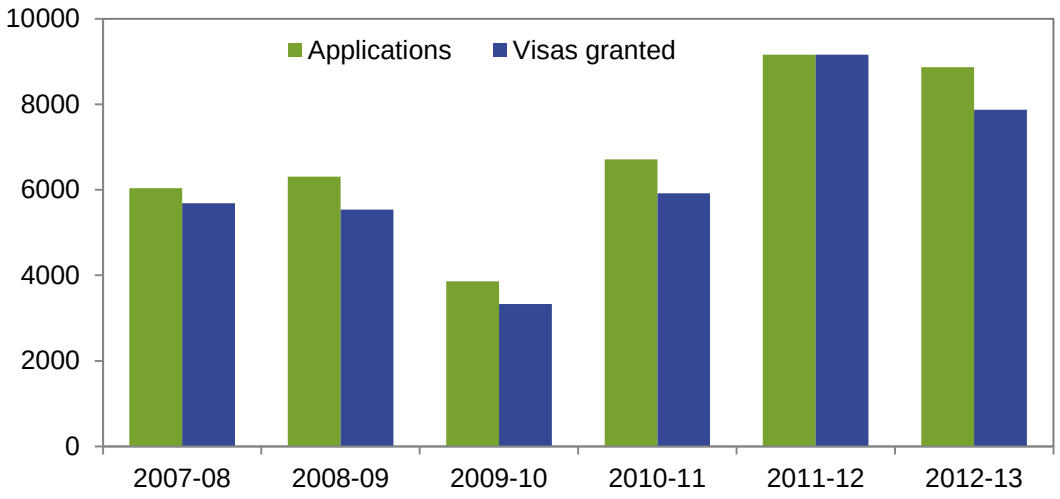
The Commission considers that overall, tradespeople, their clients and their employers have been poorly served by the lack of progress amongst governments in producing consistent occupational licensing across jurisdictions.

The use of temporary skilled migration

Temporary Skilled Migration (subclass 457) visas continue to be relevant to infrastructure construction. The visas are provided for up to four years, which would generally be a long enough timeline for most major infrastructure projects. Since 2007-08, construction has accounted for between 11 and 13 per cent of

457 visas.[72] The number of 457 visa applications have varied from year to year (figure 14.9). The numbers of Temporary Skilled Migration subclass 457 visas granted for civil engineers, draftspersons and technicians grew rapidly in the mid-2000s (figure 14.10), which is broadly consistent with the existence of recruitment difficulties.

Figure 14.9 **Number of 457 applications and visas granted in the construction industry**[a]



a Includes the entire construction industry, not restricted to civil construction.

Source: Department of Immigration and Border Protection, *Subclass 457 State-Territory Summary Report*, 2008–2013.

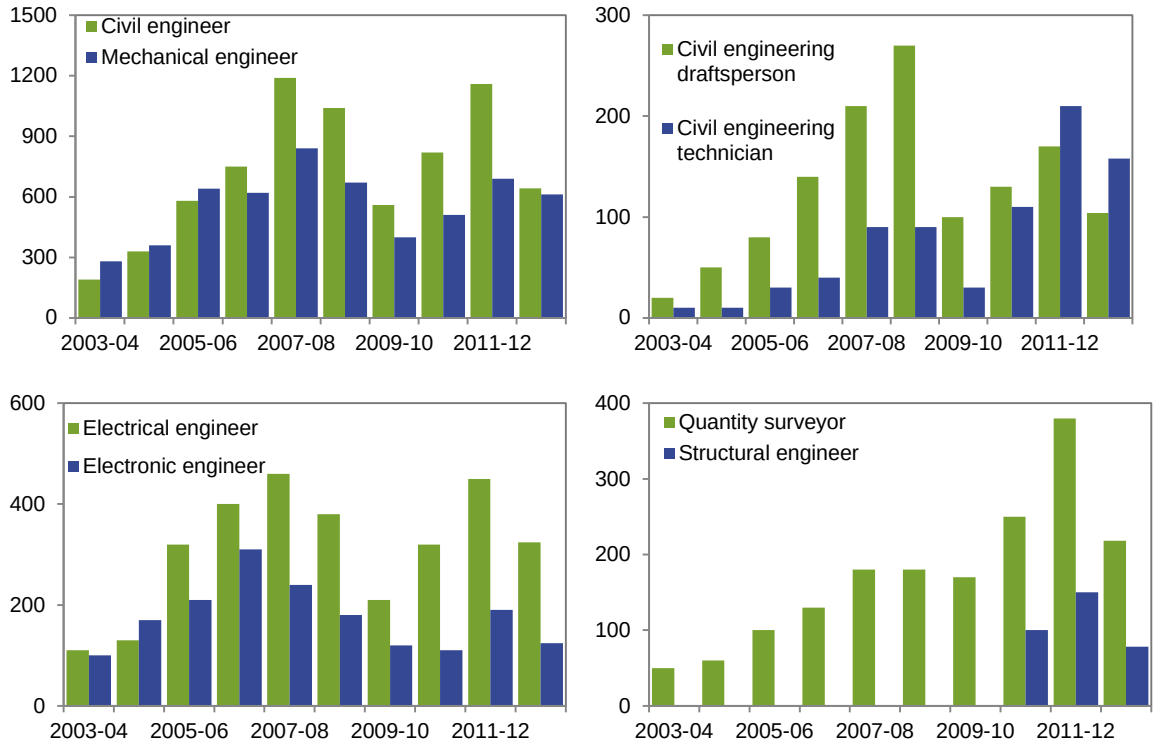
A more comprehensive breakdown of occupational data shows that the largest occupational category granted 457 visas in the construction industry was Technicians and Trades Workers (table 14.8). This differs from the experience across all industries, where Professionals comprise a larger share, accounting for almost half of 457 visas.

Temporary skilled migration visas have been used by both private construction companies and government agencies. For example, RailCorp used overseas recruitment in their management of skill shortages (NSW Auditor-General 2007). Several stakeholders have commented on the issue, advocating for both increases and reductions of temporary migration numbers (box 14.7).

72 Department of Immigration and Border Protection (various years), *Subclass 457 State-Territory Summary Report*.

Figure 14.10 **Temporary visas granted for selected civil engineering occupations**

Number of visas



Source: DIAC data as reported in Engineers Australia (sub. 26).

Table 14.8 **Occupational breakdown of 457 visas granted in all industries not limited to construction**

Number of visas granted

Occupation	*Construction*	*All industries*
Managers	909	11 740
Professionals	1 943	33 440
Technicians and Trades Workers	4 240	18 230
Community and Personal Service Workers	5	1 060
Clerical and Administrative Workers	646	2 590
Sales Workers	na	260
Machinery Operators and Drivers	105	420
Labourers	23	100
Other	na	630
Total	7 871	68 480

Source: Department of Immigration and Border Protection (*Subclass 457 State-Territory Summary Report*, 2010–2013; unpublished data).

Box 14.7 **Stakeholder views on 457 visas**

The Civil Contractors Federation are in favour of expanding the coverage of the temporary skilled migration scheme:

> The ability for civil contractors to access skilled labour through skilled migration programs such as Enterprise Migration Agreements and the sub-class 457 Visa program is currently limited.
>
> A number of highly skilled civil construction occupations are not recognised on the present sub-class 457 Visa program, due to the way in which civil skills are recognised within the ANZSCO framework.
>
> Skilled migration, both permanent and short term, complements other training initiatives as it will enable the industry to support labour market mobility, particularly for short-term projects.
>
> In this area, CCF believes that the government may be able to better measure labour shortages so that skills need can be met effectively. (sub. 34, p. 16)

Similarly, in their submission to the Senate Inquiry into the Shortage of Engineering and Related Employment Skills, Australia Wide Personnel (2012) suggests that it should be made easier for recruitment firms to sponsor overseas engineers, as it had been prior to 2007.

Other stakeholders, such as Engineers Australia, the CFMEU and the AWU are in favour of limiting or reducing the scope of temporary skilled migration. Moreover, the CFMEU (sub. DR174) claims that the scheme as it currently functions allows firms to employ foreign workers even in areas where there is no skill shortage.

Impacts of 457 visas

The role of temporary skilled migration is to supplement the workforce in areas where there are genuinely short-term shortages of appropriately skilled workers. This will continue to be an important role given that some level of skills shortage is likely to occur in the future (though it may be minimised with appropriate policy action). The use of temporary skilled migration can potentially have several impacts on the broader workforce and the labour market, which need to be considered.

The ability to hire people on 457 visas to meet short-term skill shortages may reduce employers' incentives to provide the training that may reduce or avoid future skill shortages. For example, the use of 457 visas for technicians and trades workers may be an attractive alternative to hiring and training apprentices, especially since it takes several years to produce a qualified tradesperson.

457 visas may also reduce wage pressures in those parts of the construction workforce experiencing skill shortages. Unfortunately, comparable wage data is not available at the occupational level. The average wage of a 457 visa applicant in construction has consistently been above the industry average (table 14.9). This is likely to reflect that:

- shortages are often in more senior, higher paid roles
- for the employer, there are on-costs involved with the 457 visa scheme, meaning that they may be more inclined to use them for more senior roles.

Certainly, temporary skilled migration is neither intended to lower wage rates nor to reduce the long-term incentives for Australians to acquire skills, and the design of the system should reflect this. As such, mechanisms should ensure that the use of 457 visas is linked to genuine skill shortages.

Table 14.9 **Real average annual salaries in construction, 2007-08 to 2012-13**

Dollars

	2007-08	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2012-13*
Construction 457 visas	85 830	93 833	102 601	100 654	95 116	89 200
Construction[a]	64 310	67 656	70 920	71 579	72 579	74 222
All industries[a]	65 651	67 329	69 479	70 183	71 247	73 239

a Annual salaries calculated as average of May and November data points.

Sources: Commission calculations based on Department of Immigration and Border Protection (various years), *Subclass 457 State-Territory Summary Report;* ABS (*Average Weekly Earnings, Australia, Cat. no. 6302.0, table 10G)*.

14.5 Conclusion

The skill shortages observed in civil construction have been specific to occupations, skill levels, and geographical areas. Based on current evidence, it is unlikely that skill shortages are a major cost driver for large infrastructure projects. However, they do have the potential to cause project delays and to affect wage costs and the competitiveness of subcontractors.

Policy action will not be able to remove all future skill shortages in construction — it should aim to reduce their occurrence and their impact on businesses. While there are some direct policy interventions that are possible in this area, an overarching requirement is to improve and maintain the information base on current and likely future industry needs through both consultation and analysis of data.

The intermittent nature of infrastructure construction is a significant underlying factor to skill shortages in the construction industry generally, and one that is not easily negated. Improvements to the predictability of infrastructure projects should be pursued via the Commission's suite of recommendations in this report which will assist in forming an effective pipeline of projects. This approach is itself an important aspect of reducing skill shortages, in addition to its other prospective benefits.

15 Social and environmental regulation

Key points

- The scope and stringency of the social and environmental regulations that apply to public infrastructure have escalated over time. The regulations are often complex and duplicative, and add to infrastructure costs. The costs can be significant, albeit difficult to quantify.
- Some regulatory costs are warranted. Reforms should focus on only those regulations or requirements that are unnecessary to deliver worthwhile social and environmental outcomes.
- Unnecessary costs arise where regulations are poorly designed, coordinated and/or administered. For example, delays in project approvals impose major costs on the financier (often the Government) and reduce the benefits to the community from the deployment of infrastructure. Where approval processes can be expedited without sacrificing their coherence and efficacy, there are likely to be significant gains to the community.
- There is substantial scope to rationalise and improve the web of regulations and approval processes in the infrastructure construction sector. The Commission identified many such opportunities in its recent study of development assessment processes. Australian governments are currently considering that study's wide-ranging recommendations for reform.
- While this chapter does not duplicate the Commission's previous analysis, it does look closely at three specific regulatory concerns.
  - Lead contractors on Commonwealth-funded projects are required to be accredited by the Federal Safety Commissioner. Accreditation adds an additional layer of regulation and associated compliance costs, and may be a barrier to entry for some foreign and local firms. A Review focused on reducing compliance costs has just begun. The Review should also examine options such as 'recognition' of foreign requirements and 'provisional accreditation'.
  - A raft of social and environmental regulations affect quarries, some of which may impose undue costs and restrict supply. Failure to allow new quarry developments or expansions, particularly close to cities, could lead to future scarcity of some key inputs into many infrastructure projects.
  - Road and rail regulations and requirements can add significant costs to a project. These costs need to be compared with potential benefits in order to offer the best result to the broader community.

Major public infrastructure projects are subject to an array of regulations aimed at addressing social and environmental concerns. The regulations are typically coupled with, or embody, requirements for community consultation, pre-approval assessments and, in some cases, monitoring and reporting during and/or after construction.

The regulations and requirements add to the costs of the projects. While recognising the valid public goals that often underlie them, several inquiry participants expressed concern about the cost burdens created.

This chapter discusses the nature of the regulations and requirements, and some broad means to reduce their costs while maintaining appropriate social and environmental protections. That said, many of the issues are generic, applying to all forms of economic activity — not just public infrastructure projects — that are subject to social and environmental regulation. Moreover, the Commission examined many of the issues that apply more heavily to public infrastructure projects in its recent report into *Major Project Development Assessment Processes* (MPDAP) (PC 2013e). Accordingly, for the most part this chapter restricts itself to outlining the issues and reporting the findings of the earlier study. It covers:

- the nature and scope of the social and environmental regulation affecting public infrastructure (section 15.1)
- participants' concerns about that regulation (section 15.2)
- the costs that it creates (section 15.3)
- the proposals from Commission's MPDAP report to reform development assessment and approval processes (section 15.4).

The chapter also looks at three issues given particular emphasis in submissions and/or not analysed in the MPDAP report, namely.

- safety accreditation for Commonwealth-funded projects (section 15.5)
- planning and other regulations affecting the costs of quarrying (section 15.6)
- regulations and requirements affecting road and rail construction (section 15.7).

15.1 Nature and scope of the regulation

The broad swathe of regulation in question covers matters such as pollution control and waste management; threatened species, habitat and biodiversity issues; Indigenous and non-Indigenous heritage; native title; land access, planning and zoning; noise levels and urban amenity; and workplace and public health and safety.

While there is a range of regulatory standards and codes that are enforced only if and when breaches occur, many social and environmental regulatory protections are also embodied in development assessment and approval processes. Governments typically require the proponents of major projects to obtain various permits and authorisations for the project before proceeding.

Where a government agency itself is the proponent (as is usually the case with public infrastructure), the project must still comply with relevant standards and codes and the agency still needs to obtain the relevant clearances from other government regulatory bodies. Indeed, governments sometimes impose additional requirements on projects for which they are responsible. For example, the Australian Government requires firms constructing its projects to have safety accreditation of greater stringency than required for other projects (section 15.5).

Where a project is contracted out, all these requirements will typically be embodied in the conditions a head contractor will need to satisfy. Tenderers would be expected to reflect the likely costs of satisfying the various regulations and requirements in their bids.

Social and environmental regulations and associated requirements can emanate from any of the three levels of government.

- The Australian Government is responsible among other things for matters of national environmental significance, certain heritage matters, and for projects on Commonwealth land and water.
- The State and Territory governments have the primary role for granting and determining the conditions that are attached to the approval of major infrastructure projects.
- Local governments can play a role through planning legislation and 'secondary approvals' (although these requirements can be bypassed where state ministers 'call in' a project).

The upshot is that a vast array of legislation and regulatory instruments may apply to a project, some duplicative and others contradictory, depending on its size, type, and location. For example, the Port Phillip channel deepening project had to comply

with around 79 pieces of state or federal legislation or policies (PC 2013e), while Lend Lease (sub 46, p. 27) said that projects can require up to around one hundred separate approvals from across the three levels of government.

15.2 Participants' concerns

Social and environmental regulation was not the main focus of submissions to this inquiry, and only a few discussed these matters in any depth. This may reflect the broad-ranging nature of the terms of reference, the short time available for preparing submissions, and that the Commission had recently covered much of the ground in its report on MPDAP (to which a number of submissions referred).

Of those submissions that did discuss social and/or environmental regulation, most were received from entities involved in developing infrastructure. Common themes were that the regulation and requirements:

- are complex, duplicative and costly to business
- have increased substantially in scope and stringency over recent years
- often could be reformed in ways that reduce costs without diminishing genuine social and environmental protections.

These comments — a selection of which are set out in box 15.1 — mirror comments by project proponents to the Commission's MPDAP study. While participants raised concerns about a number of different areas of regulation, environmental regulation attracted the most comment.

Importantly, while few counterviews were put in submissions to this study, a number of participants in the Commission's MPDAP study emphasised the importance of maintaining (or strengthening) social and environmental protections, and argued that the resulting regulatory costs need not be inappropriate. The Commission had regard to all these arguments in arriving at the recommendations in that report.

Box 15.1 **Selected comments on regulatory impacts and issues**

Lend Lease stated:

> [t]he regulatory conditions that are often imposed on a project can result in extraordinarily high compliance costs. For example, major projects often have in excess of a thousand conditions. In many cases discharging these conditions can in itself produce a requirement for lengthy research and planning exercises as well as highly labour intensive processes to implement. In many cases the environmental or social benefits are elusive but the economic costs are very significant. (sub. 46, p. 40)

Lend Lease estimated that the costs of addressing environmental regulatory requirements have more than doubled over the last ten years, reflected in part in the significant increase in the number of approvals and assessments required. It also estimated that there has been a fourfold increase in the number of (non-blue collar) staff necessary in the design and construct stages of a project (sub 46, p. 27).

The Minerals Council of Australia submitted:

> The growing burden of overlap and duplication in approvals processes is indicated by a July 2013 study of regulations influencing exploration and mining activity … [which] identifies a considerable increase in regulation compared with an earlier cross-jurisdictional scorecard in 2006. Across all Australian jurisdictions, new and/or amended legislation included:
>
> - six new pieces of legislation;
> - six replacement Acts; and
> - more than 60 sets of additional amendments to primary legislation governing approval processes and more than 50 sets of amendments to subordinate legislation.
>
> Despite the impost placed on project proponents, there is little, if any, evidence these additional processes have improved environmental outcomes. The complexity of project assessment has increased in part as a result of a plethora of technical and administrative changes that seek to make minor adjustments to the law, regulatory processes, fees and charges. These changes tend to be politically reactive and considered in isolation from existing regulations. Further, the increase in regulatory processes has been compounded by the imposition of additional independent advisory panels at State and Commonwealth levels. (sub. 70. p. 10)

The Civil Contractors Federation said that 'the regulatory burden now faced by the construction industry is adding considerable costs both for contractors and procuring agencies alike' (sub. 34, p. 10). For example, it expressed concern:

> … with the impact that meeting environmental laws and regulations can have on project approval timeframes. This is particularly the case with large projects that can face significant delays as environmental impacts, licenses or permits are assessed.
>
> … CCF is opposed to unfeasible, unreasonable and impractical government environmental standards, specifications and the like, that impose unfair demands on contractor provisions and activities. When developing and implementing new environmental standards, specifications and regulations, government bodies must consult with industry in order to analyse the costs versus benefits to business. (sub. 34, pp. 14–15)

The Federation recommended a range of measures to reduce business burdens, including in relation to work, health and safety regulation; environmental standards, approvals and permits; and carbon pricing.

Continued next page

Box 15.1 **continued**

The Property Council of Australia said:

> The duplication between the *Environment Protection and Biodiversity Conversation Act 1999* and state-based environment protections is well understood and there has been no credible evidence presented that this duplication results in environmental benefits. The EPBC Act lacks clear definitions, rules, and tests which has resulted in broad and inconsistent interpretations for more than a decade. All stakeholders have suffered from a lack of certainty and consistency. (sub. 53, p. 9)

The Australasian Rail Association drew particular attention to the costs of revisions to regulations after commencement of an infrastructure project, noting that:

> The rail operators' design standards are constantly under review and are periodically revised to achieve improved outcomes. The design standards cover a wide range of issues such as environmental, acoustic, safety, performance, durability and maintenance requirements. Design standard changes can occur at any stage, and they generally result in increased costs. An allowance for potential changes to design standards needs to be considered in the contingency allowance. Alternatively, projects should be quarantined from changes in design standards after the design has been approved, as is common practice in major road projects.
>
> … While the industry should not lower its HSE (Health Safety and Environment) standard in order to lower the project costs, it is worth weighting the annual expenditure increases on specific HSE initiatives against the actual improvements in their outcomes. (sub. 58, p. 16)

The Australian Airports Association submitted:

> … a major issue in airport planning revolves around the need to obtain numerous Commonwealth, State/Territory and Local Government approvals, often from numerous agencies at each governmental level. Any unnecessary delay at any of these stages by any of these agencies can fundamentally and detrimentally defer entire development projects and thereby deprive the economy and community of major benefit. (sub. 90, pp. 12–13)

According to the Lean Construction Institute of Australia:

> In an endeavour to drive improvement in safety, government legislation which focused on the culpability of senior management tended to drive bureaucratic, defensive behaviour among contractors, often adding more cost than value to their management systems. In some instances safety documentation on projects became so excessive that it was counterproductive. It added little value other than hoped for legal protection should something go wrong. (sub. 104. p. 3)

In more broad-ranging comments, Henry Ergas contended:

> Further, likely substantial, cost savings could come from reviewing and rationalising the regulations that have a major impact on infrastructure, with tighter environmental standards and occupational health and safety requirements making a substantial contribution to recent infrastructure cost inflation. Obviously, the issue is that of assessing and where possible, improving, the cost-effectiveness of those regulations. And reforming labour market regulation would also help, for example, in increasing the flexibility with which labour can be used on works sites and in eliminating cost-increasing union rules. So too would revising unnecessarily prescriptive design standards, which 'gold plate' everything from bridges to level crossings. (sub. 87, p. 9)

15.3 Impacts on costs

Types of compliance costs

Business regulation typically brings with it an array of costs on the regulated entities (as well as costs for other businesses and individuals, and for governments).

Paperwork burden and related compliance costs can arise from the need to:

- provide management and staff time to keep abreast of regulatory requirements, liaise with regulators, complete forms and assist with audits
- purchase and maintain reporting and information technology systems
- obtain advice from external sources (such as consulting scientists and engineers, accountants and lawyers) to assist with compliance activities
- obtain licences or accreditation where these are required to perform work.

Regulation can also cause businesses to adjust their processes in ways that add to costs. For example, regulatory requirements may limit innovations in the design of infrastructure, or require that more expensive processes or materials be used for construction than might otherwise be adopted. In some extreme cases, excessive regulation may even dissuade potential competitors from entering a market and offering an alternative to existing operators.

Delays in project approval processes can add to business costs where, for instance, capital or workers lay idle or opportunities cannot be seized at the most lucrative time or sequenced in the most efficient manner. Where regulatory requirements are changed midway through a project, this can create additional delays and costs, including by requiring rework or redesign. Regulatory changes and delays also push back the time from which the project can be commenced and, thus, start providing revenue for the owner. This in turn can add to the financing costs of projects.

How significant are the costs?

While it is clear from inquiry participants' comments that all these types of costs arise in relation to major infrastructure projects, only a few submissions included quantitative estimates of the costs entailed, and these related only to some particular components of the compliance costs. For example:

- Lend Lease (sub. 46, p. 27) said that (non-blue collar) staff costs for compliance activities could account for 11 per cent of the total 'design and construction' cost of a typical project.

- The Victorian Civil Construction Industry Alliance (sub. DR202. p. 8) submitted that it costs a business over $150 000 to gain Federal Safety Commissioner accreditation, and around $130 000 a year to maintain it.
- Xstrata Coal submitted to the Commission's MPDAP inquiry that the costs 'in consultancy fees alone' of environmental impact statements and related requirements for a new mine, rail or port in Queensland could range from $3 million to $15 million per development type (PC 2013e, p. 139).[73]

More comprehensive estimates of the costs of social and environmental regulation on public infrastructure are not available, in part because regulators and other bodies do not systematically collect compliance cost information. A further complication is that the extent of the regulatory costs to businesses involved in public infrastructure projects will inevitably vary, depending on the type of project, its size and location, and the jurisdiction in which it is located. In any case, from a policy perspective, what matters is not the cost of complying with regulation per se, but rather the element of those costs that is 'unnecessary' or 'excessive' to deliver worthwhile social and environmental outcomes.

That said, the available quantitative information, together with qualitative evidence from participants on the extent and causes of the cost burdens created by social and environmental regulation, suggests that those burdens can be significant and that reform efforts to reduce them, where appropriate, should be pursued across and between jurisdictions. This was also the conclusion reached in the Commission's MPDAP report.

15.4 General reform issues

Are regulatory objectives appropriate?

One way unnecessary infrastructure costs might arise is if the social and environmental objectives embodied in regulatory requirements are overly ambitious, or at least if benefits that would flow from fully attaining the objective would not be sufficient to justify the extra costs.

[73] Other estimates of the costs of environmental assessments reported in the MPDAP were lower. For example, a 2009 Allen Consulting Group study estimated the costs of preparing an average environment effects statement at around $1.2 million.

Some participants argued or implied that this is sometimes the case. Peter Katz (sub. 45), for example, said that the design of several rail infrastructure projects had been over-specified on safety grounds. In a similar vein, the Australasian Rail Association (sub. 58) argued that it would be worth weighing the annual expenditure increases on specific health, safety and environmental initiatives against the actual improvements in their outcomes. And Lend Lease (sub. 46, p. 40) noted that there had been an increase in regulatory requirements over time and contended that, in relation to some requirements, 'the environmental or social benefits are elusive but the economic costs are very significant.'

There are some good reasons as to why the extent and stringency of social and environmental regulations may have increased over time. These include people's propensity to give more weight to health, safety and other social and environmental elements of wellbeing as their income levels rise; and increased awareness of the negative side-effects that can accompany unfettered economic activity.

However, there are also some systematic incentives for governments to 'over' regulate, including to sometimes pursue overly ambitious objectives. The costs of regulation are diffuse and off-budget, and regulations in particular fields are often developed without consideration of cumulative burdens. The culture of some regulators itself tends to foster excessive regulation, and it has also been argued that society and government has become unduly risk averse (Regulation Taskforce 2006).

This highlights the importance of reviewing the stock of existing regulation periodically, and carefully vetting proposals for new regulation, to ensure among other things that the underlying objectives are appropriate in view of the social, environmental, financial and other benefits and costs entailed. (However, as alluded to earlier, assessing the objectives, benefits and costs of the myriad of specific regulations that affect public infrastructure is beyond the scope of this inquiry.)

Improving approval processes

Unnecessary costs can also arise where the design, coordination and/or administration of regulations and requirements means that they are not the most cost-effective ways of achieving their underlying social and environmental objectives.

The Commission's MPDAP study found that, while the building blocks of a sound regulatory system are in place, there is still substantial scope to improve Australia's development assessment and approval processes. It identified several problem areas including:

- unnecessary complexity and duplicative processes
- lengthy approval timeframes
- lack of regulatory certainty and transparency in decision making
- conflicting policy objectives
- inadequate consultation and enforcement
- regulatory outcomes falling short of their objectives.

The report proposed a wide-ranging reform agenda intended to help secure the benefits of major developments while at the same time protecting the nation's environmental, heritage and cultural assets (box 15.2). The reforms should benefit major public infrastructure projects along with other major projects.

Box 15.2 **Reforming major project assessments and approvals**

The Commission's proposed agenda includes:

- five steps to move towards a 'one project, one assessment, one decision' framework for environmental approvals, that includes strengthening bilateral assessment and approval agreements between the Commonwealth and the States and Territories
- limiting the use of 'stop-the-clock' provisions
- improving coordination between State and Territory regulatory agencies
- institutional separation of environmental policy development from regulatory and enforcement functions
- enshrining the principle that Ministerial approval — unless a deemed approval — should not be reviewable other than on judicial review grounds
- establishing statutory timelines, together with appropriate safeguards, for key decision points in the development assessment and approvals process
- expanding the use of Strategic Assessments and Plans where practical to do so
- requiring that approval authorities publish reasons for their approval decisions and conditions
- improving third party opportunity for compliance actions.

Several submissions to the current inquiry referred to the earlier report and endorsed all or most of its recommendations. Ai Group (sub. 47, p. 25) stated:

> Major projects of all sorts are currently subject to the potential for substantial delays and costs in order to comply with the tangle of State and Federal environmental

> regulation and approvals processes. Public infrastructure projects are no exception. The Commission's recent recommendations on Major Project Development Assessment Processes are very sensible, and Ai Group looks forward to continued action from all levels of government towards a much more efficient approach which maintains high standards while providing predictability and minimising costs.

As of May 2014, all levels of government were considering the report's recommendations.

While major projects are generally approved at the state level and can effectively bypass local government planning, local governments have other relevant powers. These include granting permits (including 'secondary approvals') within their jurisdiction. They are also responsible for planning and approval processes for the construction and use of smaller-scale projects or infrastructure, including local roads and hospitals.

Numerous issues arise in relation to smaller scale and secondary approvals (box 15.3), although many of the principles articulated in the MPDAP report are also relevant to these. The Commission has also identified 'leading practices' for such matters in its benchmarking reports on *Planning, Zoning and Development Assessments* (PC 2011b) and *The Role of Local Government as Regulator* (PC 2012a).

15.5 Federal safety accreditation

To be eligible to bid for most Commonwealth-funded projects, head contractors must be accredited under the Australian Government Building and Construction OHS Accreditation Scheme, run by the Federal Safety Commissioner (FSC).[74]

Some inquiry participants have argued that the FSC scheme is unnecessary, costly to comply with and can hamper or deter some businesses from bidding for Commonwealth-funded projects. In calling for a review of the scheme's requirements, for instance, the Victorian Civil Construction Industry Alliance (sub. 28. p. 11) said that they 'place a restrictive burden on contractors wishing to undertake works that are federally funded. The requirements add significant annual operating costs to SMEs that intermittently undertake these works.'

[74] The FSC accreditation requirement applies for projects that are directly funded by the Australian Government with a value of $3 million or more, and to joint projects where Australian Government funding either accounts for at least half of the cost and exceeds $5 million or exceeds $10 million (and the head contract accounts for at least $3 million). Where these thresholds are met, any builder who is not a subcontractor to another builder requires accreditation to work on the site.

A number of international constructors have indicated that the FSC scheme can hamper efforts of firms without recognised experience in Australia to lead major infrastructure projects here (Austrade, sub. 74).

While many other regulatory arrangements affecting major infrastructure projects have been subject to analysis (as discussed earlier), the FSC scheme issue has not been covered in such detail. This section examines the scheme and the key concerns raised.

Box 15.3 **Local government approvals and planning issues**

Secondary approval processes generally come into play at the periphery of a major construction project or in relation to smaller infrastructure projects. The processes can contribute to the costs of public infrastructure and affect usage of built infrastructure. For example, the construction of connecting roads from major highways or from ports or airports can require approval from the local council. Local governments' power over secondary approvals may give it scope to extract 'community contributions' from the infrastructure provider, Another facet of this 'last mile problem' relates to the ongoing use of roads. The Australian Trucking Association noted that a major concern of heavy vehicle operators — who are major users of ports, airports and highways — is their ability to access smaller, local roads (sub. 27, p. 9).

Often the incentives around infrastructure construction and usage can differ between local councils and State governments. For instance, while the construction of a new highway or port may benefit the state overall, the local government area is likely to endure external costs such as noise and pollution. Meanwhile, the infrastructure may not bring any new funding to the local government.

Similarly, local governments do not receive funds from heavy vehicle road charges when they allow greater access to local roads, and some have argued this makes granting heavy vehicle access a lower priority to local governments than residential works (HVCI sub. 77, p. 15). Further problems can arise because local governments may have incentives to allow development near facilities they do not control. This may impinge on the use or future expansion of the facility. In this context, the Australian Airports Association (sub. 90) highlighted the need for 'safeguarding' mechanisms to ensure that the nature of developments allowed around airports (and associated demands for noise or other restrictions) do not unduly hamper airport operations.

Finally, primary approvals for smaller infrastructure projects may also have to deal with a more complex regulatory environment. One difference is the absence of so called 'fast track' mechanisms that are designed to coordinate the various licensing arrangements for major projects (PC 2013e). Planning frameworks at the local and state levels vary in complexity across states (PC 2011b, p. 64).

Background to the scheme

The scheme commenced in 2006 and was part of the response to the Cole Royal Commission. It had found that the building and construction industry's safety record was unacceptable, and recommended that the government use its influence as a client and provider of capital to foster better performance.

To obtain accreditation, a builder or construction business must first have its WHS management systems separately certified as meeting an Australian standard (AS 4801: 2001) or its international equivalent; and then must be assessed by the FSC against various additional criteria (box 15.4). The FSC assesses applicants through desktop reviews and a number of onsite inspections of a project. While there is flexibility in the way businesses can meet the requirements, the FSC notes that:

> … [t]he Scheme sets a high benchmark and some applicants may need several months to reach the OHS standards required for accreditation. (OFSC 2012b)

Box 15.4 **Requirements for FSC accreditation**

- Evidence of an WHS management system, certified to AS/NZS 4801:2001 or the equivalent international standard.
- Demonstrated ability to manage construction hazards and high risk activities.
- Record in relation to workplace safety.
- On-site audit results.
- Performance against the following focus points
  - i) demonstrated senior management commitment to WHS
  - ii) integration of safe design principles into the risk management process
  - iii) whole of project WHS consultation and communication
  - iv) demonstrated effective subcontractor WHS management arrangements across building and construction projects
  - v) whole of project performance measurement
  - vi) WHS training and competency to deal with safety risks.

Importantly, the FSC requirements are *additional* to the standard WHS regulations that apply to building work generally. Head contractors on Commonwealth funded projects must still comply with state-based regulations and may face penalties or stop work notices on building sites if specific breaches occur. The aim of the FSC scheme is to complement normal WHS regulations, inspections and enforcement procedures by ' … assessing and auditing how well builders systematically manage work health and safety (including risks and the cause of problems) to minimise the likelihood of incidents occurring.' (Department of Employment 2014, p. 5)

Does the scheme act as a barrier to foreign firms?

One concern is that the FSC requirements may deter foreign construction firms from entering the Australian market, in turn reducing the level of competition. This may arise partly because the FSC requirements differ from those in other countries, so foreign firms — even if operating with sound safety management systems — may need to alter their processes to gain accreditation (although, of course, this difficulty also arises for local firms currently meeting only state-based WHS regulations and pre-qualification requirements). A further problem for foreign firms is that, before they have actually entered the Australian market, they will have no domestic sites that demonstrate compliance with FSC requirements and thus are unable to be audited for that purpose.

Foreign firms that wish to compete for Commonwealth-funded projects have three options in these circumstances.

- They can opt for an onsite audit of an overseas project, and make whatever adjustments are necessary at that site to comply with FSC requirements.
- They can enter the Australian market by first undertaking a project funded privately or by State or local governments (that does not require FSC accreditation), and subsequently use that project to develop compliance with FSC requirements and gain accreditation.
- Instead of obtaining accreditation, foreign firms can seek to participate in a Commonwealth-funded project as part of a joint venture or alliance, provided their partner is accredited with the FSC (and the arrangement is approved by the FSC). Under this arrangement, the management of WHS onsite must be undertaken by the accredited partner, utilising its systems.

All of these options may still impose significant costs, delays or other difficulties for foreign constructors. And even where international firms seek to side-step the accreditation requirements by coupling with domestic firms, this may reduce the total number of bids on a project and/or diminish the scope for the international firm to apply its full expertise to the project. In some cases, international firms could be precluded from bidding at all simply because they are unable to find a firm with which to partner.

The upshot is that benefits of the expertise, and additional competitive pressure, that foreign firms could bring to the Australian infrastructure market may be delayed or denied. As Austrade submitted:

> … a number of international companies have advised Austrade the process is cumbersome and tends to eliminate the possibility for international firms (without

> recognised experience in Australia) to lead public project consortiums in Australia. This is regardless of the depth and breadth of their international business. (sub. 74. p. 20)

The full extent of these problems is unclear. The Commission understands that a large proportion of the international firms that apply for accreditation ultimately obtain it. However, little is known about how many foreign firms, faced with the prospect of accreditation, have declined to apply. Without reasonable information on this matter, it is difficult to gauge the degree to which the accreditation requirements act as a barrier to entry.

Even so, given the concerns of international contractors and the importance of maintaining competitive pressure in the infrastructure construction market, there would be merit in examining options for addressing these problems:

- One option might be for the FSC to 'recognise' the existing safety management system requirements for firms operating in countries with standards broadly comparable to Australia (effectively waiving the requirement for separate accreditation using the specific FSC criteria and procedures).
- Another option might be for the FSC to provide 'provisional' accreditation to firms with appropriate safety records, but different safety management systems. Were such a firm successful in bidding for a Commonwealth-funded project, it would be expected to subsequently demonstrate compliance with FSC requirements, in part via a satisfactory onsite audit of the Australian project.

These and other ideas could be further developed and evaluated as part of a broader review of the current scheme (discussed below).

Are the compliance costs too high, and is the scheme necessary?

Aside from the particular problems faced by foreign firms, participants argued that the FSC accreditation requirement inflates costs for businesses, in a way that could penalise smaller contractors in particular. If contractors are participating in Commonwealth-funded projects infrequently, they may find it difficult to recoup the costs of obtaining and maintaining FSC accreditation. If the costs are too high, it may not be feasible for them to participate in these projects at all. This, ultimately, may affect competition. In this vein, the Northern Territory argued that the scheme was ' … [b]y far the largest impact on market competition in the Northern Territory' and 'has resulted in significantly reduced numbers of tender responses for federally funded projects greater than $5 million with obvious direct implications for construction costs' (sub. DR210 . p. 7).

Some of the scheme's costs are borne directly by the FSC, which collects no fees for the consideration of applications and for carrying out onsite audits. The costs borne by the constructor are those associated with changing safety systems to comply with FSC requirements, collecting information necessary to demonstrate ongoing compliance, and making time and staff available for onsite audits. (Audits can be a costly exercise, particularly when multiple audits are necessary to meet the requirements of federal and state jurisdictions, the head contractor and established internal systems — the CCF estimates that these requirements may result in a cost of $40,000 per small company annually (sub. DR202. p. 10)).

According to the Victorian Civil Construction Industry Alliance (sub. DR202. p. 8), the costs to medium sized or third tier businesses can amount to over $150 000 to initially gain FSC accreditation, and then around $130 000 a year to maintain it. To the extent that this represents the cost to an average firm, and given there are currently over 300 firms accredited by the FSC, these figures could translate into a total compliance cost of around $40 million annually. Adding to the complexity of estimating compliance costs is the need to distinguish cost components, since businesses would need to undertake some expenditure to comply with workplace health and safety laws (and potentially obtain AS4801 certification) irrespective of whether the company is FSC accredited or not[75]:

The broader issue raised by some inquiry participants is whether there is a case for retaining a separate set of conditions for Commonwealth-funded projects at all — conditions that are not required for other projects (including those of the same scale) elsewhere in Australia. Along these lines, the Civil Contractors Federation (CCF) argued:

> [I]t seems unreasonable and unwarranted that an additional layer of safety requirement is applied to the requirements they are already subject to in order to work for State and Territory Governments, and in fact Australia's recognised AS-NZ 4801-2001 standard. (sub. 34, p. 11)

Likewise, the Victorian Civil Construction Industry Alliance submitted:

> The Government should investigate the warrant for federally funded projects to meet a higher standard for OH&S than the Australian Standards for Safety (AS4801) which is the current industry standard and can be independently certified by a third party. The investigation should be conducted with a view to adopting AS4801 as the acceptable Standard for federally funded projects. This would provide a level playing field for all. (sub. 28, p. 11)

75 FSC accreditation imposes requirements over and above what is required for AS4801 certification. While AS4801 certification contains 33 audit criteria, the OFSC Audit Criteria, as it applies to civil construction, contains 107 audit criteria (sub. DR202. p. 7).

It should be noted that, as of May 2014, the Australian Government has indicated its intention to retain the FSC scheme, and it is included in the Bill to re-establish the ABCC.

It should also be noted that the FSC has sought to reduce the administrative burden for builders by progressing arrangements with states and territories to recognise the Commonwealth scheme. Thus, builders accredited under the Commonwealth scheme are automatically deemed to comply with the relevant work health and safety requirements in certain state/territory prequalification schemes. The current Review of the scheme (discussed below) is also exploring other means of reducing compliance costs.[76] However, given that the FSC requirements are much more onerous than other existing requirements, the federal accreditation scheme will still add to compliance costs.

Removing the requirement for FSC accreditation, and relying on other existing workplace health and safety regulation or pre-qualification requirements, would of course address concerns about the specific FSC requirements causing barriers to entry for foreign firms or small contractors, as well as reducing the compliance costs associated with accreditation. In supporting this option, the Civil Contractors Federation argued that the FSC's resources could be usefully redirected towards other means of improving WHS outcomes (sub. 34).

Equally, were it found that the FSC scheme confers net benefits and is more cost-effective than alternatives, there could be a case for expanding its reach.

Reviewing the scheme

As noted earlier, some of the matters discussed previously are likely to be considered in a review of the FSC scheme, which has just commenced. The Review is being undertaken by the Department of Employment in consultation with an advisory panel comprising representatives of industry associations, the Australian Council of Trade Unions, the FSC and government agencies that procure building works. The Review released a discussion paper in late February 2014. It is to report to the Minister for Employment by June 2014. Ideally, the Review's report will be released publicly soon after.

[76] As part of examining means of reducing compliance costs, the Review is also considering whether AS4801 certification should continue to be a *prerequisite* for FSC accreditation. However, the issues paper for the review does not countenance *replacing* the FSC accreditation requirements with the (less onerous) requirement that firms have AS4801 certification.

The scope of the Review is 'to modernise and streamline the Scheme while not reducing safety outcomes', and it will examine, among other things, various means of reducing compliance costs.

However, as presently cast, it appears that the Review will not evaluate:

- whether any safety, productivity or other benefits arising from the scheme exceed the costs entailed[77]
- whether existing WHS regulations or alternative certification or accreditation standards (including AS 4801) would be likely to generate appropriate safety outcomes more cost-effectively
- options such as 'recognition' of the existing safety management system requirements for firms operating in countries with standards broadly comparable to Australia, or 'provisional accreditation' for firms with appropriate safety records or accreditation.

In the Draft Report, the Commission said that, in view of the concerns of international contractors and the importance of maintaining competitive pressure in the infrastructure construction market, the Review should create scope for the third of these matters, with a view to recommending measures to improve access to Commonwealth-funded projects for firms not presently operating in Australia.

Some participants have raised concerns about the implementation of 'provisional accreditation' schemes. The Master Builders Australia noted that comparability of standards may be 'highly contestable and difficult to identify between countries' (sub. DR211. p. 37), while BusinessSA asked:

> … what happens if the company fails their on-site audit? Would the site be shut down in the interim? Moreover, what if a workplace accident occurs before such an audit takes place? (sub. DR136. p. 4)

The Commission recognises that there would be issues to be managed in the design of any provisional scheme, although it does not see the matters nominated by participants as sufficient to necessarily rule it out as an option — particularly given that equivalent scale projects that are not Commonwealth-funded are able to proceed without any (prior or subsequent) FSC accreditation.

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[77] The discussion paper does, however, report some 'background' data showing a reduction in serious injuries and fatalities in the construction industry since the commencement of the scheme. It also points to a number of indicators suggesting that accredited companies have higher safety outcomes and improve their safety performance following accreditation, although it also notes that it is not possible to isolate the contribution of the scheme from other variables (Department of Employment 2014, pp. 8–9). The FSC has also pointed to a range of (incidental) benefits for businesses that it claims might arise from accreditation (OFSC 2012).

RECOMMENDATION 15.1

The current Review of the Australian Government Building and Construction OHS Accreditation Scheme should examine options such as 'recognition' and 'provisional accreditation', with a view to the implementation of measures to improve access to Commonwealth-funded projects for firms not presently operating in Australia.

It is less clear cut whether, and by what means, the first and second points above should be examined at this time. These points go to the costs and benefits of retaining the FSC scheme. As noted, the Australian Government is currently committed to its retention, and the present Departmental Review is focused on making changes within the current scheme's broad settings.

Examining the merits of the scheme, and of alternatives to it, would be a different analytical challenge and would best be undertaken in a transparent review process that is independent of the agency that oversees the scheme. The Commission supports an independent review of the merits of the FSC scheme within two years.

15.6 Regulation affecting quarries

A further regulatory issue raised by inquiry participants, and not examined closely in the Commission's MPDAP report, is the effect of social and environmental regulations and related requirements on the cost and supply of quarried materials.

Rock, sand, gravel and other quarry outputs are key inputs for many infrastructure projects, and variations in the price of these products may have a considerable effect on construction costs. Drawing on data for Victoria, Macromonitors has estimated that concrete, asphalt and aggregates — largely consisting of quarry products — comprise 32 per cent of total infrastructure costs (on average, across a range of infrastructure types), and will be responsible for more than a third of anticipated cost increases in infrastructure projects between 2012 and 2022 (sub. 17. p. 3). Lend Lease noted that the cost of quarry products had already increased by 60 per cent over the last decade (sub. 46. p. 26).

There are three components of the price of quarried materials. Primarily there is the cost of extraction. Because materials sourced from quarries are heavy and bulky, and often sourced some distance from a job-site, there is also a substantial transport component. According to the Cement Concrete & Aggregates Australia (CCAA) (sub. 17), transportation can account for as much as one quarter of the total costs of material. Finally, quarry owners also need to recoup the costs of obtaining a Work Authority and complying with other regulations over the working life of the quarry.

The presence of substantial transport costs would ordinarily create the potential for geographic-based market power, with quarries close to project sites potentially able to restrict supply and lift prices, while still remaining competitive against more distant suppliers. However, to date the Commission has not seen any evidence of quarry operators acting to influence the price of their products in this way.

Of greater concern to participants is the multitude of regulations that affect quarries, and how they are administered. The regulations in question cover issues such as land use, waste disposal, site remediation, environmental offsets, public safety, WHS, noise and transport, and it is important that appropriate outcomes in these areas are not compromised. However, there may be scope to remove unnecessary regulatory burdens. While recognising that there are valid public interests in regulating in these areas, the Construction Material Processors Association (CMPA) has argued much of the regulation is excessively stringent and inflexible, and is likely to increase costs and even result in a shortfall of quarry outputs in the future. CMPA (2009, 2011) documents provide a number of cases studies of regulatory 'difficulties' encountered by quarry operators in seeking approvals to establish or expand their operations that, taken at face value, appear to involve onerous requirements and inconsistency, duplication, and significant cost and delay.

A related concern is that some quarries are being closed, and insufficient new sites or capacity may be being activated, particularly in or near cities. A lack of quarries near areas of major construction work has the potential to inflate the costs of infrastructure. As the CCAA noted:

> The efficiency of the supply chain for heavy construction materials is largely determined by location, as transportation equates to approximately 20 to 25% of the total cost of materials. The high-bulk, low-value nature of the materials means that transportation costs have a significant impact and the closer the materials are to their market the less impact transportation has on the cost.
>
> … The Melbourne market has many quarries located in the metropolitan area and the average transport distance from quarry to concrete batch plant is 30 km, whereas, in Sydney, which has one remaining metropolitan quarry, the average transportation distance is 60 km. The delivery cost of material is 70% greater in Sydney than in Melbourne, which is solely attributable to the increase in haulage distance. (sub. 17, p. 4)

The exhaustion of existing quarries and/or inability to establish new quarries close to end markets is likely to have increasingly significant ramifications, given the considerable growth expected in the populations of major Australian cities over the next 50 years — the populations of Sydney and Melbourne to exceed 7 million by 2060 (PC 2013a). Moreover, the Commission understands that disused quarries (or sections of quarries) are often used as disposal sites for rock and earth extracted from infrastructure projects. Where such disposal sites are unavailable nearby,

further costs will be incurred in this element of infrastructure projects to transport waste material to more distance areas.

Both the CMPA and the CCAA called for improvements in regulatory processes and planning mechanisms to address the problems identified. The CCAA pointed to the report of a recent Victorian Parliamentary Commission *Inquiry into Greenfields Mineral Exploration and Project Development in Victoria*, along with the Commission's MPDAP report, as providing sound principles and recommendations to streamline planning mechanisms. It also called for measures to identify and protect 'key resource areas' to ensure a capacity to access new and existing resources.

Planning and other regulations affecting quarrying are administered in a different manner in different states, and often span multiple portfolios. Without coordination, it is possible that the cumulative burden of regulation could place the production of a key input for infrastructure projects at risk. As noted, this would have a significant impact on the costs of construction. While analysis of the various regulatory requirements and processes that affect quarrying is beyond the scope of this study with its rapid time frame, State governments may need to review the cumulative burden of regulation affecting quarrying and whether additional measures to address supply issues are warranted.

15.7 Road and rail construction standards and environmental requirements

A number of interested parties have identified the effect of excessive road and rail construction standards and environmental requirements as an impediment to lowering the costs of major infrastructure projects.

These regulations detail the materials used in projects, as well as the ways in which they are to be used. Among other things, they include requirements for the quality, width and depth of pavements, tree-lining and landscaping, and requirements for noise abatement.

Such regulations and requirements can have a range of benefits. For instance, increasing the quality and depth of the pavement may improve the road's durability, leading to lower future expenditures on maintenance. Users may benefit from improvements in safety, while tree-lining or the use of noise abatement technologies may mute the impact of road use on those who live and work in close proximity. Some initiatives offer a combination of these benefits, as there have been claims that tree-lining has safety, aesthetic and environmental benefits.

Such regulations and requirements can also be costly. For example, a recent review of noise management processes in Victoria has resulted in the construction of noise barriers along over 26 kilometres of the Regional Rail Link at an estimated cost of between $20 and $50 million, prompting claims for similar noise management along more densely populated sections of the corridor (Martin 2012).

Accordingly, policy makers face trade-offs between the costs of regulation and the benefits they can bring. The Australian College of Road Safety offered an estimate of one in particular. It submitted:

> In 2013, the Australian Automobile Association's AusRAP program developed Safer Roads Investment Plans (SRIPs) for each State and Territory. Their analysis shows that a national investment of just over $4.7 billion has the potential to prevent over 36,000 fatalities and serious injuries over a 20-year period across the surveyed network. (sub. 18, p. 5)

Likewise, there are trade-offs between costs and the level of environmental protection or aesthetic value achieved.

In practice, many regulatory decisions involve 'incremental' changes in the stringency of a regulation or its associated requirements. Ideally, the responsible authority should take into account all the costs and benefits entailed (including those deriving from interactions with other regulations), with the aim of achieving the level that strikes the best balance for the community.

That said, identifying the 'ideal' level or stringency of regulation is a difficult exercise:

- As a part of finding the appropriate level, the authority needs to determine the balance between safety, financial, aesthetic and other concerns that offers the community the greatest benefit, notwithstanding the considerable uncertainty around estimating the current and future costs and benefits of these initiatives.
- A further complication is that the costs and benefits of particular regulatory requirements will not necessarily be consistent throughout a jurisdiction. On some country highways, higher quality pavement offers resistance to extreme climatic events and heavy vehicle use while the benefits of having a similarly paved inner city street would likely be more modest. Conversely, because of the relatively high population density, there may be more value in noise abatement initiatives in the city than in the country. This points to the need for regulations to have in-built flexibility to deal with such variations.
- The 'ideal' level may also change over time, as the costs and benefits associated with various regulations and requirements change. Technological change may offer new possibilities. A jurisdiction may find that a standard set at a previous

point in time may no longer be a good alternative. For example, Queensland has varied the standard of its roads, originally moving to a higher standard, before returning to a level more consistent with other state road systems.

While it is beyond the scope of this inquiry to evaluate any particular set of regulations, the cost estimates and other issues reported above highlight the importance of ensuring that regulatory standards are reviewed from time to time to ensure that they are appropriate in view of the costs and benefits entailed — and to ensure that the taxpayer's dollar is spent in areas that will achieve the most benefit.

16 Implementing the reforms

Key points

- The Commission is recommending a package of reforms aimed at improving the provision of public infrastructure to benefit the Australian community.
- Most of the Commission's recommendations can be implemented by governments without a national agreement or coordination between jurisdictions.
- Governments, including the Australian Government, should commit to and implement reforms relevant to their own jurisdictions without delay.
- Implementation of some of the reforms could benefit from coordination and cooperation between jurisdictions. The active support of Australian Government Ministers responsible for infrastructure will also be an important factor in progressing reforms at the State, Territory and local Government levels.
- While not a prerequisite for any of the reforms proceeding, there would be further benefit in incorporating a subset of the reforms in a national agreement, or a series of formal bilateral agreements between the Australian Government and the relevant State or Territory Government.
- The Commission does not oppose a national agreement, but is mindful that there are significant differences between jurisdictions in the level of privatisation, preparedness to embark on large new infrastructure programs and funding flexibility.
- Bilateral agreements may be more suitable to rapid implementation as the Australian Government could negotiate and agree with those jurisdictions whose circumstances make this most desirable.
- An agreement could commit each jurisdiction to:
  - the objectives of the reform package
  - establishing effective monitoring and public reporting arrangements
  - implementing the reforms on an agreed timetable
  - conducting an independent review of the reforms after a set time period.

This report provides a set of recommendations to reform and improve the provision of public infrastructure. This chapter:

- summarises the recommendations and identifies those that can be initiated immediately (section 16.1)
- suggests an approach for implementing the reform package (section 16.2).

16.1 The reform package

A summary of the reform package is outlined in table 16.1. From an implementation perspective, the recommendations can be grouped broadly into two categories:

- reforms targeted at a single level of government, agency or institution
- reforms applicable to multiple or all jurisdictions.

The role for governments in implementing the reforms

Most of the reforms in this report can be implemented by governments without the need for a national agreement or coordination between jurisdictions.

As such, all governments should commit to and implement reforms relevant to their own jurisdiction without delay. Early implementation will lead to the adoption of improved frameworks, governance arrangements and processes for the provision of public infrastructure within each jurisdiction. This will best ensure that infrastructure investment produces maximum benefits for the community over the long term.

It is the role of governments to create the conditions necessary for its institutions and governance arrangements to operate effectively and credibly. It is therefore vital that governments commit to and support the institutional and governance arrangements they establish for the provision of public infrastructure, even where alternatives might be politically expedient.

For the proposed reforms in this report to have their intended effect, governments must also create a sense of ownership of the reforms at the local level. As the bulk of assets and service responsibilities associated with public infrastructure lie with State and Territory Governments, reforms should be led at this level. This will allow jurisdictions to proceed at different speeds reflective of different levels of privatisation, preparedness to embark on large new infrastructure programs and funding flexibility.

The active support of the Australian Government Ministers responsible for infrastructure — not just transport — will also be a crucial factor in progressing reforms at the state, territory and local government levels and ensuring the reforms are properly embedded.

Table 16.1 **Summary of the Commission's recommendations**

Rec.	*Chapter/Topic of recommendation*	*Responsibility/Applicability*
Applicable to a single level of government, specific agency or institution		
2.1	Project selection – Privatisation	State and Territory Governments
2.2	Project selection – Privatisation	Australian Government
5.1	Infrastructure finance – Corporate bond market	Financial System Inquiry
7.2	Improving governance and institutional arrangements – The role of Infrastructure Australia (IA)	Australian Government
7.3	Improving governance and institutional arrangements – Conditions for Australian Government funding and other forms of assistance	Australian Government
8.2	Governance and institutional reform in the roads sector – Support for addressing design and implementation issues	Australian Government
10.1	Productivity – Collection of construction data	Australian Government (ABS)
13.2	Industrial relations – Penalties and resourcing	Australian Government
14.2	Workforce skills – Inquiry into apprenticeships arrangements	Australian Government (Productivity Commission)
15.1	Social and environmental regulation – Review of Australian Government Building and Construction OHS Scheme	Australian Government
Applicable to multiple levels of government		
4.1	Funding mechanisms – Pilot studies on vehicle telematics	Australian Government to encourage State and Territory Governments
2.3	Project selection – Cost–benefit analyses	All governments
6.1	Financing mechanisms – Pilot procurement program	All governments
7.1	Improving governance and institutional arrangements – Adoption of best practice institutional and governance arrangements	All governments
8.1	Governance and institutional reform in the roads sector – Establishment of Road Funds	State and Territory Governments, and local governments
9.1	Cost drivers, trends and benchmarks – Consideration of available project alternatives	All governments
9.2	Cost drivers, trends and benchmarks – Benchmarking framework for major infrastructure projects	Australian Government (IA, BITRE). Support from other governments
12.1	Tendering and contracting – Initial concept design	All governments
12.2	Tendering and contracting – Design costs	All governments
12.3	Tendering and contracting – Non-design management plans	All governments
12.4	Tendering and contracting – Early contactor model	All governments
12.5	Tendering and contracting – Use of BIM for concept designs	All governments
12.6	Tendering and contracting – Design standards	All governments
12.7	Tendering and contracting – Local content plans	All governments
12.8	Tendering and contracting – Pre-testing of market	All governments
12.9	Tendering and contracting – Site risks	All governments
13.1	Industrial relations – Codes of Practice	All governments
14.1	Workforce skills – Publish projections of labor demand	Australian Government (Department of Industry, IA). Support from State and Territory Governments

In a large proportion of cases, the necessary steps for reform are reasonably well understood. The specific implementation arrangements for the reforms will vary

depending on the recommendation in question, as will the timing of implementation. For example, some reforms will require, or would be best pursued through, legislative changes. Other reforms can be appropriately addressed through adjustments to existing policy frameworks or processes. More specific guidance on the implementation arrangements for individual recommendations is provided, as relevant, in the respective chapters of this report.

That said, a central message from this report is that there is scope for individual governments to act immediately on many of the Commission's suite of recommended reforms, with significant early action by the States and Territories as primary infrastructure owners and service providers.

Some of the reforms that should be initiated immediately include:

- more thorough consideration of alternatives to infrastructure provision that achieve the same policy goals (for example, traffic flow management with the intelligent use of traffic lights, peak hour road closure and the introduction of ramp metering among other options)
- improved project selection. Even election commitments to build and/or fund major infrastructure should be subject to rigorous project assessment and selection after the election
- pricing reform for those areas of infrastructure that are already amenable to it, which would provide a revenue source for infrastructure funding, and provide a signal about where and when to make investments
- a clearer idea about the pitfalls and lessons of different funding and financing models, which could avoid some of the mistakes of the past
- privatisation, where it improves investment and operational efficiency, and only after governments have determined the essential elements of the policy and any efficient economic and other regulatory frameworks that will be faced by the businesses post-privatisation
- the development of greater procurement competencies, and introduction of cost-reducing tender process improvements
- the adoption of procurement guidelines to provide incentives for better industrial relations arrangements.

Jurisdictions should also commence consideration of the road fund model as soon as possible, with each advising the Australian Government of how it can best support its reform as early as possible.

RECOMMENDATION 16.1

Governments should commence implementing the recommendations outlined in this report that are relevant to their jurisdiction immediately. A formal Agreement across all jurisdictions is not a prerequisite for Australian, State and Territory and Local Governments pursuing most of the recommendations made by the Commission, as they relate to implementing best practice or improved processes within each jurisdiction.

16.2 Coordination and agreement between jurisdictions

Implementation of some of the reforms could benefit from a level of coordination and cooperation between jurisdictions. Moreover, while not a prerequisite for any of the reforms proceeding, there would be further benefit in incorporating a subset of the reforms in a formal agreement between governments.

Recommendations differ in their scope for coordination

The desirability of seeking coordination between different jurisdictions to implement reform depends on the specific recommendation.

For some recommendations, coordination is not necessary. For example, recommendations 2.1 and 2.2 relating to the privatisation of certain types of public infrastructure assets, or those recommendations applicable to the Australian Government or its individual agencies or departments (7.2, 10.1, 14.1 and 15.1) can be progressed unilaterally, subject to input from relevant agencies and stakeholders (while keeping other jurisdictions and the public informed of progress of the reforms).

Development of individual jurisdictions' preferences in relation to recommendation 8.1 (for example, consultation with stakeholders) and application of reforms in 12.1 to 12.9 need not await formal coordination but could benefit from it, as far as infrastructure suppliers and financiers are concerned.

Without forestalling active jurisdictional consideration of the reforms, those that may benefit from a level of coordination and cooperation between different jurisdictions include those to:

- undertake pilot studies on how vehicle telematics could be used for distance and location charging of cars and other light vehicles at the state and territory level, with support provided by the Australian Government (recommendation 4.1)

- establish conditions for Australian Government funding for public infrastructure to other levels of government, and where consultation would occur with local, State and Territory Governments on the criteria to be applied and any potential implementation issues (recommendation 7.3)
- establish road funds at the state, territory and local government level, with scope for coordination between all levels of government, including the Australian Government (recommendation 8.1); and support provided by the Australian Government on design and implementation issues (recommendation 8.2)
- encourage cooperation to implement a benchmarking framework for major infrastructure projects and publication of this information (recommendation 9.2)
- improve tendering policies or practices where the Australian Government can add value to State and Territory Government processes; or where Australian Government audit processes may be required (recommendations 12.1 to 12.6, 12.8 and 12.9)
- establish implementation guidelines within building procurement codes, noting the Australian Government and various States now have similar but not necessarily coordinated arrangements, and that information exchanges would be a minimum area of joint behaviour (recommendation 13.1)
- publish regular projections of labor demand from public infrastructure construction, while also seeking agreement with all private sector infrastructure providers and State and Territory Governments to provide data pertaining to their expectations of future need (recommendation 14.1).

Establishing a formal agreement between jurisdictions

There would be further benefit in incorporating a subset of the reforms into a formal agreement between governments, as a means of achieving coordination, cooperation and commitment to the reforms. Reforms which could be considered for inclusion in an agreement are summarised in table 16.2.

It is not essential for reforms to await formal agreement between jurisdictions, such as a national agreement. However, there are additional gains that may be had if there is strong collective will to develop a form of national agreement. It may also help achieve a joint or collective understanding of the reasons for proceeding.

Table 16.2 **Reforms which could be incorporated in an agreement**

Rec.	*Chapter*	*Topic of recommendation*
2.3	Project selection	Cost–benefit analyses
4.1	Funding mechanisms	Pilot studies on vehicle telematics
6.1	Financing mechanisms	Pilot procurement program
7.1	Improving governance and institutional arrangements	Adoption of best practice institutional and governance arrangements
7.3	Improving governance and institutional arrangements	Conditions for Australian Government funding and other forms of assistance
9.1	Cost drivers, trends and benchmarks	Consideration of available project alternatives
9.2	Cost drivers, trends and benchmarks	Benchmarking framework for major infrastructure projects
12.1	Tendering and contracting	Initial concept design
12.2	Tendering and contracting	Design costs
12.3	Tendering and contracting	Non-design management plans
12.4	Tendering and contracting	Early contactor model
12.5	Tendering and contracting	Use of BIM for concept designs
12.6	Tendering and contracting	Design standards
12.8	Tendering and contracting	Pre-testing of market
12.9	Tendering and contracting	Site risks
13.1	Industrial relations	Codes of Practice

Rationale for a formal agreement

There are two reasons why incorporating some of the reforms in a formal agreement between governments could be of further benefit.

First, there would be benefit for the Australian community as a whole if all governments implemented reforms relevant to their own jurisdiction, including the Australian Government. A formal statement of commitment, combined with an agreed timetable, specified monitoring and reporting arrangements and commitment to an independent review is more likely to achieve best practices across jurisdictions. Further, a formal agreement could be used to demonstrate the Australian Government's commitment to the reforms and increase the likelihood they would continue given any future change in government.

Second, the process of establishing a formal agreement is a consultative approach for those reforms which, if implemented by the Australian Government, would have important flow on implications for local, State and Territory Governments. For example, some of the reforms (specifically recommendations 7.3, 9.2 and 13.1) involve the Australian Government establishing certain necessary pre-conditions that other governments would need to meet before any Australian Government funds are committed to a project. State and Territory Governments would also have

stronger incentives to commit to these reforms if the Australian Government formally commits to them itself.

Although there are potential benefits from enshrining commitment to reforms in a formal agreement, it is important that relevant standards are not compromised simply to achieve an agreement. For example, the adoption of best practice standards for institutional and governance arrangements (recommendations 7.1 and 7.3) should remain the clear intention and outcome of these reforms. If certain jurisdictions are not in a position to implement fully or commit to these best practice standards, but wish to enter into an agreement, at a minimum the commitment should be to move towards best practice arrangements within an agreed time period rather than settle on a lower standard.

Local governments need not be party to a formal agreement. Commitments by State and Territory Governments to work with and provide capability and support to their local governments (and representative bodies) would be a practical way to proceed.

Options for an agreement – national or bilateral?

In principle, a formal agreement on the reforms summarised in table 16.2 (or some combination of them) could be achieved through a series of bilateral agreements (between the Australian and State/Territory Governments) or through a national COAG-umbrella intergovernmental agreement.

The Commission does not oppose a national agreement in support of aspects of these reforms that can benefit from nationally coordinated activity. However, it is mindful that there are significant differences between jurisdictions in their levels of privatisation, preparedness to embark on large new infrastructure programs and funding flexibility.

Bilateral agreements may be more suitable to rapid implementation as the Australian Government could negotiate and agree early with those jurisdictions whose circumstances make this most desirable. This may create bilateral model agreements that could be rolled out by other jurisdictions sequentially; or be adapted to meet the specific characteristics of individual jurisdictions. The reforms proposed are for the long term. The time needed by different jurisdictions to adopt them should be expected to vary.

The Australian Government could also pursue bilateral agreements in the interim with a view to establishing an overarching national intergovernmental agreement in due course (which would subsume the bilateral agreements).

Many of the reforms have application and relevance across a range of sectors, including transport, water and electricity. At the same time, various infrastructure sectors have different institutional, policy and regulatory arrangements already in place for the provision of public infrastructure and related services. Thus, the path to embedding these reforms in each sector will necessarily vary.

To progress implementation of these reforms, one option could be for the Australian Government to convene a ministerial public forum on public infrastructure before the end of 2014 in which jurisdictions make public statements on their reform commitments, including how they would apply across different public infrastructure sectors. The reform commitments need not be symmetrical across jurisdictions, and could reflect the needs, priorities and capabilities of individual jurisdictions. This would assist to raise public recognition of the need for reform and could include participation by representative groups with strong infrastructure interests, such as roads and motorists associations and heavy vehicle organisations.

Content of an agreement

The content of an agreement would depend on a range of factors, including the parties to an agreement and the reforms being incorporated. However, key common features of an agreement should include:

- the overarching objectives of the reforms
- an agreed timetable for implementation
- effective monitoring and public reporting arrangements
- commitment to an independent review after a set time period.

Objectives

The overarching objective of an agreement would be to implement reforms in each jurisdiction that ensure that decisions are undertaken in the public interest, taken to be the wellbeing of the community as a whole, and improve resource allocation more broadly. The explicit inclusion of this objective could help to ensure that subsequent development of policy over time does not incorporate changes (such as new regulation) that are inconsistent with this objective.

Monitoring and public reporting arrangements

An agreement should outline measures to regularly monitor and publicly report on the progress of reforms. For example, once jurisdictions have set their timetables

and any bilateral or nationally agreed arrangements are in place, Departments of the Treasury could be asked to monitor the pace of implementation of the reforms, similar to the process associated with National Competition Policy (under Heads of Treasury).

In addition, a process could be established within each of the relevant ministerial councils within COAG whereby infrastructure Ministers are provided with a regular update on progress of the reforms committed to in each jurisdiction (under either a bilateral agreement or a national agreement) and this report is published.

Timetable for implementation

An agreed timetable for implementation can provide a discipline on progressing the reform program. Timeframes for jurisdictional decisions are a matter for each jurisdiction and would depend on the parties to an agreement and the specific reforms to be included.

However, the Commission favours an early start to reforms as this will deliver large benefits for the community. It is desirable that infrastructure Ministers place these reforms on the agenda of relevant ministerial councils as a matter of priority. The Commission considers that there is scope, given present priorities expressed by several governments, to make significant reform progress in 2014.

Review arrangements

An agreement should include a commitment to review the effectiveness of the reform package after a set period of time (say five years). In principle, this review should be undertaken by an independent agency. This would give governments a reasonable period of time to embed these reforms into their respective decision-making processes, realise early benefits from reform and provide scope for a more extensive overhaul or reform program if needed.

RECOMMENDATION 16.2

The Australian Government should consider entering into formal bilateral agreements with State and Territory Governments that commit each jurisdiction to implementing a subset of the reforms (such as those identified by the Commission in table 16.2, or some combination of these recommendations).

The agreements should contain effective monitoring and public reporting arrangements, an agreed timetable for implementation, and a commitment to conduct an independent review of the reforms after a set time period.

A Conduct of the inquiry

This appendix lists parties the Commission consulted with through:

- submissions received (table A.1)
- visits (table A.2)
- a roundtable (table A.3)
- public hearings (table A.4).

The Commission received the terms of reference for this inquiry on 13 November 2013. Following receipt of the terms of reference, the Commission placed notices in the press and on its website inviting public participation in the inquiry. Information about the inquiry was also circulated to people and organisations likely to have an interest in it. The Commission released an issues paper in November 2013 to assist inquiry participants with preparing their submissions. The Commission received a total of 214 submissions.

A roundtable was held in Melbourne on 19 December 2013 and public hearings were held in Melbourne on 9 April, Brisbane on 11 April and Sydney on 14 April, which together attracted 37 participants.

The Commission consulted with a range of organisations, individuals, industry bodies and government departments and agencies.

Table A.1 **Submissions received[a]**

Individual or organisation	*Submission number*
Action for Public Transport	DR152
AEC Connect	DR126
AECOM	DR188
Australian Competition and Consumer Commission (ACCC)	83
Air Conditioning and Mechanical Contractors' Association of Australia (AMCA)	19, DR157
AMP Capital	86, 99
Asciano, Aurizon, Australian Rail Track Corporation and Australasian Railway Association	56, DR187
Association of Mining and Exploration Companies (AMEC)	32
Association of Superannuation Funds of Australia	DR139
Assured Guaranty Ltd	29, DR128
Atlas Iron	93
Attorney-General's Department	101
Australasian College of Road Safety	18
Australasian Railway Association #	58, DR178
Australia Institute	85
Australian Airports Association	90
Australian Automobile Association	65
Australian Construction Industry Forum	DR183
Australian Constructors Association	72, DR169
Australian Council of Trade Unions (ACTU)	95
Australian Industry Group	47, DR165
Australian Information Industry Association	25
Australian Local Government Association	DR137
Australian Logistics Council	48
Australian Motoring Enthusiast Party	DR149
Australian Property Institute	13
Australian Services Union	69
Australian Sustainable Built Environment Council	75, DR164
Australian Trade Commission (Austrade)	74
Australian Trucking Association #	27, DR176
Autodesk Asia #	24, DR130
Bianchi, Robert J and Drew, Michael E	33
Board of Professional Engineers of Queensland	DR135
Borland, Jeff	102
Bridge, Adrian *	11, DR190
buildingSMART *	DR170, DR209
Bus Industry Confederation	43, DR127
Business Council of Australia (BCA) #	39, DR197
BusinessSA	31, DR136
Cameron, Greg	6
Cbus #	67
Central NSW Councils (CENTROC)	37
Centre for Comparative Construction Research	DR112

(Continued next page)

Table A.1 (continued)

Individual or organisation	*Submission number*
Centre for Policy and Development Systems	DR115
Certain Planning Pty Ltd and Hopman Consulting Services Pty Ltd #	91, DR189
Chamber of Minerals and Energy of Western Australia (CME) *	36, DR132
Chandler, David	63
Civil Contractors Federation	34, DR202
Clean Energy Finance Corporation (CEFC)	109
Cockatoo Network #	98
Combined Small Business Alliance of WA	104
Committee for Melbourne	30
Construction, Forestry, Mining and Energy Union (CFMEU)	DR174, DR206
Consult Australia	23, DR168
Corsie, Darce	DR199
Council of Capital City Lord Mayors #	73, DR160
Council of Mayors (South East Queensland)	38, DR119
Council of Social Service of New South Wales (NCOSS)	20
de Valence, Gerard	16, DR140
Department of Infrastructure and Regional Development (DIRD)	64
Dial Before You Dig	5
Dollery, Brian	DR111
Drew, Michael E and Bianchi, Robert J	33
Dwyer Lawyers	DR195
Edwards, Geoff	DR118, DR181
Electrical Trades Union	DR159
Engineers Australia	26, DR123
Ergas, Henry	87, DR182
Evans & Peck	DR175
Financial Services Council (FSC) #	22
Financial-Architects Asia Pty Ltd	DR191, DR207
Forsyth, Peter	DR117
French Ministry of Finance	110
Gillard, I M	106
Goldberg, John	84, DR179
Green Building Council of Australia	50
Hale, Chris #	2
Henn, Liesel	DR146
Hepburn, Gavin	57
Herbert Smith Freehills (HSF) #	68, DR192
Hodge, Graeme	DR151
Holman, Geoff	96, DR172
Hopman Consulting Services Pty Ltd and Certain Planning Pty Ltd	91
Housing Industry Association (HIA)	21, DR173
Heavy Vehicle Charging and Investment Reform (HVCI)	77
IFM Investors	79, DR184, DR214
Independent Contractors Australia	100

(Continued next page)

Table A.1 (continued)

Individual or organisation	*Submission number*
Industry Super Australia (ISA)	60, DR114, DR150
Infrastructure Financial Opportunity Pty Ltd	DR138
Infrastructure Partnerships Australia	DR186
Infrastructure Sustainability Council of Australia	DR122
Institute of Public Works Engineering Australasia (IPWEA)	DR141, DR162, DR194, DR205
Institute of Value Management	DR125
International Centre for Complex Project Management	105
K McGovern and Associates	DR198
Katz, Peter	45
Knight, Peter	DR113
Kolar Consulting	7
Laird, Philip	3, DR158
Lean Construction Institute of Australia	103
Lend Lease	46, DR201
Local Government Association of Queensland (LGAQ)	52, DR143
Local Government Association of South Australia	DR200
Local Government Infrastructure Services Pty Ltd	DR155
Loosemore, Martin	DR116
Macquarie Group Limited *	97
Makin, Anthony	4
Maritime Super #	15
Maroondah City Council	76
Master Builders Australia	88, DR211
Mayo, Wayne	DR208
McLeod Rail	49
Menno Henneveld Consulting	62
Minerals Council of Australia	70
Mission Australia	14
Morandini, John	107
Mushalik, Matt	DR120
National Apprenticeships Program	9
National Australia Bank	DR124
National Growth Areas Alliance	41, DR133
National ICT Australia	DR121
National Public Lobby	80, DR193
National Transport Commission	DR129
Norton Rose Fulbright	DR134
Newman, Lynda	DR204
Nolan, Ross	DR180
Northern Territory Government	DR210
NSW Business Chamber	DR148
NSW Government	DR171
O'Donnell, Carol	DR167

(Continued next page)

Table A.1 (continued)

Individual or organisation	*Submission number*
O'Sullivan, Jane	DR156
Office of the Infrastructure Coordinator (OIC)	78, DR185
Pottinger	8
Professionals Australia	10, DR142
Property Council of Australia	53, DR131
Queensland Council for Civil Liberties	DR166
Queensland Government	DR203
Queensland Investment Corporation (QIC)	DR147
Regional Australia Institute #	92
Ridley & Co	DR161
Roads Australia #	66
Royal Institution of Chartered Surveyors	DR144
Salini Australia Pty Ltd	1
Sinclair Knight Merz	108
Sine Iacture Pty Limited	DR153
Smart Infrastructure Facility - University of Wollongong	94
SMSF Professionals' Association of Australia	35
Spring, Ian	89
Stakehill Road Transport-oriented Urban Development Alliance	59
Stanger, Aidan	71, DR145
Telstra	82
Transport Reform Network #	54, DR163
Transurban #	61, DR177
University of New South Wales	44
Urban Development Institute of Australia (UDIA)	40
Victorian Civil Construction Industry Alliance #	28
Victorian Government	81, DR196
Victorian Healthcare Association	12
Water Services Association of Australia	55
Western Australia Local Government Association	DR154
Westpac	51
Yilgarn Iron Producers Association	42

a An asterisk (*) indicates that the submission contains confidential material NOT available to the public. A hash (#) indicates that the submission includes attachments.

Table A.2 **Visits**

Organisation
Australian Capital Territory
Australian Competition and Consumer Commission (ACCC)
Acciona
Australian Trade Commission (Austrade)
Australian Constructors Association
Australian Workers Union (AWU)
Boston Consulting Group
Bureau of Infrastructure, Transport and Regional Economics (BITRE)
Construction, Forestry, Mining and Energy Union (CFMEU)
Clayton Utz
Department of Industry
Department of Infrastructure and Regional Development (DIRD)
Department of Treasury
Engineers Australia
Evans & Peck
Fair Work Building and Construction
Federal Safety Commissioner
Independent Economics
Master Builders Australia
McLeod Rail
Minerals Council of Australia
National Apprenticeships Program
Obrascon Huarte Lain (OHL)
Perkins, Stephen (OECD International Transport Forum)
Safe Work Australia
URS Corporation
New South Wales
ATEC Rail Group
Department of Premier and Cabinet
Deutsche Bank Australia
Financial System Inquiry
Infrastructure NSW
Infrastructure Partnerships Australia
Leighton
Lend Lease
MMA Civil Contractors
NSW Treasury
Reserve Bank of Australia
Smart Infrastructure Facility - University of Wollongong
Transport for NSW

(Continued next page)

Table A.2 (continued)

Organisation
Queensland
BMD Group
Brisbane Airport Corporation
Brisbane City Council
Centre for Comparative Construction Research
Civil Contractors Federation
Department of State Development, Infrastructure and Planning
Local Government Association of Queensland (LGAQ)
Port of Brisbane
Queensland Building Services Authority
Queensland Major Contractors Association
Queensland Motorways
Victoria
Acorn Capital
Australian and New Zealand Banking Group
Committee for Economic Development of Australia
Construction Material Processors Association (CMPA)
Department of Premier and Cabinet
Department of Treasury and Finance
Freebairn, John
Fulton, Hogan
Herbert Smith Freehills
Heavy Vehicle Charging and Investment Reform (HVCI)
Independent Economics
King, Stephen
Linking Melbourne Authority
Lloyd, John
Maddock, Rod
Master Builders Australia
Murray Inquiry
Melbourne Airport
National Transport Commission
Victorian Government
Western Australia
Brookfield Multiplex
Chamber of Minerals and Energy Western Australia (CME)
Construction Contractors Association of Western Australia
Department of Metropolitan Redevelopment Authority
Department of Planning
Department of Premier and Cabinet
Department of Transport
Perth Airport

(Continued next page)

Table A.2 (continued)

Organisation
New Zealand
Treasury

Table A.3 Roundtable participants

Name of participant	*Organisation*
Melbourne — 19 December 2013	
Davies, Philip	AECOM
Evans, Jon	Australia and New Zealand
Hall, Jessica	Department of Infrastructure and Regional Development (DIRD)
Kanowski, Steve	Department of State Development, Infrastructure and Planning
Maguire, Glenn	Evans & Peck
Hoskins, Richard	Hastings Funds Management
Hanna, Michael	IFM Investors
Roe, Paul	Infrastructure Australia
Lyon, Brendan	Infrastructure Partnerships Australia
Cain, James	M21 Consulting
Maddock, Rod	Monash University
Esposito, Simon	National Australia Bank
Frew, Leilani	NSW Treasury
Waller, Mike	Office of Living Victoria
Loos, Jason	Partnerships Victoria
Ergas, Henry	Smart Infrastructure Facility - University of Wollongong
Legg, Chris	Treasury (Australian Government)
Freebairn, John	University of Melbourne
Seiffert, Bob	Victorian Civil Construction Industry Alliance

Table A.4 Public hearings

Individual or organisation	*Transcript page numbers*
Melbourne — 9 April 2014	
Transport Reform Network	3–16
Assured Guaranty Ltd	17–32
Cbus	33–47
Master Builders Australia	48–58
Australasian Railway Association	59–73
Industry Super Australia	74–87
IFM Investors	88–100
Electrical Trades Union	101–114
BTI Consulting	115–122
AEC Connect	123–129
Holman, Geoff	130–137
Professionals Australia	138–156

(Continued next page)

Table A.4 (continued)

Individual or organisation	*Transcript page numbers*
Brisbane — 11 April 2014	
Board of Professional Engineers of Queensland	159–172
Infrastructure Financial Opportunity Pty Ltd	173–181
Construction, Forestry, Mining and Energy Union (CFMEU)	182–193
Infrastructure Partnerships Australia	194–210
K McGovern and Associates	211–221
Institute of Public Works Engineering Australasia	222–226
Local Government Association of Queensland (LGAQ)	227–237
Ergas, Henry	238–244
Edwards, Geoff	245–252
Sydney — 14 April 2014	
RICS Oceania	255–262
National ICT Australia	263–273
Australian Constructors Association	274–287
PricewaterhouseCoopers	288–299
Infrastructure Australia	300–313
Goldberg, John	314–320
Financial-Architects Asia Pty Ltd	321–329
Business Council of Australia (BCA)	330–345
Heavy Vehicle Charging and Investment Reform (HVCI)	346–358
Certain Planning Pty Ltd	359–364
de Valence, Gerard	365–374
Consult Australia	375–380
Laird, Philip	381–386
buildingSMART	387–396
Morandini, John	397–403
RICS Oceania	404–404
Woodward, Roger	405–407

B Australian and international public infrastructure case studies

This appendix examines a range of public infrastructure projects from Australia and overseas.

There is a range of different models of delivery of public infrastructure projects, which vary in the degree of public and private sector involvement (chapter 3). The case studies in this appendix have been selected to cover a range of different delivery models, jurisdictions and sectors.

The case studies indicate that the Australian and international experience with delivering public infrastructure has been mixed. Some projects have been considered successful, others less so, and the reasons for this vary from project to project.

The case studies cover road, rail, utilities, social infrastructure and urban renewal public infrastructure projects from Australia and overseas. A summary of the case studies is in table B.1.

Table B.1 **Summary of public infrastructure case studies**

Project	*Capital value*	*Delivery model*	*Funding*	*Financing*	*Comments*
Road					
CityLink (Vic)	$2.1 billion	PPP: Build-own-operate-transfer[a]	• Tolls • Public	Private	• Patronage currently exceeds forecasts • Patronage risk transferred to the private sector
CLEM7 (Qld)	$3 billion	PPP: Design-build-own-operate-finance-maintain	• Tolls • Public	Private	• CBA proved highly inaccurate • Patronage significantly below forecasts, SPV went into receivership

(Continued next page)

Table B.1 (continued)

Project	*Capital value*	*Delivery model*	*Funding*	*Financing*	*Comments*
Road					
WestConnex (NSW)	$11 billion (estimated)	Design-build-operate-maintain	• Tolls (75%) • Public (25%)	Public (stage one) Public and private (stage two)	• Stage one to commence in 2015. Due to be completed in 2019 • Funded by capital recycling
LBJ Express (US)	US$3.1 billion (estimated)	PPP: Design-build-finance-operate-maintain	• Tolls • Public	Public and private	• Opens in 2016 • Tolled and untolled lanes • Tolls vary with congestion • Use of PPP resulted in large cost saving
Rail					
Channel Tunnel Rail Link (HS1) (UK)	£5.8 billion	PPP: Design-build-finance-manage	• Train fares • Public	Public and private	• Substantial guarantees provided by the UK Government
Alice Springs to Darwin (NT)	$1.3 billion	PPP: Build-own-operate-transfer	• Train fares • Public	Public and private	• Construction praised for being timely and low-cost • Questionable project selection • SPV went into receivership
Utilities					
Adelaide desalination plant (SA)	$1.83 billion	Design-build-operate-maintain	• Water charges • Public	Public	• Project selection decision criticised
Social infrastructure					
Darent Valley Hospital (UK)	£133.5 million	PPP: Design-build-finance-maintain	• Availability payments (100%)	Private	• Use of new delivery model had teething problems
Wiri Prison (NZ)	NZ$402 million (estimated)	PPP: Design-build-finance-operate-maintain	• Availability payments (100%)	Private	• Funding varies with recidivism • Complete 2015
Urban renewal					
Denver Union Station (US)	US$500 million	Design-build-operate	• Value capture (33%) • Other taxation • Fares • Public	Public	• Complete May 2014 • Value capture includes a special taxation district for the project and a lodgers tax on hotels

a As discussed in chapter 3, although definitions vary, for the purposes of this inquiry, public private partnerships are defined to involve some private finance.

B.1 Road infrastructure

Case study 1: CityLink, Victoria

Background

CityLink is a privately owned and operated electronic toll road in Melbourne. It is 22 kilometres long and links major routes between Melbourne Airport, the Port of Melbourne and routes to the industrial centres in the city's south-east. It consists of two sections of roadway: the Western Link, which connects the Tullamarine Freeway to the West Gate Freeway, and the Southern Link, which connects the West Gate Freeway to the Monash Freeway. Construction of CityLink commenced in May 1996, and it opened at the end of 2000.

Project selection

As early as 1929, a proposal for a southern bypass of Melbourne's central business district (CBD) was put forward as part of a transport plan. The Melbourne Metropolitan Board of Works planning scheme in 1954 and the highway plan in 1957 both proposed an inner ring road around the CBD, a series of freeways to the east, south-east, north-west, as well as a number of bypasses. While most of the freeways on the outskirts of Melbourne were built by the late 1970s, freeways around the CBD were omitted due to community opposition and insufficient funds (Muhammad and Low 2006).

In the 1990s, various alternative strategic solutions were investigated to deal with growing traffic problems, and it was ultimately decided by the Victorian Government that a link should be provided to circumvent the CBD — the CityLink project (GHD 2011).

Two cost–benefit analyses were conducted for the project, which showed that the benefits of the project significantly outweighed the costs:

- May 1995: benefit–cost ratio of 3.82 and a net present value of $2.69 billion.
- April 1996: benefit–cost ratio of 2 and a net present value of $1.3 billion.

However, a number of changes to the project and the modelling were made for the second analysis, which means these reports are for somewhat different projects. The second report took into account the effect of design modifications, as well as the impact of Transurban's proposed tolling regime on patronage (Allen Consulting Group 1996).

Delivery model

In May 1992, the Victorian Government invited businesses interested in building, owning and operating CityLink to submit a bid on a build-own-operate-transfer basis. At the time construction commenced, CityLink was the largest such scheme in Australia. More generally, the Victorian Government has been active in using the public private partnership (PPP) model.

Five proposals were received and two consortia shortlisted based on pre-determined selection criteria. These consortia — Transurban and CHART Roads — were announced in September 1992 (GHD 2011). The Transurban consortium comprised Transfield Construction and the Obayashi Corporation, and CHART Roads comprised Clough Engineering, John Holland Construction and Engineering, Roche Brothers and Theiss Contractors. The final brief was issued in 1994, requiring detailed traffic forecasting (although the tender conditions stated 'toll price and pricing mechanisms are to be negotiated at financial close'). The successful consortium for the CityLink Project spent $28 million tendering for the project (PAEC (Vic) 2006).

Once the tender process was concluded and Transurban was announced as the preferred consortium, a contract was negotiated between the Minister for Roads and Ports on behalf of the State of Victoria and Transurban (published as schedule 1 to the *Melbourne City Link Act 1995* (Vic)). Under this Act, the Victorian Government granted an exclusive licence to Transurban to design, build, finance, operate, levy tolls and maintain CityLink for 34 years (until 2034) (IPA 2006). When the contract expires, CityLink will be transferred to the Victorian Government. The concession period was anticipated to provide a net return to shareholders of 17.5 per cent per annum (PAEC (Vic) 2006).

The majority of the risks associated with CityLink were transferred to Transurban, including patronage risk. However, compensation is payable to Transurban for network changes made by the Victorian Government that might reduce demand.

The design and construction of CityLink was undertaken by a joint venture between Transfield and Obayashi Corporation, under contract to Transurban. The design and construction of the Western Link was outsourced to Baulderstone Hornibrook Engineering and the supply of the electronic tolling system to Translink Systems, a company jointly owned by Transfield and Transroute of France (IPA 2006). To keep construction on schedule and ensure that each project element was built to specific standards, an independent reviewer was also appointed to the project.

The Melbourne CityLink Authority facilitated and oversaw the project. It also worked on land acquisition, provided advice on legislation, monitored design and

construction, and provided risk management, public affairs commentary and community consultation (Muhammad and Low 2006). Following the opening of CityLink, the responsibilities of the Melbourne CityLink Authority were transferred to the Victorian Department of Infrastructure. From June 2004, VicRoads became responsible for the management of the CityLink contract, public safety on CityLink, the protection of state interests and assets, and the integration of traffic on the road network (Muhammad and Low 2006).

Funding for CityLink

Most of the funding for the project is through tolling. CityLink uses distance-based tolling which is indexed to the consumer price index. Current toll caps are $6.93 for cars, $9.24 for commercial vehicles during the day, and $6.93 for commercial vehicles during the night.

The Victorian Government agreed to fund certain state works (worth $266 million) during the construction phase, to implement specific agreed traffic measures in favour of CityLink (Muhammad and Low 2006; PAEC (Vic) 2006). In exchange, Transurban was to pay the Victorian Government 'concession fees' to compensate them for the cost of acquiring the tollway land and undertaking associated works. However, the Victorian Government subsequently waived its right to receive these fees in exchange for Transurban undertaking some construction work to upgrade parts of the freeway (Omega Centre for Mega Projects in Transport 2008).

Financing for CityLink

Transurban financed $1.8 billion of construction costs using a mix of debt and equity, as follows:

- Total equity raised was $510 million. Initial equity included a public issue ($63.5 million), and an institutional issue ($206.5 million), and the balance of equity came from private investors ($185 million). A deferred equity component of $55 million was contributed by Obayashi and Transroute (IPA 2006).
- $1.3 billion of debt finance, comprised of tranche A ($1.2 billion with a 17 year maturity, primarily used during the construction phase), and tranche B ($97.5 million to provide additional liquidity for the operational phase of the project) (IPA 2006). Subordinated debt raised was $51 million.
  - This debt finance was raised from, and underwritten by, a syndicate of banks with 17–19 year loan maturities. These banks included Australia's four largest banks, and several local subsidiaries of international banks. These lenders secured the debts through deeds of charge over Transurban's assets

and obligations (including toll revenues), and mortgages over project leases (GHD 2011).

The Australian Government financially supported CityLink through significant tax concessions. These tax concessions helped Transurban to attract investors by offering tax-exempt returns on their investments during the four-year construction period before the project began to earn money (Muhammad and Low 2006).

Outcomes

When CityLink first opened, traffic was about 90 per cent of the initial forecast. Initial patronage was impacted by technical problems with the automated tolling systems (which, for example, resulted in some accounts being charged before opening). After the initial technical problems were resolved, patronage increased but still tracked slightly below forecast levels, although some sections with higher traffic levels compensated for others with lower levels; differences varied from 9 per cent above to 39 per cent below forecasts. After nine years of operation, in 2008 the gap between the projected and actual volume of traffic had closed to within 6 per cent (GHD 2011). Currently the road patronage exceeds forecasts, at about 750 000 tolls per day. More than 1.5 million vehicles (or over 35 per cent of Victoria's vehicles) are registered with CityLink.

Case study 2: Clem Jones tunnel (CLEM7), Queensland

Background

The Clem Jones (CLEM7) project involved building 6.5 kilometres of freeway (including 4.7 kilometres of tunnels), to link five freeways and arterials on the north and south sides of the Brisbane river, while bypassing the CBD. Construction commenced in 2006 and was completed in 2010. It was also the first section of the new M7 motorway in Brisbane, which was completed when the AirportLink tunnel opened (in 2012).

The Clem Jones tunnel was the first local government PPP of its kind in Australia, and is the longest road tunnel in Australia.

Project selection

The project grew out of a comprehensive examination of Brisbane City Council's 'Strategic Transport Opportunities Brisbane' initiative, to address road network

deficiencies. An outcome of this process was the identification of this project as being high priority (Maunsell 2005).

After the project was announced in the Brisbane City Council's *Transport Plan for 2002–2016,* Maunsells were engaged to examine relevant traffic and transport conditions, and provide traffic and transport input to the Environmental Impact Assessment.

In their report provided to Brisbane City Council, Maunsells (2005) estimated that:

- The CLEM7 road itself would save transit time of between eight and ten minutes in peak periods, and up to 20 minutes when there is a traffic incident (Clem 7 nd). Further, there were estimated to be significant time travel savings on other roads as a result of reduced congestion. Taken together, these travel time savings comprised approximately 93 per cent of the benefits of the project.
  - The value of these time savings for a private car were assumed to be just over $10/hr for an ordinary car driver in both peak and non-peak periods, and almost $33/hr for a business driver in peak periods.
  - For an assumed toll of $3.30, patronage of the CLEM7 was estimated to be just under 60 000 cars per weekday in 2011.
- The CLEM7 had a net present value of between $407 million (7 per cent discount rate) and $638 million (6 per cent discount rate). These estimates were relatively sensitive to the estimated travel time savings, but Maunsells concluded that, even if the travel time savings were considerably lower, the project would still be worthwhile in terms of direct transport benefits.

Maunsells (2005) also assumed that the project would cost $1.2 billion to build, based on estimates made by the project business case team. They conducted sensitivity analysis around the range of $1.1 billion to $1.3 billion. However, both the patronage and cost estimates for the project proved to be highly inaccurate.

Delivery model

The contract was a design-build-own-operate-finance-maintain model. The concession period was to be 45 years from financial close, ending in 2051.

Bids were received from two consortia — Brisconnections and RiverCity Motorways. Each bid cost about $20 million. Bids were assessed in terms of engineering design, traffic benefits, environmental outcomes and value-for-money (Moir 2006).

The successful tenderer was announced in April 2006, and the Brisbane City Council entered into a contract with RiverCity Motorway Consortium, a publicly-traded company comprising Leighton Contractors, Baulderstone Hornibrook, Bilfinger Berger Concessions and ABN AMRO. In turn, the RiverCity Motorway Consortium:

- contracted the design and construction of the tunnel to the Leighton Contractors and Baulderstone Bilfinger Berger Joint Venture (Dixon 2011; Hicks 2008)
- intended to outsource operations and maintenance to Brisbane Motorway Services (50 per cent owned by Leighton Services and 50 per cent owned by Bilfinger Berger Services) but retain flexibility to undertake the tolling and customer service obligations inhouse (Hicks 2006).

The patronage risk was borne by RiverCity Motorways.

While Brisbane City Council was the proponent of the project, it signed a memorandum of understanding with the Queensland Government on how they would jointly manage the project. Revenue was to be shared with Brisbane City Council from years 35 to 45.

Funding

The project was to be primarily funded through tolls. Tolls were intended to be $3.30 for cars, $4.95 for light commercial vehicles, and $8.75 for heavy vehicles (Hicks 2006), indexed to the CPI for 30 years (DPT (Qld) 2005). However, patronage was considerably lower than forecast, which meant tolls were not imposed in line with this model (discussed below). Current toll prices are: $2.36 (motorbike), $4.72 (car), $7.08 (light commercial vehicle), and $12.50 (heavy commercial vehicle) (Clem7 nd).

The Brisbane City Council undertook to pay RiverCity Motorway Group $377 million for the construction of certain works in relation to CLEM7, after the commissioning of the tolling system (RiverCity Motorway nd).

Financing

The final cost of the project was about $3 billion, financed by a mix of debt and equity.

The senior debt structure utilised:

- a construction facility which was to roll into a term facility at construction completion

- a council works tranche to be repaid by Council at construction completion
- an equity bridge facility to be drawn during construction and repaid with a deferred equity tranche to be provided by contractors at construction completion (Hicks 2006).

The debt structure had some protection to withstand significant downside scenarios, with a debt service reserve (three months), a 'ramp-up' reserve (seven months), and an equity contingency reserve ($20 million), as well as performance bonds and provision for liquidated damages of up to 10 per cent in the design and construct contract (Hicks 2006).

The three main sources for the equity raised were:

- *Initial Public Offering* (IPO)*:* about $691 million of equity was raised. The stapled securities were originally listed at $1 each and were partly-paid (50 per cent of the value was paid at the initial public offering, and 50 per cent was paid after 12 months). The IPO gave priority to Queensland residents and provided a purchasing incentive program.
- *Dividend Reinvestment Plan:* distributions up to the end of the 'ramp-up' period were subject to a dividend reinvestment plan, which was underwritten by ABN AMRO.
- *Deferred equity:* a tranche of $155 million was subscribed by Leighton and Bilfinger Berger at the end of construction. The application price was the same as the IPO and the obligation was secured by a letter of credit (Hicks 2006).

Outcomes

The project was delivered on budget and almost seven months ahead of schedule (Dixon 2011). It cost about $3 billion and was completed in 2010 (Clem 7 nd). However, this $3 billion budget had been significantly revised from the original $1.2 billion estimate.

Patronage was much lower than originally forecast. In a Brisbane City Council briefing, Maunsells (2005) forecast about 60 000 vehicles a day would use the tunnel in 2011, when tolls were to be introduced. In the investor briefing prepared for RiverCity Motorways (Hicks 2006, 2008), Maunsells forecast that patronage would be, on average, 100 000 vehicles per day in 2010, increasing to over 130 000 per day in 2025.

When the tunnel opened in 2010, traffic was running at about 60 000 vehicles per weekday for the three week toll-free period, but:

> … the first week of tolls at $3.50 for cars saw weekday traffic at only 20 600 [per weekday] and stayed around that level. The toll was cut to $2.00 at the end of June and traffic rose to 27 600 [per weekday]. By September, traffic was reported at 28 400 per weekday … Tolls have since been raised to $3.00 and traffic is [in 2011] running [at] 22 000 to 23 000 [per weekday]. (Samuel 2011)

As a result of lower-than-forecasted patronage, the $1.3 billion in short-term loans were not renewed and, unable to refinance its debt, RiverCity Motorways was put into receivership in 2011, 11 months after the tunnel opened. Share prices dropped from $1 in 2006 to $0.01 by the time Queensland Motorways acquired it for $618 million in September 2013 (Queensland Motorways was then owned by the Queensland Investment Corporation, which is a Queensland Government body) (Samuel 2011).

Subsequently, a class action against engineering consultant AECOM Australia Pty Ltd (the organisation that prepared the traffic forecasts) was commenced by retail equity investors. The investors claimed the traffic forecasts were misleading, and that it was not disclosed that the traffic forecasts provided to Brisbane City Council 18 months earlier were significantly lower than the forecasts provided to them as investors (Maurice Blackburn 2012).

This project is an example of demand risk being transferred to private investors and not being borne by the government.

The Brisbane City Council has continued to progress its 'TransApex' plan, with the construction of two more tunnels, AirportLink and Legacy Way, and the Go-Between Bridge.

Case study 3: WestConnex (and the sale of Port Kembla and Port Botany), New South Wales

Background

WestConnex is a group of projects, comprised of: new sections of motorway; extending the M4 to Sydney Airport; duplicating the existing M5 East; and making capacity improvements on existing motorways (Infrastructure NSW 2013). In total, WestConnex involves 19 kilometres of tunnels and 14 kilometres of surface roads. It will provide a three to four lane motorway in each direction and allow motorists to avoid up to 52 sets of traffic lights on their journey (NSW Government 2014b).

Project selection

The WestConnex proposal was developed by Infrastructure NSW after a number of investigations and consultations by transport and urban planners on the best way to fix deficiencies in Sydney's road network.

WestConnex was designed to address a number of perceived gaps in Sydney's motorway network, including: the missing link in the east-west 'spine' created by the M4 terminating at North Strathfield; congestion, low travel speeds and unreliable travel times on the M4, M5 East, Parramatta Roads and in the Sydney Airport/Port Botany precinct; and poor urban amenity along Parramatta Road due to heavy traffic volumes and congestion (WestConnex 2013c). Infrastructure NSW identified WestConnex as the state's highest priority project in the NSW State Infrastructure Strategy, and the NSW Government accepted that recommendation.

Delivery model

The NSW Government created the WestConnex Delivery Authority in 2013, which reports to the NSW Minister for Roads and Ports (WestConnex 2014).

The risk allocation proposed by the NSW Government is as follows. The NSW Government will take on the risk of planning and environmental approvals, project specifications and performance requirements, project funding risk, and the greenfields patronage risk (prior to sale). It is intended that the private sector will bear the design, construction, commissioning, maintenance, operations, tolling services, and brownfields (post-sale) patronage risk. The tender process has not been concluded, so the delivery model has not been finalised, but the above risk-sharing arrangement implies a design-build-operate-maintain contract.

The project is to be delivered in three stages over ten years (WestConnex 2013c).

The NSW Government conducted an industry engagement process to involve industry in the design of the project before the tender process is carried out (WestConnex 2013c). For example, Hassell has been appointed to carry out the urban design work, Ernst and Young and Parsons Brinkerhoff will look at network design targets, and Ferrovial Agroman and Leighton Contractors will develop design aspects along Parramatta Road (WestConnex 2013b).

By January 2014, six consortia had lodged expressions of interest to build the first section of WestConnex and four were shortlisted:

- Lend Lease Engineering
- McConnell Dowell-OHL joint venture

- Rizzani De Eccher-Leighton joint venture
- Thiess (Roads and Maritime NSW 2014).

Construction of stage one (Parramatta to Haberfield) is expected to commence in 2015 and be completed by 2019 (WestConnex 2013c).

Funding

The WestConnex business case was based around a tolling strategy that contained the following principles and indicative tolls:

- A minimum toll (about $1.50 to $1.80) will apply to short trips. The maximum toll will be $7.35, consistent with the existing M7. Indicative average tolls will be between $2.40 and $3.00 for each of the three stages, and the overall average toll will be $4.50 per trip.
- The toll will be distance based, meaning that longer trips are more expensive.
- Cars will pay one-third of the heavy truck toll.

Initial modelling indicated around 75 per cent of the funding for WestConnex could be sourced from user charges. The remainder of the funding (about $2 to $3 billion) would be provided by the NSW and Australian Governments (Infrastructure NSW 2013; WestConnex 2013c).

Financing

WestConnex is expected to cost about $11 billion to build (WestConnex 2013a). In terms of selecting a financing model, Infrastructure NSW (2013, p. 6) commented:

> The WestConnex scheme will be, by a large margin, the most expensive motorway development for Sydney to date and will require substantial financing and funding resources. With the varying success of recent public private partnerships … in Australia and the post global financial crisis … environment, it is clear that new and innovative ways of delivering motorway projects will be required. It is likely that WestConnex will require a blend of private and public financing. WestConnex can be delivered within ten years, dependent on a viable financing and funding model.

The original financing strategy was as follows:

- It is envisaged that stage one (Parramatta to Haberfield) will be predominantly publicly financed, with the NSW Government making a $1.8 billion contribution over the next four years, and the Australian Government providing $1.5 billion over the next four years.

- As tolls are introduced on WestConnex and traffic volumes are established, finance for subsequent stages will be obtained by:
  - raising non-recourse private sector debt against the toll revenue
  - selling the NSW Government's equity investment in stage one and recycling the proceeds.
- The NSW Government will retain ownership of stages two and three until after project completion (WestConnex 2013c).

However, the Australian Government subsequently agreed to provide a $2 billion concessional loan to finance construction of stage two of WestConnex, in addition to the $1.5 billion contribution the Australian Government had already agreed to make towards stage one. This concessional loan is estimated to bring forward the construction of stage two by about 18 months by removing reliance on the sale of stage one of the project to fund stage two (NSW Government 2014b).

The NSW Government's $1.8 billion contribution towards the cost of delivering stage one of the WestConnex motorway scheme is to be provided by the Restart NSW fund, which was established to fund major infrastructure projects in New South Wales. Sources of money for the fund include proceeds from asset sales, and general budget appropriations. Infrastructure NSW is responsible for independently assessing projects and making recommendations to the NSW Government on use of the funds (Infrastructure NSW nd).

In April 2012, the NSW Government announced that terms had been reached for the long-term lease of Port Botany and Port Kembla. Following a six-month competitive bidding process, the 99-year lease was awarded to the NSW Ports Consortium, and $4 billion from the proceeds of the sale were allocated to Restart NSW (NSW Treasury nd).

Case study 4: LBJ Express, United States

Background

The LBJ Express project involves rebuilding, expanding, and introducing new toll lanes on one of the busiest and most congested highways in North Texas. The project is 26.6 kilometres long, 21.4 kilometres of which will be tolled (TxDOT 2014).

Project selection

When first opened more than 40 years ago, the LBJ Freeway was designed to carry 180 000 vehicles per day. LBJ Development Partners (nd, p. 2) commented that 'today, the LBJ Freeway carries more than 270 000 vehicles daily, with demand expected to exceed 450 000 vehicles by 2020, making the urban area the fifth most congested in the country'. The LBJ Express project is intended to relieve this congestion by almost doubling the existing roadway capacity (TxDOT 2014).

Delivery model

The contract is a design-build-finance-operate-maintain contract.

In March 2006, the Texas Transportation Commission called for qualifications to tender for the PPP contract. The Comprehensive Development Agreement was entered into in September 2009 by the Texas Department of Transport and the LBJ Infrastructure Group (comprised of Cintra US, Meridiam Infrastructure Finance, and the Dallas Police and Fire Pension System). The term of the concession is 52 years. The Texas Department of Transport owns the project. The North Texas Tollway Authority will provide toll collection services (TxDOT 2014).

Construction began in early 2011, with an anticipated substantial completion date of 2016. Construction is being carried out by Spanish contractor Ferrovial Agroman, and its Texas subsidiary W.W. Webber (Sharn 2010). The project is being designed and built concurrently, which is expected to reduce construction time by several years (TxDOT 2014).

Funding

LBJ Express will have four main untolled lanes each way, two to three continuous frontage roads in each direction, and three toll lanes in each direction. This means drivers will have the choice of driving on general purpose lanes at no cost or opting for new tolled 'express lanes'.

The tolls will use dynamic pricing designed to keep traffic moving at 80 kilometres per hour (TxDOT 2014). It is estimated that tolls will initially be US$0.09 per kilometre in low traffic, but peak period charges could be as high as US$0.47 per kilometre (TxDOT 2014).

As part of the US$2.6 billion construction cost, the Texas Department of Transport contributed a grant of US$490 million. The balance was financed as detailed below.

Financing

The total investment cost of the project is expected to be US$3.1 billion. Total construction cost is expected to be US$2.6 billion, raised as follows:

- US$664 million equity from the LBJ Infrastructure Group, divided between Cintra (51.0 per cent), Meridam (42.4 per cent) and the Dallas Police and Fire Pension System (6.6 per cent) (the first pension fund to invest directly in infrastructure development in the United States)
- US$615 million of 30-year tax-exempt private activity bonds
- US$850 million from the federal Transportation Infrastructure Finance and Innovation Act (TIFIA) loan program (Sharn 2010; TxDOT 2014). The US TIFIA program provides up to US$10 in credit assistance for each dollar of federal funds for state and local transport infrastructure investments. This allows projects using tax increment funding and other innovative funding sources to secure favourable financing rates in the private market during early ramp-up periods for new projects (Langley 2013).

As detailed above, the US$490 million balance was contributed by the Texas Department of Transport.

Outcomes

In early 2014, the project was more than 65 per cent complete, and phase one of the toll lanes, as well as several frontage roads and general purpose lanes opened in December 2013 (TxDOT 2014). The entire project is expected to be completed in 2016.

The OECD International Transport Forum (2013) found that the largest potential cost savings from using public private partnerships arise from the freedom to fundamentally redesign projects. They cited the LBJ Express as an example, stating that the redesign of the project under the private consortium had reportedly reduced construction costs by US$970 million. Thus, ‘this is the type of project that brings the biggest benefits from PPP contracting but, by number, such schemes represent a small proportion of the transport PPP projects contracted around the world to date’ (OECD/ITF 2013, p. 21).

B.2 Rail infrastructure

Case study 5: Channel Tunnel Rail Link (HS1), United Kingdom

Background

The Channel Tunnel Rail Link Project (now known as High Speed 1, or HS1) involved constructing a 106 kilometre railway to provide a high-speed link from London St Pancras Station, to the rail tunnel that runs under the English Channel to France. The contract also included operating the British arm of this train service (Eurostar UK).

The project commenced in 1996 and was completed in 2007.

Project selection

The project was perceived as necessary to increase the speed of the existing train from London to the English Channel, and increase the frequency of trains between London and Paris, which on the existing line was limited to four trains per hour in each direction. It also involved works associated with moving the existing London station to a location (St Pancras Station) that better integrated the new HS1 with the rest of the public transport network (Hansen 2010). A separate project to upgrade and improve the capacity of trains in London (Thameslink), was important to manage the increase in passengers that would result from routing the Channel Tunnel Rail through St Pancras station (Butcher 2012).

The HS1 project was originally suggested by (the then state-owned) British Rail in 1988. A modified proposal gained government support in 1991. After some amendments, enabling legislation was passed by the UK Parliament in 1996 (Butcher 2010).

Delivery model

Consistent with other heavy railway infrastructure projects reviewed by Hansen (2010), the project used a design-build-finance-manage contract. The concession period was 90 years (until 2086). Construction was to start in 1998, and the line was to be opened in 2003. The way risk was shared varied as the financing arrangements evolved (see below), but throughout, the Department of Transport wished to minimise the construction risk it bore (CPAHC 2006).

A tender process was commenced in 1994 by the Department of Transport. Bidders were required to compete for design, construction and management of the rail link,

as well as the amount of public sector financial contribution they would require (which could include a domestic capacity charge) (Butcher 2010).

The Department awarded London and Continental Railways (LCR) the contract to build the high-speed rail link and run the Eurostar train service (which was operating across the English Channel to London–Waterloo on a low-speed line). The shareholders of LCR were a number of engineering consulting firms (Arup, Bechtel, Halcrow and Systra), a subsidiary of the state-owned French power distribution company EDF, the private British transport provider National Express, the public French railway operator SNCF, and the investment bank UBS. LCR managed the project through its property division and three subsidiaries (Hansen 2010).

Funding

The original contract envisaged that LCR would draw on revenue from the existing service across the English Channel to service the private debt raised and provide shareholder returns. Since that service had been open for less than a year when the HS1 forecasts were made, passenger numbers on this line were fairly low but they were expected to significantly increase as the 'ramp-up' stage progressed, with further increases expected after the new HS1 rail opened.

In bidding for the deal in 1996, LCR forecast that passenger numbers on this route would reach 9.5 million in 1996-97 and 21.4 million by 2004. However, actual patronage proved to be substantially below forecasts, which was problematic for LCR in obtaining finance for HS1 (see below).

The original financing arrangement involved £1.8 billion in government grants.

In later refinancing deals, the UK Government guaranteed debt repayments.

Financing

Total investment costs were £5.8 billion (Butcher 2011), of which £4 billion was to be borrowed by LCR in private capital markets, secured on future revenue from operating the existing train service from London to Paris (NAO UK 2001a). Prior to being floated, LCR had £60 million in equity and £430 million of short-term bank loans — the rest of the finance was to be raised through a stockmarket float and the issue of debt.

However, LCR failed to raise the required finance. Patronage forecasts for the new railway proved overly optimistic, and it was losing money heavily (Perkins 2013).

This was problematic for LCR as these revenues were intended to be used to service the debt raised for the new high-speed link.

Unable to raise the required private finance, LCR requested an additional £1.2 billion in government grants. The UK Government did not agree to additional grants, opting instead to restructure the contract, even though LCR's failure to raise the private finance would have given the UK Government grounds to terminate it (the first restructure) (NAO UK 2001a). This occurred in 1998.

Under the first restructure, Railtrack (the operator of the UK rail network) agreed to manage, and eventually purchase section one of the new high-speed track when it was complete (to raise funds for construction of section two). Railtrack was also granted an option to purchase section two when it was complete.

To enable LCR to raise the finance required (Hansen 2010; NAO UK 2001a), the following arrangements were put in place:

- The UK Government guaranteed LCR's remaining borrowing requirement (£3.75 billion in bonds).
- The Department of Transport agreed to lend money directly to LCR to cover operational expenses for several years after project completion. (This was intended to be £140 million, but later estimates suggested it would be closer to £1.2 billion.) The Department of Transport also took a small shareholding in LCR, which entitled it to receive at least 35 per cent of the pre-tax cash flow and proceeds after 2020.
- LCR put in place facilities to draw, if needed, up to £700 million of debt from a consortium of commercial banks and other sources. This debt was guaranteed by Railtrack (the operator of the entire UK rail network).
- Railtrack took on construction risk for section one (if construction costs exceeded a specified threshold), and also accepted a capped share of revenue risk, in exchange for receiving guaranteed payment of track access charges.

Under this first restructure, LCR raised about £6.2 billion of debt in the capital markets to fund construction of sections 1 and 2 of HS1, operation and maintenance of section one, and the losses being concurrently incurred through operating the existing service across the English Channel (NAO UK 2005b).

However, in 2001, Railtrack announced that it would not purchase section one of the high-speed rail link, and then withdrew from the deal altogether in 2002 following its entry into railway administration. This triggered another restructuring (the second restructure) (Butcher 2011; CPAHC 2006).

Under the second restructure, LCR purchased Railtrack's interest in section one of the railway. Railtrack's withdrawal from the deal required some changes to the financial structure of the project. The Department of Transport agreed to make availability payments regardless of the attainment of construction milestones, and LCR was required to find a source of finance for section two, other than proceeds from the sale of section one (NAO UK 2005b).

The withdrawal of Railtrack also required a new arrangement for sharing construction risk, under which LCR would be backed by the Department of Transport, Bechtel and a group of insurers in sharing construction risk for section two (known as the Cost Overrun Protection Program), where construction cost overruns of greater than 3 per cent a year were to fall on LCR and, ultimately, the Department of Transport (CPAHC 2006; NAO UK 2005b).

Outcomes

The HS1 project was completed in 2007 at a total cost of £5.8 billion (£6.2 billion including additions). The project was completed within the extended time and budget envelope made available at refinancing, but it was 11 months behind original target completion date and 18 per cent over original target cost (Perkins 2013).

Passenger numbers and revenues increased over time but remained substantially below forecasts. In particular, unanticipated competition from low-cost airlines and a fire in the Channel Tunnel in 1996 badly affected passenger numbers in 1996-97. The UK Government was also criticised by the House of Commons Public Accounts Committee for failing to independently verify the patronage forecasts until two years after it had awarded the contract to LCR (House of Commons (UK) 2002).

In May 2009, LCR became insolvent and ownership of the project was transferred to the UK Government, together with debt of about £4.8 billion (which the UK Government had guaranteed). In 2010, the UK Government awarded a concession to operate the line for 30 years to Borealis Infrastructure and Ontario Teachers' Pension Plan for £2.1 billion (Perkins 2013). Network Rail (owned by the UK Government) operates and maintains the stations and infrastructure under this contract.

The House of Commons Public Accounts Committee (2012, p. 1) commented:

> Total taxpayer support for the [HS1] line, over a 60 year period to 2070, has an estimated present value of £10.2 billion. Benefits for passengers from shorter journey times over this period have an estimated present value of £7 billion. … Over-optimistic

and unrealised forecasts for passenger demand on High Speed 1 left the taxpayer saddled with £4.8 billion of debt.

The UK Government is currently progressing a second high speed rail line (HS2) running north from London to the English Midlands, North West England, Yorkshire, and, potentially, to North East England and the Central Belt of Scotland.

Case study 6: Alice Springs to Darwin Railway, Australia

Background

The Alice Springs to Darwin Railway project was designed to complete the rail link between Australia's northern and southern coasts. It was constructed in two stages — the 824 kilometre Adelaide to Alice Springs component, completed in 1980, and the 1420 kilometre Alice Springs to Darwin component, completed in 2003 (IFC 2013).

First suggested in 1858 by a Melbourne businessman, J. Roberston, the Adelaide to Darwin railway has a long history. In 1876, a bill was passed by the South Australian Parliament authorising construction of the southern line. At that time, South Australia was responsible for administration of the Northern Territory. Construction of the southern line from Adelaide commenced in 1878, and the line reached Oodnadatta in 1891, but was not continued because of 'lack of funds … and the lack of pressing need for [an] extension north' (Symon 2004, p. 3). The southern line was taken as far as Alice Springs in 1929 as a narrow gauge railway (ABS 2005a; Symon 2004).

For the northern line, a bill was introduced to the South Australian Parliament in 1883 to authorise its construction. Construction of a railway between Darwin and Pine Creek subsequently commenced, and the railway became operational on 1 October 1889. The line was officially closed in 1981, as it had never been profitable (ABS 1985; DIRD 2014). The Commonwealth Government undertook to complete the Adelaide to Darwin railway when South Australia transferred administration of the Northern Territory to the Commonwealth under the *Northern Territory Acceptance Act 1910* (Cwlth), but did not commit to any date for construction.

Project selection

In 1978, the Northern Territory achieved self-government and 'the campaign [by the NT Government] began in earnest to get the Australian Government to honour its … promise' (AA Rail nd).

Throughout the 1980s and 1990s there were a number of investigations into the railway's feasibility. For instance:

- three studies in the early 1980s concluded that the project was not economically viable at that time
- three subsequent studies concluded that the project would only be viable under certain conditions
- one study by the Bureau of Transport and Regional Economics concluded that the economic viability of the project was marginal (that is, whether or not the net present value was positive depended on the discount rate used).

Further, a financial analysis was conducted in 1986 that concluded the railway would cover its operating and equipment costs but not yield sufficient revenue to recoup construction costs in its first 12 years of operation. Thus:

> … the railway will be totally unattractive as a strictly commercial venture over the period covering construction and the first 12 years of operation, since the cashflow will be negative. The railway will turn substantially cash-positive over the ensuing 8 years, but the internal rate of return (approximately 2% p.a.) will be unattractive in itself to potential equity investors. (NTREG 1986, p. 134)

A 1995 study departed from these previous reports by changing the scope of the Alice Springs to Darwin Railway. In this study, it was assumed that the existing section of the rail link between Tarcoola and Alice Springs would be transferred at no cost to the private party building and operating the link to Darwin — that is, the existing railway was to be an additional form of government contribution. This study found that the benefits of the new investment did not outweigh the costs (with a benefit–cost ratio of 0.78 for the base case scenario). However, the study noted:

> … the need to consider wider national and public sector costs and benefits which may not be captured by the cost–benefit appraisal. The key factors which need to be taken into account are the symbolic importance attached to completing the line in terms of commitment to greater integration with Asia and the unquantifiable effects of the railway on regional development (The Committee on Darwin 1995, p. ii).

In 1995, a memorandum of understanding was signed between the Northern Territory and South Australian governments to establish the basis of their cooperation to create the railway, 'based on mutual self-interest in seeing the establishment of a trans-continental trade route' (AA Rail nd).

Delivery model

The project was delivered under a build-own-operate-transfer contract (Clayton Utz 2011), with a lease granted for 50 years. At the end of the concession, the railway will be transferred to the NT and SA Governments.

In 1997, the AustralAsia Railway Corporation was established by the two governments as a government trading enterprise tasked with awarding the tender and holding the titles to the land for railway construction (IFC 2013). The contract was awarded to the Asia Pacific Transport Consortium in June 1999, comprised of Kellogg Brown and Boot, John Holland Group, Barclay Mowlem, Macmahon Holdings, and the Australian Railroad Group.

The contract included:

- construction of a new 1420 kilometre stretch of standard gauge line between Alice Springs and Darwin
- operation and maintenance of the existing 830 kilometre line between Tarcoola (north of Adelaide) and Alice Springs
- integration of the completed railway line with Darwin's East Arm Port (the $100 million stage one opened in 2000) which includes a railway embankment and intermodal container terminal
- operation of the completed transcontinental railway line from Tarcoola through to Darwin for 50 years (Australasia Railway Corporation nd).

Construction began in July 2001 and was completed in September 2003, with the railway becoming operational in 2004.

Funding

The railway was to be funded by revenue from its operation. Further, a $428 million works contribution was provided by the public sector as follows. The Australian Government provided $191.4 million and the NT and SA governments contributed the remainder (Webb 2009).

The Adelaide to Darwin railway transports both passengers and freight.

For passengers, current adult fares for a one way trip from Adelaide to Darwin are $889 (red service), $2099 (gold service), and $3469 (platinum service). Pensioner, student, backpacker, and low season discounts apply.

Current freight charges are not available. Initially, there was criticism that the railway could not compete on price with seaborne freight. A 2005 trial found that the cost of using the rail line was between $2100 and $2500 for a single container, compared to a total of $750 to ship the container by sea from Shanghai to Adelaide (Wiese Bockman 2005).

Financing

The cost was $1.3 billion (IA 2014). This amount was financed as follows:

- equity of $238 million provided by the consortium
- senior debt of $491 million, consisting of a $150 million five-year 'bullet' loan, a $261 million 12-year loan, and an $80 million 12-year 'rolling stock' loan
- subordinated debt of $112 million, including a tier one mezzanine loan of $86 million and a tier two mezzanine loan of $26 million
- a government loan of $50 million (AA Rail nd; IFC 2013; Webb 2009).

The balance was provided by government grants, as outlined earlier. In January 2001, another $79 million in standby funding was provided by the three governments on commercial terms (AA Rail nd).

According to Symon (2004, p. 10), the gearing of the project was fairly low, and:

> … banks were also comforted by the concession provided to [the private sponsor] at generous terms by the Commonwealth of the existing Tarcoola to Alice Springs railway. This means that the project automatically gained the existing rail traffic to Alice Springs to support repayment in addition to the expected shift of road-hauled transport to the railway.

The assumptions underlying the financing structure were that the railway needed to capture approximately 45 per cent of the freight market share to break even and repay the senior debt within 12 years of operation (IFC 2013).

Financial close was reached on 21 April 2001 (IA 2014).

Outcomes

The project 'was lauded for efficient and speedy construction' (IFC 2013, p. 56). The time from financial close in April 2001 to completion of construction in September 2003 was 29 months, at an average construction cost of $800 000 per kilometre (Laird, sub. 3), meaning that it was within budget and five months ahead of schedule (Symon 2004).

In development of the project, the volume of freight that could potentially be captured by a railway was subject to debate, as road, air and sea transport could all be viable substitutes. In particular, there were concerns about whether a railway would be able to attract patronage from shippers of lower value or less time-sensitive cargoes (Trace 1997).

However, when the construction of the railway was in in progress, some studies took a positive view of the railway's ability to attract domestic and international freight, even without secured customer arrangements (IFC 2013). For example, FreightLink (the rail operator) anticipated quickly gaining 350 000 tonnes per year of general freight and fuel transported along this central corridor, particularly given that, as the new operator of the Tarcoola to Alice Springs railway, FreightLink automatically gained the existing traffic on that route (Symon 2004).

As at 2004, the railway had contracts for 170 000 tonnes of freight per year. The target was to achieve 800 000 tonnes per year of freight by the end of the first three to four years of operation (Symon 2004). However, during these first three years, the railway was unable to secure sufficient customers and did not make an operating profit. By October 2006, FreightLink was unable to service the senior debt. In December 2006, FreightLink entered into a standstill agreement with the senior debt holders in the hopes of restructuring or refinancing the business.

After several years of negotiation, the assets and business were sold in 2010 to Genesee and Wyoming Incorporated, a New York Stock Exchange-listed corporation that operates railways in the United States, Canada and the Netherlands. The sale price was $334 million, which was insufficient to pay FreightLink's total remaining liabilities (which were about $900 million).

The International Finance Corporation (2013, p. 44) criticised the project for being 'financed on [a] limited recourse basis and had significant commercial debt; in hindsight, the lenders clearly underestimated the risks and funded an unbankable project.'

Currently, there are five or more freight trains every week, ten bulk trains (four Bootu Creek Mine Manganese and six iron ore), as well as trains carrying piggyback oil tanker trucks (Laird, sub. 3). The line now carries about 800 000 tonnes of intermodal freight and 70 000 tonnes of bulk liquids between Adelaide and Darwin each year. Passenger trains run weekly or biweekly, depending on whether it is high or low season.

B.3 Utilities

Case study 7: Adelaide Desalination Plant, South Australia

Background

The Adelaide Desalination Plant is a seawater desalination plant at Lonsdale, south of Adelaide, that uses a technique known as reverse osmosis.

Adelaide's other main sources of water are dams in the Mount Lofty Ranges catchment and diversions from the Murray River. Adelaide has sourced water from the Murray River for many years. On average, the Murray River has provided about 40 per cent of Adelaide's mains water, and in a drought year this has been as high as 90 per cent.

In recent drought years, extra seasonal allocations were purchased from irrigators to meet urban demand shortfalls. During 2008-09, 106 gigalitres (GL) of temporary water was purchased for critical human needs, and a further 60 GL was purchased in 2009-10. In recent years, Adelaide's water consumption has averaged about 138 GL per year (South Australian Water Corporation 2013).

Project selection

In December 2007, the SA Government announced that a 50 GL per year seawater desalination plant would be constructed to provide additional water for Adelaide in preference to relying on rural–urban trade — that is, water purchased from the Murray-Darling Basin (PC 2011a).

However, the Australian Government wanted the capacity of the desalination plant to be doubled to 100 GL per year. It appears that this was at least partly motivated by the objective of reducing Adelaide's dependence on the Murray River, thereby securing environmental water to help meet the anticipated requirements of the Murray-Darling Basin Plan (PC 2011a). The SA Government agreed to this (discussed later).

Delivery model

The project was delivered through a design-build-operate-maintain contract. A shortlist of bidders was selected as part of the Early Contractor Involvement process (SA Government nd).

A competitive procurement process was conducted. Expressions of interest were advertised in July 2008 and received in August 2008. Two tenderers were shortlisted and invited to submit detailed proposals (South Australian Water Corporation 2010). SA Water evaluated the proposals and selected a preferred bidder (AdelaideAqua 2009).

In March 2009, the contract was awarded to AdelaideAqua — a consortium comprising McConnell Dowell Constructors, Abigroup Contractors, ACCIONA Aqua and TRILITY (AdelaideAqua 2009).

Construction commenced in 2009 and was completed in 2012. The contractor will be responsible for the operation of the desalination plant for up to 20 years after the plant becomes operational — that is, until June 2031. The plant remains owned by SA Water.

Funding

The operating cost for running the plant at full capacity will be $130 million per year, or $1.30 per kilolitre (kL). Should the plant be shut down, the annual cost will be $20 million, and will reduce further should the shutdown continue beyond 12 months.

The desalination plant is being funded through user charges and availability payments. The environmental impact assessment published by the SA Government (nd, p. 7) stated:

> The cost of the proposed development [the desalination plant] will result in increases in water prices to customers. In December 2007, the Government announced that a new water pricing structure would be introduced. In addition, the new structure includes a new, third-tier targeting residential customers who use in excess of 520 kilolitres per annum. The new pricing structure is designed both to raise sufficient revenue to meet the costs of the water security initiatives discussed above [including the desalination plant] and also to provide an incentive for residential customers to minimise their discretionary use of water.

On average, prices increased 26 per cent from July 2011 (PC 2011a).

Financing

The plant was built at a cost of $1.83 billion (PC 2011a), financed from a combination of SA Government and Australian Government contributions, as follows:

- The SA Government made $1274 million in contributions, and agreed to cover any additional costs incurred to complete the project.
- The Australian Government provided a grant of $328 million, on certain conditions (discussed later) (SCFFR 2011).

Outcomes

The project was completed on time and within budget.

The conditions of the grant provided by the Australian Government distorted the SA Government's investment decision (PC 2011a). The Australian Government's grant of $328 million was provided through the National Urban Water and Desalination Plan, most of which was on the condition that the plant's capacity be expanded from 50 to 100 GL per year.

The Commission's inquiry into urban water concluded that purchasing equivalent capacity from the Murray-Darling Basin would have been a cheaper option than building the desalination plant. Purchasing 105 GL of high reliability Victorian Murray entitlements from the Murray would have cost about $190 million, with operating costs between $0.20 and $0.30 per kL. By contrast, the cost of the desalination plant was $1.83 billion, with operating costs of $1.30 per kL (at full capacity) (PC 2011a).

The Commission concluded, on the limited information available to it, that opting for purchasing water entitlements instead of proceeding with the desalination plant would have:

- generated capital savings of as much as $1.6 billion
- produced substantial savings in operating costs
- significantly increased flexibility, given the option of selling surplus allocations to irrigators in some years (PC 2011a).

B.4 Social infrastructure

Case study 8: Darent Valley Hospital, United Kingdom

Background

The 400 bed Dartford and Gravesham Hospital in the Darent Valley was the first major hospital contract to be privately financed in the United Kingdom (DVH UK nd).

Project selection

The project was proposed to enable the relocation of health services previously provided on three relatively old sites in need of major maintenance (NAO UK 1999). In compliance with revised health care standards, the new hospital was constructed with 75 less beds than the hospitals it was designed to replace. However, at the time, the decision to reduce the number of beds was criticised by a number of medical professionals (NAO UK 1999).

Delivery model

In the United Kingdom, privately financed hospitals are paid for by 'trusts', which are National Health Service (NHS) providers of acute and specialised care, set up as corporate bodies (that is, separate from the Secretary of State) and responsible for a particular geographic area (Hellowell and Pollock 2009).

The delivery model was a design-build-finance-maintain model. That is, under the contract (awarded in 1997), Pentland was required to design, construct and finance the hospital, and then to maintain it and provide support services for a period of up to 60 years**.** The clinical services in the hospital were provided by the relevant NHS Trust (NAO UK 1999).

The tender process was criticised by the National Audit Office for being uncompetitive. There were four initial bids, but the NHS Trust only invited Pentland and United Healthcare to make final bids, judging that the extra costs and time from including a third bidder would outweigh the potential benefits of increased competition. However, only Pentland submitted a final bid; United Healthcare argued that the short timeframe imposed on the tender process by the NHS Trust (22 months to submit the final bid) was infeasible. The NHS Trust sought to address this absence of competition by benchmarking most of Pentland's costs. However, this meant the contract terms arose from a period of negotiation over 12 months, rather than from competitive bidding (NAO UK 1999).

Funding

The hospital is funded through an availability payment, or 'unitary charge' (Hellowell and Pollock 2009) of up to £1.32 million per month (in 1996 prices).

The initial business case anticipated that the new hospital might achieve savings or be revenue neutral. However, when Pentland's final bid was received and the full business case was approved, it was clear that additional funding of £4.7 million a year would be needed because:

- the costs of the new hospital increased, partly due to additional requirements imposed by the NHS Trust
- the profile of payments made by the NHS Trust under the private finance initiative contract would be greater over the first 25 years of the 60 year project (and less over the last 35 years) than under an equivalent public sector procurement
  - one contribution to this was a subsequent determination that the NHS Trust should be required to pay for the land over the first 25 years of the contract
- the full business case had not initially reflected the £1.2 million reduction in income the NHS Trust would experience from transferring ear, nose and throat services to another hospital.

The NHS Trust and Pentland agreed to make annual savings of £0.7 million and, as a consequence, the additional financial support the NHS Trust was required to pay was £4.0 million a year.

Since then, the NHS system has been reformed, and there is now the requirement for a funding ceiling to be developed and agreed to for each project by the NHS Trust and the local Health Authority before a project can proceed to avoid cost overruns of a project impacting on other health services in a district (NAO UK 1999).

Financing

The required £133.5 million in finance was raised as follows:

- £98.2 million of bank loans at 6.1 per cent interest
- £5.7 million, comprised of subordinated debt (85 per cent) and equity (15 per cent), raised from the contractors at an estimated 17 per cent interest rate
- £7.7 million, comprised of subordinated debt (85 per cent) and equity capital (15 per cent) from external investors at an estimated 17 per cent interest rate. These external investors would be repaid if the contract was terminated
- £21.9 million in cash from land sales (NAO UK 1999).

The contract was refinanced in March 2003. The NHS Trust received £11.7 million in refinancing benefits in exchange for the Trust accepting some additional risks. Pentland's shareholders benefited from the refinancing — after investing £17 million in the project, they received £5 million in present value terms within three years of the hospital coming into use. This is a 60 per cent increase on the returns to equity originally anticipated (NAO UK 2005a, 2006).

Outcomes

The NHS Trust received the new hospital two months early and for the price agreed in the contract. Pentland has successfully provided janitorial services with only occasional lapses (which reduced the unitary charge they received).

However, the contract has been criticised for:

- the unanticipated additional funding requirement of £4 million per year, which will have implications for other health services in the district
- incorrect use of the public sector comparator, which reduced savings by £12 million
- advisory costs exceeding estimates by 700 per cent (CPAHC 1999).

Guidance was subsequently issued, which was intended to address many of the issues that arose in this contract (NAO UK 1999).

In 2012, seven NHS Trusts announced that they were experiencing difficulties in meeting payments required of them under private finance contracts. The UK Department of Health announced a £1.5 billion 'stability fund' that will provide grants to trusts to enable them to meet private finance repayments, and some trusts have been taken over by other NHS Trusts or private parties (Campbell 2012, 2013; NHS UK 2014).

Case study 9: Wiri prison, New Zealand

Background

The Wiri prison is a 960 bed men's prison facility at Wiri, Auckland, New Zealand, that is currently being constructed.

Project selection

When the project was announced, the Wiri prison was intended to respond to an increased requirement for prison places.

However, despite subsequent forecasts predicting that New Zealand's prison population would decrease, the NZ Government decided to proceed with the project on the basis that the new prison could be used to provide replacement capacity and allow 683 ageing prisoner places to be decommissioned.

The prison will have 960 beds and employ 300 people.

Delivery model

The contract is a design-build-finance-operate-maintain model.

The project was opened to tender at the end of 2010. SecureFuture (comprised of Serco Group, John Laing, InfraRed, and the Accident Compensation Corporation) won preferred bidder status in March 2012, beating bids from G4S and Leighton Contractors (SecureFuture 2013). The Department of Corrections awarded the contract to them in September 2012.

The project is for a concession of 25 years. The maximum potential cost of the project has been capped at $900 million (NZ Department of Corrections nd).

Construction began in 2012 and the new prison is expected to open in 2015. According to the Department of Corrections, the PPP procurement model will be 17 per cent cheaper than traditional procurement (Department of Corrections 2010).

Funding

The project will be funded by an availability payment of $67.6 million in 2015-16, and $51.3 million in 2016-17, and subsequent years. However, from 2016-17 onwards, the costs of proceeding with Wiri exceed the funding set aside in the operating contingency, but this overrun will be offset through savings from closing the other prisons that Wiri is intended to replace (NZ Treasury 2012).

The prison operator will receive a financial incentive if it performs better than public sector run facilities at reducing the recidivism rate (the proportion of prisoners who return to prison within 24 months). The contractor's performance will be measured against a suite of indicators such as the occurrence of incidents such as escapes, assaults and self-harm (NZ Treasury 2012).

Financing

The finance required was NZ$402 million, as follows:

- NZ$67 million in equity provided by the consortium. Each consortium partner supplied approximately 30 per cent of the equity, with the exception of Serco, which supplied 10 per cent (Infrastructure Journal 2012)
- NZ$335 million in debt, provided as a construction facility for the three year construction period, after which a $335 million term loan with a four-year tenor will commence.

More than 80 per cent of the total budget is for construction and site works, with 6 per cent for the fitout, and 9 per cent for design, professional fees, and development consents. Approximately 640 workers will be employed during construction (sustaining an annual wage bill of NZ$41.8 million). The operational cost (comprised of prisoner, facility and maintenance costs) will be NZ$17.6 million (Department of Corrections 2010).

Outcomes

As at April 2014, construction was running on schedule, and work is due to be completed in May 2015 (SecureFuture 2014).

B.5 Urban renewal

Case study 10: Denver station redevelopment, United States

Background

The Denver Union Station project is intended to renovate a historic building and create a multi-modal transport hub and urban renewal precinct, and allow redevelopment of the station, which was built in the late 19th Century (Langley 2013). The station will connect the precinct to nearby sports stadia, the entertainment precinct, CBD, convention centre and the Platte River open space district. There is also a commercial and residential development program that will develop at least 125 400 square metres of retail, residential, hotel and commercial office space (Langley 2013).

Project selection

The Denver Union Station redevelopment project is part of FasTracks, a US$7.4 billion project comprised of:

- 197 kilometres of rail lines serving six new commuter and light rail lines and three extensions to existing light rail lines
- 29 kilometres of bus rapid transit lines
- 57 new transit stations
- 21 000 commuter car parking spaces
- redevelopment of the historic Denver Union Station (at a cost of almost US$500 million) (Langley 2013).

The FasTracks project was designed to aid Denver's transition to a public transport city, given its low population density (Langley 2013). The FasTracks project was developed by the Denver Regional Transportation Authority. In April 2004, the Regional Transportation District Board of Directors approved a resolution adopting the Fastracks plan and declaring a commitment to hold a ballot on the FasTracks plan in the November 2004 general election. At the election, voters supported the FasTracks plan and a 0.4 per cent sales tax increase to fund a large proportion of the project (RTD 2004).

Delivery model

The Denver Union Station Project Authority is a dedicated special purpose public transport and renewal authority that will develop the public infrastructure and public domain components within the Denver Union Station precinct, and hand them over to existing operating agencies upon their completion. The Denver Union Station redevelopment was undertaken through a design and build contract with the Kiewit Western Company and AECOM (Langley 2013).

Two private sector property development consortia are developing five parcels of land within the 16 hectare improvement district. These private sector partners serve as master developers of the private components of the precinct and manage the Union Station Neighbourhood Company under a design-build-operate contract (Langley 2013).

Funding

FasTracks was originally intended to cost $4.9 billion, which would be funded through a 0.4 per cent sales tax increase (which would have provided 50 per cent of the necessary funding), federal government grants (25 per cent) and other sources (25 per cent). A portion of the sales tax revenue, along with other government funds, was dedicated to the construction of transportation improvements at the Denver Union Station (Federal Railroad Administration 2009).

However, FasTracks experienced higher-than-expected construction material costs and decreases in revenue from sales tax. Between 2004 and 2008, the cost estimates for FasTracks climbed from $4.9 to $7.9 billion (since revised down to $7.4 billion). After considering a range of options, the Denver Regional Transportation District decided more funding was essential. Voters approved a small 'bailout' tax increase, the project scope was narrowed, and some under-used existing transport services were discontinued (ISC 2010).

More specifically, for the Denver Union Station redevelopment, a number of different sources of funding contributed to the US$500 million project cost.

The following federal and state government grants ($183 million) were obtained:

- US$9.3 million in Federal Transit Administration grants
- US$45.3 million in Federal Highway Administration grants (projects of national or regional significance)
- US$28.4 million of US Recovery and Reinvestment Act stimulus funds
- US$40.5 million in cash contributions from the Denver Transit Authority from revenues from the sales tax approved by voters for the project
- an estimated US$40.0 million in proceeds from sale of land by the Denver Transit Authority
- US$17.3 million from the Colorado Department of Transportation
- US$2.5 million from the Denver Regional Council of Governments (DUSPA 2011).

The Denver Union Station Project Authority will be responsible for repaying the two federal loans ($300 million, discussed below) used to finance the project with revenue sourced from increased fares, and taxation (DUSPA 2011). Sources of tax revenue include:

- increases in property values within the tax increment funding district
- tax revenues from special taxing districts established for the project
- a lodgers' tax on hotels.

This tax revenue is estimated to total US$135 million over 30 years, which will comprise about one-third of the required funding for the Denver Union Station. If there is a shortfall in tax revenues that causes the Denver Union Station Project Authority to be unable to repay the federal loans, the City and County of Denver has provided the Denver Union Station Project Authority with loan guarantees of up to $8 million (Langley 2013).

Financing

The total contract value was almost US$500 million, and this was publicly financed through a mixture of government grants (discussed above) and loans.

There were two sources of federal loans:

- a US$155 million loan was provided through the Railroad Rehabilitation and Improvement Financing Program, administered through the Federal Railroad Administration
- the US Federal Department of Transport approved a US$145 million TIFIA loan (DUSPA 2011).

Outcomes

As discussed earlier, the FasTracks program experienced significant cost increases. The level of design used in the cost estimates was at a conceptual level when it was voted on in 2004 (due to fiscal and regulatory constraints), and construction material costs substantially increased. In addition to these increased costs, sales tax revenue (a key component of the project's funding) declined over this period. Current forecast collections through 2035 are likely to be 31 per cent lower than the original 2004 forecasts (RTD 2009). As at 2012, tax revenues were predicted to be $8.0 billion (revised down from $13.7 billion) with $7.4 billion in capital costs (revised up from $4.7 billion). As a result of these revised forecasts, the project deadline had to be extended from 2017 to 2022 and beyond (RTD 2012).

However, progress on the Denver Union Station redevelopment itself has been relatively smooth. The commercial development has progressed ahead of schedule. As at June 2013, commercial development completed or under construction exceeded the forecasts in the initial feasibility study by 6 per cent, and approximately half of the residential dwellings estimated for the same year have already been completed or are under construction (as of June 2013). Further, there has been no need to tap into the City's loan guarantee or the federal government's credit assistance program (Langley 2013). The Denver Union Station is scheduled to open in May 2014.

C Cost–benefit analysis

This appendix provides an overview of the application of cost–benefit analysis (CBA) to infrastructure projects. It contains a brief description of the nature of CBA and key stages in the CBA process. Some practical considerations and commonly used tools are also discussed. More detailed guidance on the conduct of CBA can be found in the Australian Government's *Handbook of Cost–Benefit Analysis* and Boardman et al.'s *Cost–Benefit Analysis: Concepts and Practice* (Boardman et al. 2011; DFA 2006a).

C.1 What is cost–benefit analysis?

CBA is a method used to estimate the net benefit of a proposed project (or policy). It does this by valuing the benefits of the project according to the willingness of individuals to pay for them, and costs according to the best alternative forgone (often called the 'opportunity cost'). The net benefit is calculated by subtracting the total costs from the total benefits.

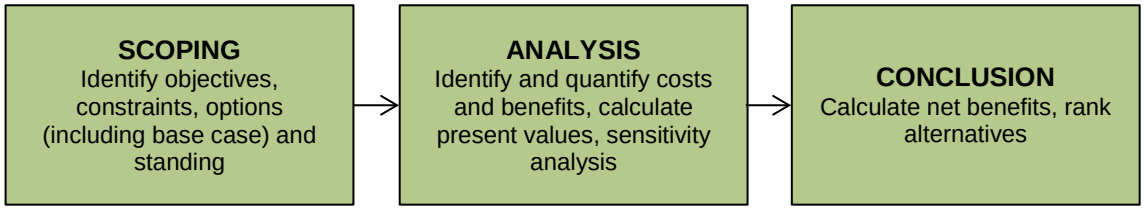
A financial analysis only takes into account the market price (and total revenue) of supplying the service relative to its cost of production. CBA takes into account the value of the service to consumers beyond the price paid, and the cost beyond what is paid to the factors of production. A CBA should also take into account any externalities — other costs and benefits — that fall on people outside those involved in the transaction (DFA 2006b).

A CBA can be used to ascertain whether an individual project will make the community better off overall compared to a 'no project' or 'base case' scenario. It can also be used to evaluate how several alternative projects compare with each other, or determine whether certain investments should be undertaken or continued. CBA allows information to be analysed in a logical and consistent way, and encourages decision makers to take into consideration all costs and benefits of a project, rather than making decisions based on selected impacts only (DFA 2006a). In this way, the judicious and rigorous application of CBA supports evidence-based policy and decision making by governments (Deloitte 2012).

C.2 The cost–benefit analysis process

The CBA process involves a number of key stages (figure C.1). This section provides a brief summary of these stages.

Figure C.1 **Key stages of the CBA process**



Sources: Adapted from Australian Government (2007); Boardman et al. (2011); Deloitte (2012); Department of Finance and Administration (2006b).

Scoping

It is first necessary to identify and define the scope of the CBA. This involves a number of steps:

- determining objectives
- identifying constraints
- identifying options, including the 'base case'
- deciding 'standing'.

Determining objectives

The CBA should outline the nature of the problem to be addressed and the objectives of the infrastructure project. The objectives should be defined in terms of the market failures that warrant government intervention, and should be specific enough so as to allow an assessment of whether, or to what extent, they would be met by the project (DFA 2006b).

Identify constraints

Any constraints on achieving the objectives should also be identified. This includes financial, distributional, institutional, managerial, environmental and political constraints (DFA 2006b). Some of these constraints may be fixed, but others may be flexible over a longer time period.

Identifying options, including the 'base case'

The CBA should clearly identify the set of options that would achieve the specified objective, subject to any stated constraints. This could include investment in new infrastructure, as well as different or better use of existing assets. One of these options should be the 'base case', in which current arrangements are maintained. Each option should also be screened to ensure its viability. There should be consideration of the outcomes expected from each proposal and how these outcomes relate to the stated objectives.

Deciding 'standing'

It is also necessary to identify whose costs and benefits will be taken into account. For example, a CBA could be restricted to the interests of a particular State or Territory or to people residing in Australia, in which case costs and benefits to individuals outside those groups should be ignored (Australian Government 2007).

Analysis

At the analysis stage of the CBA process, the first step is to identify the costs and benefits associated with each option. The types and nature of these will depend on the project, but should include both market and non-market impacts.

The next step involves quantifying these costs and benefits. In most cases, the valuation of costs and benefits will need to be discounted to account for when they accrue, and tested for risk sensitivity. Section C.3 discusses some practical considerations and commonly used tools for identifying and quantifying costs and benefits. In some cases, certain costs and benefits may not be able to be quantified. These should be made explicit and described in the CBA.

Results

At the last stage of a CBA, the net benefit of each option is calculated by subtracting the total costs from the total benefits. Under certain assumptions, the alternatives may be ranked against each other, usually by reference to the size of the net benefit.

C.3 Cost–benefit analysis in practice

In practice, the conduct of a CBA is rarely straightforward. This section gives a brief overview of some of the key considerations and issues faced by CBA practitioners, as well as some of the commonly used principles and tools used to resolve or address them.

Characterising the base case

As discussed above, one of the options identified as part of the scoping process should be the base case scenario in which current arrangements are maintained. It is important that the base case be clearly defined, in order to enable the incremental impacts of each investment option to be assessed. Often, the base case will be a 'do nothing' option, but this is not always the case. For example, in the case of road infrastructure, routine upkeep and minor upgrades will generally occur even if there is no investment in new infrastructure. Accordingly, the base case may be defined as a 'do minimum' option, rather than 'do nothing'. In other instances, the base case may involve the private sector eventually developing some form of alternative infrastructure solution.

Because CBA compares the expected outcomes from each option, the characterisation of the base case should facilitate an appraisal of what would happen with and without the investment. A common mistake is to equate the base case with the situation 'before investment'; instead, the base case should correspond to the 'future without government investment' scenario (DFA 2006a).

Identifying costs and benefits

The scope of a CBA should include both market and non-market benefits and costs. In particular, the benefits identified should include those that are easily valued in monetary terms (such as revenue or cost savings), as well as those which are not as easily monetised (such as reduced travel time for commuters from improved transport infrastructure). The costs associated with infrastructure projects typically include capital, operating and maintenance costs. In estimating such costs and benefits, it is important to avoid double counting. Box C.1 outlines some technical considerations regarding what should and should not be included.

Box C.1 **What counts as a cost or benefit?**

Transfers to domestic consumers or producers should not be counted as part of the costs or benefits of a project. A transfer occurs when benefits or costs are redistributed from one party to another. Transfers should not be counted in the cost–benefit analysis process because they represent a redistribution of benefits and costs and could result in double counting.

Secondary effects (that is, effects in secondary markets) should be treated with care, so as to avoid double counting. Generally, secondary effects should be ignored. For example, suppose a road upgrade results in travel time savings, which in turn increases the value of real estate in certain areas. If both benefits are counted, the value of reduced travel time will have been accounted for twice. However, where there are distortions in the secondary market, any costs or benefits resulting directly from changes in the size of the distortion should be counted. For example, if new rail infrastructure eases road congestion, the benefit of reduced congestion should be included provided there is no cost-reflective congestion charge (the lack of such a charge is a distortion).

Sunk costs should not be counted as part of the costs of a project. A sunk cost is a cost that has already been incurred and is therefore no longer subject to decision. Because a cost–benefit analysis is forward-looking and concerned with future changes to welfare, past decisions (including sunk costs) are irrelevant and should not be included.

Interest payments on capital should be covered by the discount rate or the internal rate of return. Hence, to avoid double counting, interest payments should not be included as a cost or benefit.

Sources: Boardman et al. (2011); DFA (2006a).

Quantifying costs and benefits

Generally, the value of benefits is assessed by reference to what individuals would be willing to pay for them. The touchstone for assessing the value of costs is the concept of 'opportunity cost', which is the value of the best forgone alternative. For example, where a certain resource is used in the construction of an infrastructure project, the opportunity cost of that resource is equal to the benefits forgone by not using the resource for the next best alternative purpose.

Costs and benefits should be measured at the margin — that is, the additional cost or benefit from undertaking the infrastructure project. For example, if a new rail track duplicates part of the existing network, its benefits should be measured in accordance with how much individuals are willing to pay for the *additional* track.

In practice, the value of costs and benefits may be difficult to express in dollar terms, especially when the source of the cost or benefit is not traded in markets. One

example of this is when improvements to transport infrastructure result in agglomeration economies, whereby a reduction in the effective economic distance between areas results in efficiency gains (such as those arising from the increased mobility of human capital). These benefits are often difficult to value because agglomeration is usually accompanied by numerous spillover effects that must also be accounted for, and may not be fully captured by measures of private willingness to pay. For example, the gross benefits of agglomeration in one area (say, a city) may be offset by losses arising from changes in settlement patterns and agglomeration in other areas (say, a nearby town) if resources are redirected from one to the other (Ergas and Robson 2009).

In the case of public infrastructure projects, the quantification of costs and benefits often involves the use of economic modelling. For example, levels of demand are usually critical to the viability of infrastructure projects, so demand forecasting (including an estimation of demand by year, date and user type) is usually an essential part of the CBA. In the case of transport infrastructure, CBAs often incorporate detailed traffic models to estimate congestion effects, time savings and impacts on capacity (Brisbane City Council 2007; NAO UK 2001b). Boardman et al. (2011) contains a detailed discussion of other quantification methods.

In some cases it may not be appropriate or possible to assign dollar values to a cost or benefit. For example, Infrastructure Australia generally views as relevant, but does not monetise, impacts relating to social amenity, social cohesion, heritage or culture, and landscape (IA 2013b). In these situations, the cost or benefit should be quantified so far as possible, even if not in monetary terms. When quantification is not possible, the CBA should include all relevant information that might affect the final decision, and should make explicit allowance for the costs and benefits that cannot be valued (Australian Government 2007). Specifically, the CBA should report all costs and benefits within the following three categories:

- monetised
- quantified, but not monetised
- qualitative, but not quantified or monetised.

Discount rates and inflation

The impacts of infrastructure projects are spread over many years, which has implications for a dollar valuation of costs and benefits. In particular, a dollar today is generally worth more than a dollar in the future because of inflation, interest rates and individual preferences.

One way to compare and aggregate costs and benefits that accrue at different times is to calculate their present value, which expresses their value in today's dollars (Harrison 2010). This involves setting a discount rate, which is used to convert the value of all costs and benefits into today's dollars. The Australian Government's *Handbook of Cost–Benefit Analysis* contains a detailed discussion on setting the discount rate, and a number of government publications prescribe discount rates to be used for particular types of project (DTF (Vic) 2013; IA 2008b; NSW Treasury 2007).

Care should be taken to ensure that real and nominal values are used consistently throughout the analysis. Normally, future costs and benefits are expressed in real rather than nominal terms, and so a real discount rate should also be used.

Treatment of risk and uncertainty

There will inevitably be some risk and uncertainty associated with the costs and benefits of a project. This includes uncertainty relating to whether or not a cost or benefit will be realised, as well as the magnitude or nature of the cost or benefit. Infrastructure projects commonly face risks in relation to demand, construction and operation.

At the most basic level, CBA should account for uncertainty by reporting and using expected values (that is, a probability-weighted average of all possible values) for each variable, in order to reflect the expected outcomes for the project. If expected values alone are used, the discount rate must also be adjusted for risk. Alternatively, a CBA could use certainty-equivalent values of costs and benefits and a risk-free discount rate. However, these adjustments do not capture how sensitive the predicted net benefits are to changes in those variables and/or assumptions.

Sensitivity analysis allows decision makers to understand how changes to different variables and assumptions affect the overall costs and benefits of a project. It also helps to identify which factors are critical to the success of a project or policy (Australian Government 2007). Box C.2 summarises some common approaches to sensitivity analysis, depending on the extent and nature of the risk or uncertainty. If the level of net benefits is very sensitive to changes in variables or parameter assumptions, this indicates that there may be significant risks associated with the project.

Box C.2 **Common approaches to sensitivity analysis**

Depending on the nature and extent of the risk and uncertainty associated with a project, different approaches to sensitivity analysis may be used.

- *Worst-case analysis*: the first step is to construct a hypothetical worst-case scenario by identifying the least favourable plausible outcome for each variable, and calculating the net benefit for the project using those values. If this value is positive, then the project yields a net benefit even with pessimistic assumptions and no further analysis is needed.
- *Partial sensitivity analysis*: if there are a small number of key variables, an analysis of how the net benefit is affected by changes in the most important variables may be sufficient. In order to allow the decision maker to make an informed judgment, the analysis should:
  - report the critical threshold for the variables, above or below which the project is likely to be justified or not justified
  - evaluate the likelihood of the variables falling above or below that threshold.
- *Full risk analysis*: When there are many uncertain variables, it may be necessary to undertake a full risk analysis (using, for example, Monte Carlo simulation). This involves assigning probabilities to the values of all key variables and estimating covariances for each pair of variables. A probability distribution of the net benefit of the project is then generated through random sampling of the values of the variables. This provides a comprehensive analysis of the potential variability of the project.

The cost-benefit analysis may also report P10, P50 and/or P90 cost estimates, which refer to the probability that costs will fall below a particular value. For example, a P50 estimate of $10 million indicates that the analyst has 50 per cent confidence that project costs will not exceed $10 million.

Sources: Australian Government (2007); DFA (2006a).

In many cases, better information about the costs and benefits of a project may become available over time or with further investigation. In recognition of this, a CBA may incorporate a 'real options' approach — for example, to ascertain whether it is preferable to proceed with an investment now or undertake some preliminary actions that would allow the investment decision to be delayed in order to take advantage of any forthcoming information.

Optimism bias

Optimism bias occurs when overly favourable estimates of net benefits are cast as the most likely or mean estimates. This could occur as a result of overestimating future benefits (often linked to an unrealistically high estimate of the annual rate of growth of benefits) or underestimating future costs (often linked to excluding relevant costs) (DFA 2006a). Optimism bias is an endemic problem associated with CBA (DFA 2006a; UK Government 2011).

Several remedies have been suggested to counter optimism bias:

- sensitivity analysis, to test the robustness of outcomes to changes in variables or assumptions (as discussed above)
- a clear statement of the assumptions underpinning the analysis and reasons for those assumptions to increase the amount of information held by the decision maker, and reduce the likelihood of them being misled and allowing for an independent analysis of the results (DFA 2006a)
- reference class forecasting provides a point of comparison by examining the outcomes of comparable past projects (OECD/ITF 2013).

Distributional effects

Usually, costs and benefits are aggregated across individuals without regard to winners and losers from the policy. Governments and others may be concerned about how particular groups, such as low-income households or rural communities, are affected, and so may not think it appropriate to base decisions purely on a cost–benefit rule. Such distributional (or equity) concerns can be addressed in a CBA by separately presenting disaggregated results showing the effects on particular groups (Deloitte 2012). Decision makers can then make judgments about the need for any particular response to equity issues.

Choosing the appropriate decision rule

A number of decision rules may be used for comparing costs and benefits. Generally, the most appropriate is the 'net benefits' criterion — that is, options should be ranked by the size of its net benefit and a project should not be adopted unless it has a positive net benefit. Where projects are mutually exclusive, the highest ranked project should be chosen.

However, in certain circumstances, other measures may be useful.

- Where there is a budget constraint and projects are not mutually exclusive, it may be useful to calculate the *benefit–cost ratio* (calculated by dividing total benefits by total costs) of each project. This can help determine the set of projects with the greatest net benefit.
- When a project is the only alternative proposal to the status quo, it may also be useful to calculate the *internal rate of return*, as this provides an indicator of how sensitive the net benefit is to the discount rate (OECD/ITF 2013).

D Canada's corporate bond market

This appendix provides information on Canada's corporate bond market and a summary of factors that may have contributed to the current state of the market. The information does not represent a comparative study of the strengths and weaknesses of the Australian and Canadian bond markets, which is beyond the scope of this inquiry.

At the end of 2013, Canada's bond market had a total issuance of about C$2.5 trillion. This was made up of bonds issued by the federal, provincial and municipal governments, corporations, institutions, foreign debtors, and bonds issued as term securities.

The value of corporate bonds outstanding in 2013 was almost C$837 billion, representing about 33 per cent of the total bond market. This consisted of bonds issued by financial and non-financial corporations, and a relatively large proportion of these bonds were issued in foreign currencies (table D.1).

Table D.1 **Composition of the Canadian bond market**

Bonds outstanding at 31 December 2013

Bond issuer	*Canadian dollars*			*Other currency*[a]		
	$ millions	*% of funds*	*% of GDP*	*$ millions*	*% of funds*	*% of GDP*
Government of Canada	476 995	98	25.3	9 528	2	0.5
Provincial	498 511	79	26.5	134 838	21	7.2
Municipal	59 132	98	3.2	1 393	2	0.1
Financial corporation	248 528	57	13.2	188 763	43	10.0
Non-financial corporation	202 900	51	10.8	196 723	49	10.5
Institutional	5 647	100	0.3	-	-	-
Foreign debtor	56 976	100	3.0	-	-	-
Term securitisations[b]	468 732	100	24.9	-	-	-

[a] Other currencies are converted and presented in Canadian dollars. [b] Term securitisations include instruments issued under the National Housing Act insured mortgage-backed securities program, as well as other term securities issued by special purpose corporations. – nil or rounded to zero.

Sources: Bank of Canada (2014); Statistics Canada (2014).

D.1 Recent history of the Canadian bond market

Since the early 1980s, there has been a relative decrease in the use of indirect financing (bank loans) in Canada, which coincided with increased corporate reliance on bond financing (Calmès 2004; Witmer 2010). In part, this can be explained by historical market developments and subsequent regulatory responses.

During the 1970s, high inflation and nominal interest rates led to corporations increasing their use of bank debt. Greater uncertainty about inflation expectations provided a further disincentive for corporations and lenders to issue and accept long-term debt.[78] A recession in 1981-82 further contributed to a decline in long-term financing.

This trend was reversed in the early 1980s, as corporations rebalanced their financing portfolios in response to lower inflation, and sought to reduce their exposure to refinancing risk (Miville and Bernier 1999). Coinciding with this was an increase in bond issuance, partly driven by rising government debt, and a fall in bank mortgage lending. This impacted on bank profitability, and provided stimulus for reform to the banking system (Calmès 2004).

Banking sector reforms in 1987 permitted Canadian banks to invest in corporate securities and distribute government bonds. As an income-generating asset, bonds are a substitute to lending, and banks responded to the reforms by allocating part of their deposit base to corporate bonds. This reform was one of many factors that contributed to the trend towards bond financing (Calmès 2004; Freedman and Engert 2003).

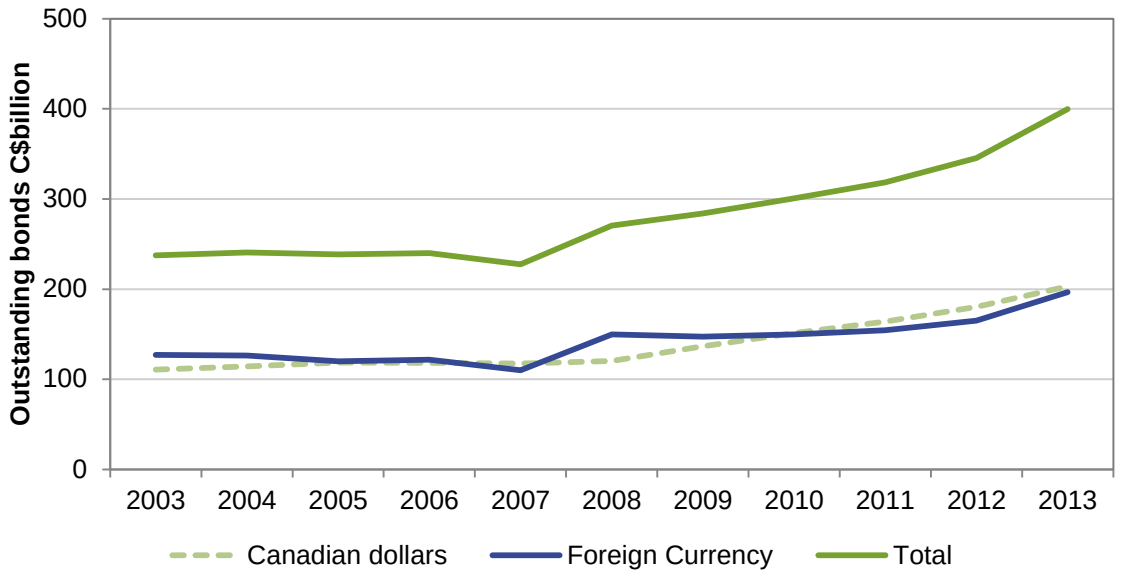
Subsequent reforms in 1992 permitted banks to offer in-house activities, such as portfolio management and investment advice. Permitting banks to offer in-house investment services facilitated investment in financial markets by their customers, and thereby opened up a new market to bonds issuers, which may have contributed to the growth of the corporate bond market in Canada (Calmès 2004).

In the 2000s, long-term bank debt finance was provided by European banks. However, following the global financial crisis, European banks exited the Canadian market, which resulted in an increase in the use of bond financing for infrastructure (PwC 2013b). Consequently, since 2008, the value of non-financial corporate bonds

[78] Uncertain inflation expectations pose a risk for both lenders and borrowers entering into long-term financing arrangements. A rise in inflation would be expected to increase nominal rates, and lower the real rate of return for lenders who have previously purchased long-term bonds. Decreases in inflation would be expected to lower the real rate of return for borrowers who have issued long-term bonds.

(which includes infrastructure bonds) outstanding has increased by almost 50 per cent (figure D.1).

Figure D.1 **Outstanding bonds**
Canadian non-financial corporations, 2003–2013[a]



[a] Foreign currency bonds are converted to Canadian dollars using same-day US exchange rates.

Source: Bank of Canada (2014).

D.2 Canadian bond market features

There are several features of Canadian financial markets that may also contribute to the depth and liquidity of the Canadian corporate bond market.

The Canadian corporate bond market has an investor base primarily made up of pension funds and life insurance companies. The majority of Canadian pension funds operate under a defined benefits scheme, with the result that funds under management tend to be less portable. Consequently, Canadian pension funds tend to have long-term liabilities (as do Canadian life insurance companies). The Office of the Infrastructure Coordinator (sub. 78, attach. M) observed that both groups of investors seek to match these long-term liabilities with long-term income generating assets, such as infrastructure bonds. Demand for corporate bonds is not limited to large pension funds and life insurance companies, and includes those with less than C$5 billion in assets under management.

On the supply side, owners of long-lived assets (such as infrastructure) often prefer to issue long-tenor bonds due to a lack of availability of long-term bank finance.

Canadian banks have not historically demonstrated an appetite for longer tenor debt. Prior to the global financial crisis, European banks were particularly active in the Canadian market, and were willing to provide long-term debt (with tenors up to 30 years) to infrastructure projects. However, the exit of European banks in the aftermath of the global financial crisis has increased the importance of bond financing for infrastructure projects (PwC 2013b).

The Canadian corporate bond market also appears to have benefited from a close integration with the US bond market, which is the deepest and most liquid bond market internationally. In addition to an established corporate bond market, the United States has a relatively developed municipal bond market, offering bonds issued by local governments and government agencies paying coupons that are exempt from state and federal income taxes. The municipal bond market also includes project bonds, and is often used by US local governments to raise funds for infrastructure projects. There are various factors that explain the depth and liquidity of the US corporate bond market, including the fragmented nature of the US banking system — which increased corporate reliance on bond markets — and the concessional tax treatment of the returns from municipal bonds (Calmès 2004).

D.3 Canada's project bond market

In addition to market features that may explain the strength of Canada's corporate bond market, there are several features of the infrastructure market that may provide further explanation for the strength of Canada's project bond market.

The first is infrastructure funding arrangements. The majority of major infrastructure projects in Canada are funded through availability payments. Research shows that all but one of Canada's public private partnership projects for roads have availability payments (Poole 2011). The Commission has also received information on a sample of 17 recent infrastructure projects (nine of which are greenfield). With the exception of the abovementioned road project, all of the projects were availability payment funded (Fey, pers. comm., 23 April 2014). Availability payments allocate a portion of project risk to the government, and thus reduce the share of risk borne by bondholders (for projects where bonds are issued). This is likely to increase the credit rating of issued bonds, which may improve access to bond markets since investor demand for project bonds is typically strongest for higher rated bonds (BBB+/A or above) (Vinter, Price and Lee 2013).

The Office of the Infrastructure Coordinator (sub. 78, attach. M) suggested several other factors that may explain the depth and liquidity of the Canadian corporate bond market.

- The Canadian Government shares credit risk spread during the bid process, which reduces the uncertainties associated with changes in the pricing of risk, and thus reduces the incentive to prefer bank debt over bond debt. The Canadian Government also provides financial loan guarantees during the construction phase of public private partnership projects (McBride 2013).
- Almost all rated projects have been structured in the A rating band, which is attractive to a broader investor base, partly because project sponsors and construction companies in Canada are generally A-rated entities themselves.
- Bond price benchmarking is possible due to the existence of liquid and relevant benchmark bonds.
- New infrastructure projects (and subsequent financing deals) come to market consistently, and are typically executed efficiently. Furthermore, direct communication between bond issuers and investors means that the practical differences between bond and loan debt is reduced.
- Canadian investors were not previously burned by large mark-to-market losses.

E Building information modelling

In this appendix, background of the potential benefits to flow from the widespread adoption of Building Information Modelling (BIM) are briefly discussed.

E.1 Potential benefits of BIM

BIM has most potential for complex construction. The key feature of BIM is that it provides a platform to explore the structure of objects and their spatial relationship to each other. It also provides a means to incorporate scheduling of activities during the build phase (termed '4D' BIM) and allow for costing through the inclusion of cost data (termed '5D' BIM).

BIM can allow for any clashes in various design elements to be discovered prior to them occurring, reducing rework or rebuild costs. It also provides a means for constructors to better schedule their construction activities, helping to find ways to minimise site costs.

Proponents of BIM have suggested it has a number of significant benefits, including:

- improved information sharing
- time and cost savings
- improved quality
- greater transparency in decision making (ACG 2010).

Faster adoption of BIM has also been suggested to have the potential to yield significant economywide gains (box E.1).

Box E.1 **Reported benefits from the accelerated adoption of BIM**

A study by the Allen Consulting Group assessed the *potential* benefits to flow from the accelerated widespread adoption of BIM in Australia. Using a Computable General Equilibrium model, they found that:

- accelerated adoption of BIM would increase GDP growth by 0.2 basis points in 2011, by 2025, it was estimated that GDP growth would be 5 basis points higher
  - in net present value (NPV) terms this represents a one-off increase in GDP in 2010 of between $4.8 to $7.6 billion.
- the benefit cost ratio of early adoption would be around 10 (assuming a $500 million adoption cost)
- the NPV of the increase in private consumption between 2011 and 2025 (as a proxy for overall wellbeing in Australia) of around $1.4 billion in 2010.

Source: ACG (2010, p. x).

BIM can be applied to all stages of a building's (or piece of infrastructure's) life cycle (figure E.1). The benefits of BIM can therefore extend from the design, tender and construction process to the management and eventual decommissioning of an asset.

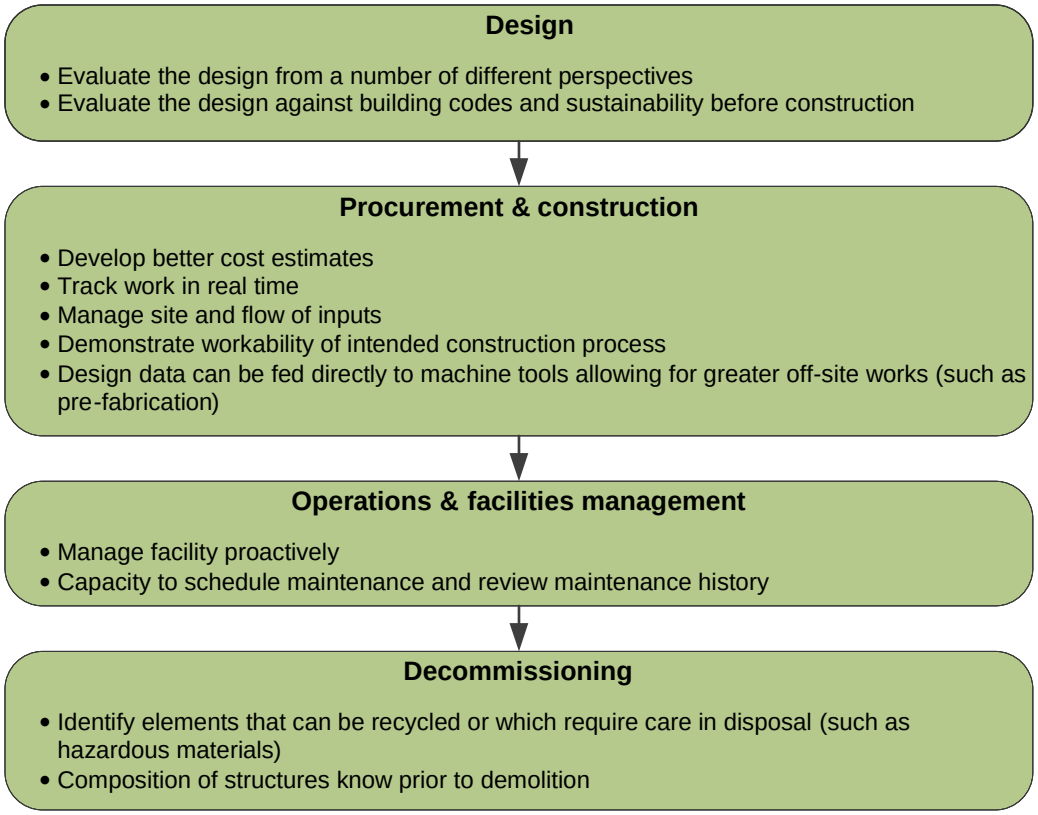
In terms of the design phase alone, the use of BIM has been suggested to lead to savings from improving project design documentation. Cost savings can arise from reducing 'avoidance costs' (the costs of systems that are put in place to avoid errors generated from the paper based exchange of design elements); 'delay costs' (those imposed through waiting for information to be exchanged); and 'overlap costs' (caused where the same information has to be entered by multiple parties as they cannot work from the same model) (ACG 2010). Flaws in design documentation can have flow-on effects to the construction phase, with estimates suggesting that between 60 to 90 per cent of project variations during construction are the result of poor design documentation (CRC for Construction Innovation 2007).

Additionally, during construction it has been reported that as much as 30 per cent of the construction cost of complex buildings is made up of costs resulting from coordination errors, ordering of incorrect materials and labour inefficiencies (generated by poor scheduling of activities) (Brown 2008; Construction Users Roundtable 2004). BIM has been argued to be a tool to reduce these. However, for such benefits to be realised, industry users would require the necessary project management skills to implement the schedules generated by BIM — an area where the skill set of principal contractors have been questioned (see Loosemore 2014a).

Along with lowering the potential costs of a project's design and construction, the information provided by BIM can generate savings during the procurement process.

BIM allows any potential tenderer to put forward more accurate costings for infrastructure projects. With the inclusion of both operations and facilities management and decommissioning into BIM, 'whole of life' costs can also be considered at the tender stage. This would allow for the least whole of life cost tender to be selected, or at least consideration given to any tradeoff between upfront capital costs and potentially lower life costs.

Figure E.1 **Application of BIM across the asset life cycle**



Source: Adapted from ACG (2010, p. 9).

E.2 Evidence on realised benefits

In a review of the adoption of BIM in the United States for 32 major projects, it was found that BIM technology lead to:

- 7 per cent reduction in project time
- 10 per cent saving of the contract value through clash detection
- 40 per cent elimination of unbudgeted change

- 80 per cent reduction in the time taken to generate a cost estimate, with cost estimation accuracy within 3 per cent (Centre for Integrated Facility Engineering 2007).

Given the benefits that can stem from the use of BIM, some government clients have mandated its use for building and infrastructure works. In the United Kingdom, the Government has mandated the use of BIM for all projects by 2016 (UK Cabinet Office 2011). To facilitate this, the UK Cabinet Office co-ordinated the development of standards and other protocols (relating to legal and insurance matters and contracting with BIM) (Building Information Modelling (BIM) Task Group 2014; UK Cabinet Office 2011).

F Differences in public and private sector procurement

Key points

- Procurement of public infrastructure is complex, and requires sufficient expertise to avoid time and cost overruns. Overruns will depend on a client's skills and practices related to project planning, contracting and project management.
- Little information is available to compare the project selection practices of public and private clients. For each, projects must be demonstrated to deliver net benefits to the community (public) or the shareholder (private). However, it appears the private sector is more willing to cancel projects when conditions change or more information comes to light (rightly considering expenditure to date as a sunk cost).
- The choice of delivery models used by government clients do not appear to differ substantially from those of the public sector. For both, project risks and potential gains from innovative ideas drive the choice of contract type used for infrastructure projects.
- Probity requirements, however, create differences in the tendering arrangements used by public and private sector clients. While promoting transparency and addressing democratic accountability issues, excessive probity requirements can restrict the discretion of public sector clients and may inhibit competition amongst potential constructors.
- A number of claims have been made around the apparent lack of expertise of public sector clients in scoping and delivering infrastructure projects.
  - Data on project outcomes in terms of cost overruns suggest that when they do occur, they are often large (more than 15 per cent) and occur more commonly for large – hence more complex - projects (those over $50 million).
  - But in terms of average overrun costs both public and private sector clients experience similar outcomes — project size, and thus complexity appears to be the most significant driver of overruns.
  - Despite this, while not conclusive, public sector clients appear more likely to experience cost overruns during delivery than their private sector peers.
  - Of critical importance is better planning. Cost overruns during delivery are strongly linked to overruns during the planning phase.
- Overall, the available evidence suggests scope exists for improvement in procurement, both in scoping and in delivery for both sectors.

In Australia, public sector clients are responsible for the delivery of the vast majority of economic and social infrastructure. Public clients undertake a range of infrastructure projects ranging from small 'routine' road upgrades to large-scale unique projects. Optimising project outcomes requires extensive skill, expertise and experience.

But not all public infrastructure is procured by the public sector. With the privatisation of some infrastructure assets, private clients are increasingly procuring 'public' infrastructure assets — as in the case of electricity generation and supply assets. Further, the private sector undertakes a number of similar projects (in terms of size and complexity) such as the procurement and construction of mining and other major projects. Their experiences may be useful for public sector procurers since, prima facie; the private sector has very strong incentives for efficient procurement. Some stakeholders have also suggested that they serve as a benchmark against which to judge the performance of public sector procurement.

Accordingly, this appendix compares the procurement approaches (including project selection) and outcomes of public and private sector clients. However, while there are lessons from private sector procurement practices, simple mimicry is not desirable.

For all clients, processes have to be in place to select projects (section F.1) and the procurement approach must address a number of principal-agent problems (section F.2). The solutions to these problems necessarily differ between public and private clients including in the contract types let to construct the projects (section F.3) and the manner in which a final constructor is selected to complete the build (section F.4). As such, there is potential for differences to exist in the relative performance of public versus private sector clients (section F.5).

F.1 Project selection: how decisions are made

Public sector client project selection

In Australia, responsibility for investment in infrastructure is spread across local governments, the States and Territories and the Commonwealth. This responsibility is allocated according to infrastructure type (as set out in chapter 1).

Because project identification and scoping practices vary across sectors and jurisdictions, they cannot be readily generalised. As a result, this section takes a case study approach and examines the processes behind project identification and

scoping for major projects, transport, and electricity (noting practices vary for other utilities-based investment).

Major Projects

Major projects include a wide array of infrastructure works, including both economic and social infrastructure. Government clients generally identify major project initiatives through agency plans and infrastructure strategy documents. A list of such documents by state is presented in table F.2.

Table F.1 **Infrastructure planning documents**

Excluding budget papers, corporate planning documents and the strategic land use plans of the capital cities

Jurisdiction	*Infrastructure planning documents*
NSW	State Infrastructure Strategy (2012)
	Metropolitan Transport Plan (2010)
Vic	Melbourne 2030 (2002)
	The Victorian Transport Plan (2010)
	Our Water Our Future: Next Stage of the Government's Plan (2007)
Qld	Queensland Infrastructure Plan (November 2011)
	South-East Queensland Infrastructure Plan and Program (2010)
WA	Pilbara Planning and Infrastructure Framework (2012)
	South West Development Commission Strategic Plan 2010–2025 (2011)
	Roads 2025 Regional Road Development Strategy (2007)
SA	South Australia's Strategic Plan (2011)
	Strategic Infrastructure Plan (2005)
	Water for Good Plan (2009)
Tas	Tasmanian Infrastructure Strategy (2010)
	Tasmanian Infrastructure Advisory Council Annual Report (2011-12)
	Southern Integrated Transport Plan (2010)
ACT	ACT Government Infrastructure Plan (2010)
NT	..

Sources: IA (2012b); Productivity Commission (2011b, p. 191).

The documents identify high-level infrastructure goals along with corresponding projects and timelines, and often also present brief business cases for identified projects.

For infrastructure projects of national significance, business cases may be submitted to Infrastructure Australia (IA) for federal funding under the *Nation-building Funds Act 2008* (Cwlth), according to which IA provides advice for funding from the Building Australia Fund (BAF). Project submissions are assessed against the BAF Evaluation criteria and IA's *Reform and Investment Framework* (table F.2).

Table F.2 **Infrastructure Australia's Reform and Investment Framework**

Core component	*Stage and purpose*
Strategic alignment and profiling The proposal relates to clear goals that address national infrastructure priorities The problem being addressed is well understood and constrains achievement of stated goals The costs of the problem and potential benefits of the solution are presented and supported by evidence Understanding causes allows effective and targeted solutions to be created	**Goal definition** Identify goals that are: clearly defined; are relevant to the problems identified; and drive the development of solutions **Problem identification** Demonstrate that problems identified are a constraint of the achievement of stated goals **Problem assessment** Demonstrate with data rich evidence that is a priority to address the problem **Problem analysis** Analyse the extent of problems and the root causes **Options generation** Develop a full range of possible options to solve the problem, including reform and investment proposals **Option Assessment** Undertake strategic analysis and cost benefit analysis of the viability of the options
Economic viability The proposal's lifetime benefits must significantly outweigh its lifetime costs to society **Deliverability** The proposal must have a clear and robust delivery plan to ensure its successful realisation	**Solution evaluation** Detailed business case for the preferred option included detailed cost benefit analysis, deliverability (including cost, risk, and procurement)

Source: IA (2013a, p. 13).

Once projects are identified and prioritised, approval processes are required for the project to go ahead. This process varies across states, although generally Cabinet approval is required first for the allocation of funds, and later for approval of the proposed procurement approach. The investment decision allocates budget funding to a project and is dependent on the content of the business case, while the

procurement decision considers the potential for the procurement approach to elicit the best value for money (procurement options analysis is discussed in section F.3).

In addition to this approval process, some states have introduced additional independent assessments throughout the development of infrastructure projects. For example, New South Wales, Victoria, Queensland, Western Australia and South Australia have all introduced the Gateway Review Process, which involves independent expert review of project performance and planning at several key stages. For example, Victoria's Gateway Review process is undertaken for the strategic assessment, business case, readiness for market, tender decision, and readiness for service stages.

It is important to note that failing to pass review processes does not necessarily imply that a project will not go ahead. Often proposals are rescoped or redesigned by the sponsoring department or state government at a later stage. For example, the ACT Government announced plans to rescope a prospective light rail project and reapply for federal funding following an unsuccessful submission to IA (Mosley 2013). At this stage, construction commencement is planned for 2016 (ACT Government 2014).

Transport

While transport infrastructure comprises a large component of state infrastructure planning strategies, all levels of government are involved in identifying and scoping road infrastructure projects. To guide planning of transport infrastructure, local, state and federal government agencies have collaboratively produced the *National Guidelines for Transport System Management in Australia* (Australian Transport Council 2006). These guidelines provide a national standard for planning and developing transport systems, facilitating transport planning and management across all jurisdictions in Australia.

According to these high-level guidelines, identified initiatives are appraised in three stages, including a strategic merit test (SMT), rapid appraisal, and finally a detailed appraisal.

- The strategic merit test (SMT) is a qualitative assessment of the 'strategic fit' of a project proposal, and involves assessing the degree to which the current project contributes to transport system objectives, policies and strategies.
- The rapid appraisal stage introduces an assessment of the costs and benefits, using readily available data and producing estimates without a high level of accuracy.

- The detailed appraisal involves a comprehensive analysis of the impacts and merits of an initiative. Among other requirements, this includes a detailed cost-benefit analysis and financial or budget assessment. (There is of course sometimes a gap between aspiration and practice, and much of this analysis is not made public).

The high-level guidelines presented in the *National Guidelines for Transport System Management in Australia* are reflected in the Road Transport Authority's scoping document, *Project Estimating* (NSW Roads and Traffic Authority 2008). This document guides the estimation of project costs, outlining the requirements for 'strategic', 'concept' and 'detailed' estimates. Consistent with the national guidelines, increasing amounts of data are required at each stage, allowing for increasingly accurate cost estimation. For example, at the 'strategic' assessment stage, costs are required to fall within 30 per cent of the real value. These estimates should later fall within 20 and 10 per cent of the real cost at the 'concept' and 'detailed' stages, respectively.

Electricity networks across the National Electricity Market

Electricity supply networks are made up of the transmission network (the 'backbone' of high voltage lines) and smaller distribution networks (the local poles and wires) which connect individual houses to the broader network. Individual state electricity networks within the National Electricity Market (NEM) (which includes Queensland, New South Wales, Victoria, Tasmania and South Australia) are interconnected through their transmission networks.

State networks are either privatised or operated by corporatised government business entities and the network is managed using an incentive regulation approach. A series of price and rate of return regulation is applied to network businesses in the NEM using the building block approach to determine an allowable level of revenue. There are also targeted incentives to promote specific goals, such as reliability and demand management.

Despite the interconnected nature of transmission networks, as highlighted in the Commission's Electricity Network Regulatory Frameworks inquiry (PC 2013c), infrastructure investment decision making remains fragmented, with decisions made at the state level.

The decision-making processes for investments in the transmission network vary by jurisdiction. Network augmentation is determined by both reliability requirements and market driven investments. However, investments made for reliability purposes dominate network augmentation decisions.

In Queensland, New South Wales and Tasmania, reliability requirements are expressed through deterministic standards that are applied to various parts of the transmission network. Network businesses are explicitly required to meet these standards and develop a capital works program accordingly. The capital works programs are then reviewed and contested every five years by the Australian Energy Regulator (AER) when it makes its revenue determinations for the network businesses — essentially determining their allowable revenues and profits based on returns to the existing network assets along with the proposed augmentations. However, for these states, network augmentations for reliability purposes need not pass a cost-benefit test (unlike other augmentations) as long as they allow the network business to meet its reliability requirements.

In Victoria the planning process is significantly different. The Australian Energy Market Operator (AEMO) is responsible for network planning. It then directs the network business to undertake the necessary work to ensure the network is reliable and meets the needs of the community. In undertaking its planning, AEMO identifies emerging network limitations through running screening studies that test whether the network can be operated in a satisfactory state under future possible demand and generation scenarios.

In determining what infrastructure investments should take place, AEMO uses a probabilistic planning framework (2013b, p. 14). This framework examines both network and non-network solutions to any constraints identified. Only augmentations where the economic benefits, equal or exceed the cost are selected to go ahead. Further, as decisions are made within a probabilistic framework, AEMO is able to assess the possible savings from delayed investment decisions, allowing it to wait until the point in time where augmentations represent the most net beneficial option before proceeding.

Thus, in Victoria compared with other jurisdictions, scoping considers a range of possible future scenarios based on demand and generation forecasts, while also taking into account the different likelihoods of exceeding the forecasts.

In South Australia, a hybrid of the Victorian and deterministic planning approaches is used. Again the AER is required to review and approve the capital works programs of the transmission network business, however, AEMO plays a role in helping determine possible network augmentation options and so investment decisions incorporate some aspects of probabilistic planning (however, the strict deterministic standards still apply and levels of reliability, even though reviewed, can never be lessened even if demand levels were to fall).

In electricity distribution networks, the effects of infrastructure augmentation typically remain within the local geographic region defined by the network. Given this, infrastructure planning is undertaken much more on a local scale. As for transmission networks, the AER is ultimately responsible for reviewing and approving network augmentations through the revenue determination process. The AER also has a program that provides incentives for reliability-driven network augmentations to be undertaken only when they meet a cost-benefit test (and to penalise those which would fail a cost-benefit analysis). It does this by linking payments for the achievement of reliability linked to the value that customers place on reliability.

Private sector project selection

There is less public information about the private sector's processes used to identify projects, develop business cases and commit to a project. Despite this, some broad information is available from annual reports and the general decision-making processes that are in place for corporate entities.

As with other investment decisions made by private businesses, the decision whether to proceed with major capital works rests with the board.[79] The board is appointed to act on behalf of the ultimate owners of the business much in the same way that government agencies (or individuals) responsible for the gatekeeper processes act on behalf of the general public.

The board should normally only approve projects that are likely to have a net commercial benefit, taking account of the cost of capital, credit availability and project risk. Boards also exercise options to delay or cease investment projects during the planning process as more information becomes available or commercial circumstances change (and in this respect are probably more nimble than governments, which sometimes prematurely commit to projects or maintain a commitment for political rather than economic reasons). For example, amid falling profits and commodity prices, the BHP board opted to pull out of both a Port Hedland outer harbour development project and the South Australia Olympic Dam project (Evans 2012).

79 Most annual reports set out the responsibilities of the board. These typically include responsibility for approving the capital works programs of the business — see for example Perth Airport (Perth Airport Pty Ltd 2013, p. 87).

F.2 The complexity of procurement and the principal-agent problem

The procurement of infrastructure projects is often complex. Although a portion of infrastructure works are completed routinely, client experience with more bespoke projects, such as desalination plants, is generally limited. Even with extensive experience, varying site conditions can introduce uncertainty. As a result, risk is inherent in the procurement process, and thus managing risk is necessary to ensure projects are delivered without cost or time overrun.

Appropriate risk allocation between clients and contractors is central to ensuring project outcomes. However, deciding on an appropriate allocation of risk can be difficult. This is particularly the case where information asymmetries exist. Given the differing incentives between clients and contractors, information asymmetries create the potential for sub-optimal outcomes throughout project tendering and delivery.

Procurement theory highlights these issues through the lens of the principal-agent problem. Principal-agent theory examines relationships where an agent undertakes work on behalf of a principal but a portion of the work non-contractible or unobservable (Stiglitz 2008). Without incentives to complete work to explicit standards, contractors may underinvest in non-contractible parts of the project or those for which clients cannot determine the quality.

The implications of insights from principal-agent theory for procurement practices relate primarily to the contracting practices and expertise of clients. In order to minimise the potential for substandard work, transfer of risk to those who can best manage it is essential. This requires the capacity to write effective and complete contracts. Further, clients must have the expertise to determine whether work has been completed to the specified standard, as well as assess variation claims.

F.3 Deciding on the procurement approach

Clients can use several contracting arrangements with constructors (chapter 12). Each varies in the risks and project development responsibilities assumed by the client. Government clients may also public-private partnerships (a method discussed in chapter 3 and not repeated here). However, once the decision has been made, the special purpose vehicle that has been established as the new owner of the infrastructure asset must still decide on the approach used to engage the constructor.

Deciding on the contracting arrangements (and risk allocation)

Contract types matter

The distribution of risk among parties can have a substantial bearing on project outcomes. As a result, having sufficient expertise to assess risk during the scoping stages of each project and thus being able to select the appropriate contract is critical to delivering projects on time and within budget. Contracting arrangements for major infrastructure projects take several forms. These include construct only; design and construct; alliance contracts; and managing contractor arrangements. These models are discussed in detail in chapter 12.

Project packaging is also important

Packaging involves the division of work into parcels to which separate contract types may be applied. Projects can be split according to the nature, location or stage of work, which offers several advantages. Packaging can increase competitive pressure in the bidding process, especially for large infrastructure projects where the capacity of firms is limited. Moreover, packaging allows for more flexibility surrounding the allocation of risk, with separate contracting arrangements possible across packages. Among government clients, packaging is used for a wide range of infrastructure projects. For example, the Australian Government's *National Infrastructure Construction Schedule* (Australian Government 2014) lists packaged projects for hospital, road, rail, school, radio and stadium construction.

The rationale for project packaging is illustrated by the Victorian Department of Treasury and Finance (2013, p. 23) in a case study of the Regional Rail Link (RRL). The RRL required 47.5 kilometres of railway line construction through the inner western suburbs of Melbourne. Given the distinct nature of work across locations, the project was split into six packages that included both alliance and design and construct contracting arrangements. Alliance contracts were used in brownfields projects where it was reasoned that cooperation with existing rail operators and franchisees would be enhanced by alliance contracting. On the other hand, design and construct contracts were applied to greenfields projects, which required less management of stakeholders.

How decisions are made

Governments set procurement guidelines (box F.1), whose primary role is optimising project objectives and outcomes (including the timing, cost and quality of the project) through selection of appropriate contract types. This aims to achieve

the right balance between the amount of control the department requires and the degree of risk that is optimal to bear.

In deciding on an appropriate contract type, an early consideration is whether to opt for PPP or a more traditional contracting approach (including those outlined in chapter 12). In its *National PPP Guidelines*, IA (IA 2008a, p. 23) have produced an assessment matrix for determining where PPP projects are likely to be better than traditional contract types (table F.4). It recommends consideration of a PPP where the project value is over 100 million dollars, scope can be clearly defined, there are opportunities for whole-of-life servicing and risk can be defined and allocated.

Box F.1 **Procurement Guidelines**

Commonwealth

- Building and Construction Procurement Guide: Principles and Options (2014)
- National Public Private Partnership Guidelines: Procurement Options Analysis (2008a)

New South Wales

- Procurement Methodology Guidelines for Construction (2005)

Victoria

- Investment Lifecycle and High Value/High Risk Guidelines: Procurement strategy guideline (2013)

Queensland

- Project assurance framework: Procurement options analysis (2009)

Western Australia

- Infrastructure Procurement Options Guide (2010)

South Australia

- Procurement: Good Practice Guide (2007)

Tasmania

- Purchasing Goods and Services: A Guide for Government Buyers (2014)

Australian Capital Territory

- Building and Construction Procurement Guide: Principles and Options (2014)

Northern Territory

- Procurement Directions (2013a)

Not all procurement guidelines explicitly discuss contracting arrangements, but focus instead on related facets of procurement, such as obtaining value for money.

Where PPP is not suitable, government client decision-making among traditional contract types is guided by documents such as the Australasian Procurement and

Construction Council's (APCC) *Building and Construction Procurement Guide – Principle and Options*, as well as various state-level procurement guidelines. All guidelines outline the advantages and disadvantages of each contract type, and the situations where they are most appropriate. These guidelines are largely in accordance with the content presented earlier in the section and in chapter 12.

Table F.3 **Shortlisting of suitable delivery methods**

Category	*PPP*	*Project alliance, managing contractor*	*Other*
Scale			
Project value over $100 million?	✓	✓	✓
If not, can services be bundled to exceed this threshold	✓		
Scope and outputs			
Scope and outputs can be defined clearly	✓		
Scope likely to change significantly prior to project completion and the potential change cannot be satisfactorily provided for in the specification	✓		✓
Whole-of-life opportunities			
Services can be bundled together to create a long-term operational/maintenance opportunity	✓		
Risk			
A significant proportion of the material risks can be defined, allocated and potentially transferred to a private party	✓		✓
Unquantifiable risk that could not have material impact of projects costs and objects		✓	
Government is best-placed to manage material risks, with the cost of transferring the risk prohibitive		✓	✓

Source: IA (2008a, p. 23).

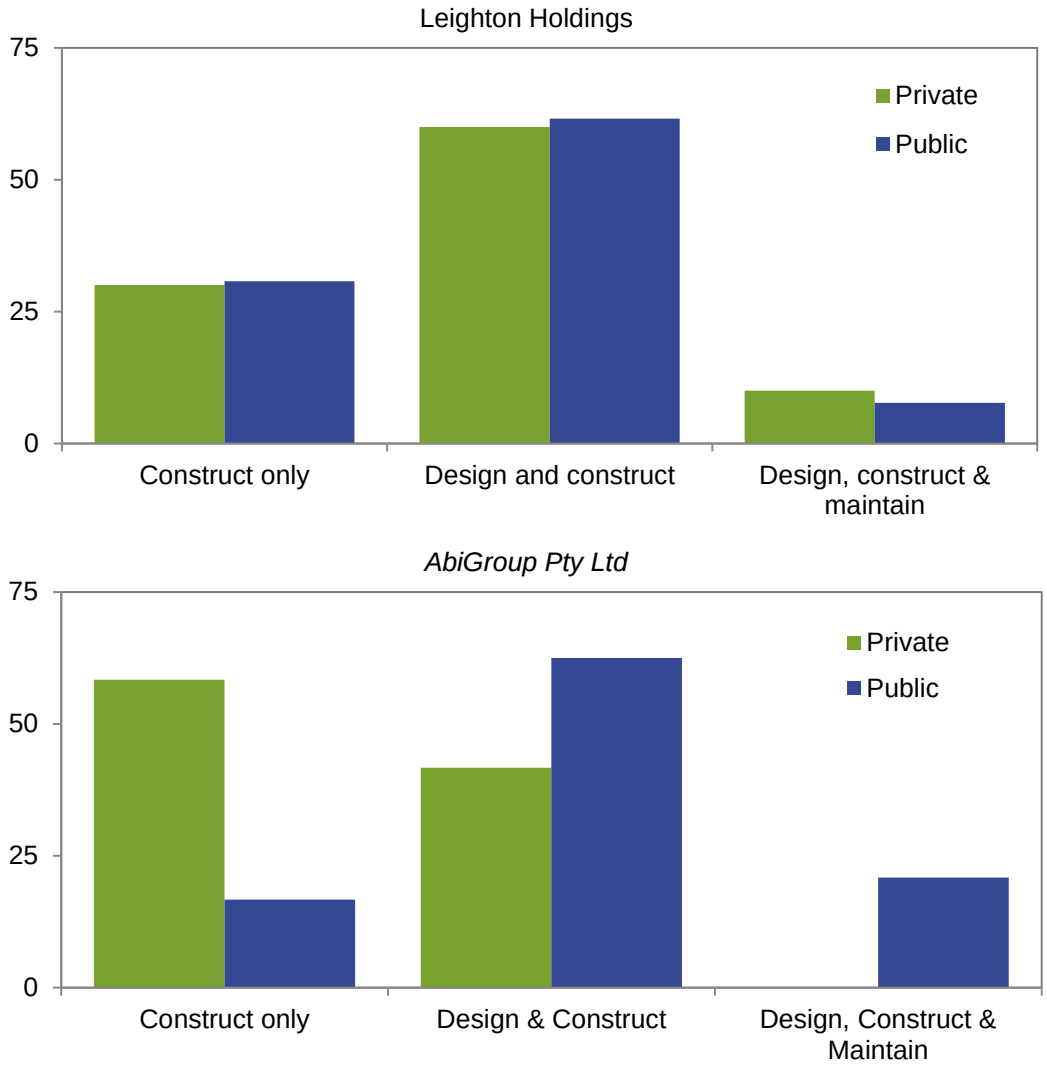
The private sector approach

While not usually documented publicly, anecdotal and other evidence provided to the Commission suggests that the private sector tends to use decision-making processes close to those of the public sector. While they also use the same spectrum of contract types, they sometimes have a greater emphasis on some contract types. For example, data from the Leighton Holdings' website suggest that public and private contractors opt for the traditional contract types in similar proportions (figure F.1). However, data from AbiGroup presents a different picture. These data indicate substantial differences between clients of public and private sectors, with private firms selecting construct only contracts more often.

These data should be interpreted with caution and considered indicative only. The sample selected is small, not necessarily representative and there is little information on the nature of projects. Accordingly, some of the apparent differences in contracting choices may reflect different project types, rather than any fundamental differences in contracting preferences. Similarly, the (typically) lower financial resources of businesses versus governments affect their differential capacity to bear risk, which then shapes contracting choices. Therefore, it cannot be concluded that the differences between the contracting choices of private sector versus government clients necessarily reveal flaws for either party in their procurement approaches.

Figure F.1 **Proportion of contracts by client sector and contract type**

Per cent of projects, 1994 to 2014



Sources: Leighton Holdings (2014b); AbiGroup (2014).

F.4 Selecting a constructor: public sector tendering and the 'commercial approach'

Contractor selection, through tendering arrangements or otherwise, is a major source of difference in the procurement approach of public and private sector clients. Public sector clients are bound to much stricter probity requirements than their private sector peers (given the greater distance in accountability between the decision maker and whom they represent). This section examines the two approaches.

Public sector approach to selecting a constructor

Why do governments go to tender?

Governments, as representatives of the public, are required to demonstrate that contractors are treated fairly and on merit given the perceived risks that probity might otherwise be compromised. However, staff in the responsible agency, not the government *per se*, usually make the actual decisions about a preferred tenderer, even though governments are ultimately held responsible for any problematic conduct. A requirement for agencies to follow formal and transparent tendering and selection processes reduces the apparent risks for government.

These processes generally mean that contracts are awarded according to an explicit set of criteria. The processes are auditable, allowing decisions to be evaluated and criticised. In this way, they provide some surety to the public that the procurement process has been conducted fairly and should discourage corruption. However, in making use of explicit criteria, the discretion with which government clients can select successful bidders is more limited.

Tendering processes also allow each possible constructor the same opportunity to bid for work as their competitor. In doing so, they provide a platform on which possible constructors can compete for the work on offer, helping in the discovery of the lowest cost provider and providing incentives for constructors to be innovative in their product offering. This process, however, increases transaction costs which, if too high, may limit the ability for the process to generate competitive tension between constructors. It may also stifle the development of collaborative relationships during the tendering phase as clients may not wish to interact too closely with tenderers given fears of appearing to favour one bidder over another. This can limit the ability of the process to elicit the most innovative and best value for money offerings from potential constructors.

Bid selection and probity

While each jurisdiction has its own tendering policies, the criteria used for selecting a successful constructor are much the same across government clients. Broadly, the criteria applied requires bids to be assessed against factors such as price; project improvements contained within bids; proposed methodology; technical and managerial resources allocated to the project; workplace health and safety performance; and a business' ability to manage the industrial environment. In addition, to enhance the objectivity of bid evaluation, weights for each criterion are provided.

However, assessment against strict criteria has risks. It can make clients too focused on individual aspects of a bid, such as price. Indeed, some stakeholders say that government clients excessively prioritise price (Ai Group, sub. 47, p. 24). Although a primary reason for competitive bidding is to drive lower prices, selecting the lowest bid does not necessarily ensure minimised costs over the life of the project. For example, underbidding, a practice noted in the theoretical contracting literature and claimed to occur in Australia (McLeod Rail, sub. 49, p. 4), involves contractors submitting bids below market price with the expectations that a large number of variation will more than make up that shortfall.

Further, too much focus on price may prevent consideration of other important factors that contribute to project outcomes, such as contractor efficiency, willingness to innovate, commitment and propensity for litigation. Indeed, Government clients have been criticised for their lack of consideration of past performance in bid selection. Risk aversion, in conjunction with an excessive reliance on the initial tender price, can ultimately lead to inflated costs to the taxpayer.

Despite this, some agencies have sought to explicitly include this in bid selection. The Department of Infrastructure and Transport (2013, p. 16), for example, have recommended consideration of past project outcomes and relationships with clients. This practice commonly takes place within the private sector, though without an explicit framework. However, it is noted that this may introduce probity risks that would need to be addressed.

In consulting with PPP practitioners, KPMG (2010, p. 34) report that government overemphasise probity during the tendering process:

- Information sharing of project requirements is often unduly limited in the Interactive Tender Process, preventing efficiency gains on which the Interactive Tender Process is premised.

- Feedback for unsuccessful bids has been reported to be unnecessarily restricted, with clients reluctant to provide reasonably detailed information regarding the relative strengths and weakness of a proposal.
- Tenderers are provided with limited information about probity processes except for the requirement to sign up to the Probity and Process Deed (PPD) and the attendance of probity auditors and advisors at workshops as part of the Interactive Tender Process.

PPP practitioners say that these practices result in reduced competition, conservatism bias and bids that are further from the desired outcomes of clients.

However, concerns about governments' probity processes do not appear to be universal. This suggests that practice of excessive probity may not be a result of procurement guidelines, but rather the discretion of staff within procurement teams. KPMG (2010, p. 34), for example report that excessive probity practices are observed where project teams appear to lack experience or confidence. Further, guidelines do not generally appear to prescribe excessively strict probity requirements and in fact encourage openness with bidders. For example, the New South Wales Procurement Board (NSW Government 2013a, p. 34) in its *Procurement Policy Framework* emphasises that probity should not be a 'road-block' to procurement.

The 'commercial approach' used by private sector clients

Private sector clients adopt more flexible procurement arrangements. Industry stakeholders told the Commission that while contracting decisions still need to be justified to shareholders, private clients were much more likely than public clients to select a constructor based on its previous performance in delivering a project for the client's business. This, along with a more selective approach to seeking expressions of interest from a smaller number of possible constructors, has been termed the 'commercial approach' to contractor selection.

Given the greater focus on known past performance, the transaction costs involved for possible constructors are significantly lower than those faced in bidding for public sector work. Further, some have argued that as private clients are not bound by probity constraints (to the same extent as Government clients), information sharing during the bidding process has been more effective, with clients and constructors able to build more collaborative relationships. That said, stakeholders commented that client skills were essential for these relationships to be effective.

F.5 Are there differences in procurement outcomes between public and private sector clients?

While there are differences between government and private procurement processes, a key question is whether these have any material differences in outcomes — such as lower cost or time overruns, improved innovation, and selection of best value for money bids. From a theoretical perspective, there is some reason to suspect that the accountability mechanisms faced by the public and private sectors could lead to different outcomes. Flyberg (2009) argues that the incentive structure faced by both public and private clients promotes systematic underestimation and costs and overestimation of benefits, resulting in cost overrun (box F.2).

Box F.2 **An explanation of systematic cost overrun**

Flyvberg argues that political-economic factors encourage systematic underestimation of costs and overestimation of benefits during project scoping. Since stakeholders with input into the scoping procedure stand to benefit from project approval, incentives exist to present projects as favourably as possible. This involves understating costs and overstating benefits. Subsequently, the differential between actual and estimated costs results in either reappraisal of costs following commitment to the project or cost overrun during the delivery phase.

The mechanisms that hold clients accountable for error in project scoping differ substantially across sectors, providing the potential for systematic differences in project outcomes. Public sector clients are held accountable by public control and transparency. Government representatives require support from the general public to remain in power. Provided effective transparency measures are in place, government clients are held accountable for poor scoping practices and project selection by the voting public.

On the other hand, private sector clients are held accountable by competition and market mechanisms. To remain in business, private clients must make profits in the long run. Thus a firm that systematically underestimates costs will experience poor profitability, and face risks of takeover or insolvency. To the extent that these mechanisms offer differing degrees of accountability, sectors differentials in project outcomes are likely to occur.

Source: Flyvberg (2009).

More broadly, differences can exist in the relative skill sets of clients. Such differences could arise in the project selection stage or during project delivery, or potentially during both.

While information on the best indicator, value for money, is not available, there is information about cost overruns. This provides some insight into whether clients have forecast accurately and managed project costs effectively throughout procurement processes. Poor forecasting is not just problematic in its own right, but if there is a systematic tendency for cost underestimation this will imply overinvestment (or incorrect choice of projects).

In the analysis presented in this appendix, the Commission has drawn heavily on the *Investment Monitor* data set, collected and published by Deloitte Access Economics.[80] Drawing definitive conclusions from this analysis is difficult as the results will be influenced by not only planning and project delivery capabilities, but also legitimate changes in scope and cost revisions driven by changes in external market conditions along with any systematic differences in project types (as discussed by Clements, Si and Simpson (2013)). Therefore, it cannot be simply read that differences between private and public sector procurers are due to differences in relative skills or processes.

The Commission's analysis of the data focuses on the *variations* in costs through the various stages of projects (box F.3). While both percentage and absolute dollar differences in total costs are presented, caution needs to be applied when interpreting the latter. Analysis of absolute cost differences can be misleading as total costs are heavily influenced by project scope, industry and financial capacity of the client which can provide legitimate reasons for differences.[81]

The Commission's analysis focused on four areas of differences in reported construction costs for the major projects identified in the data set, including:

- differences in reported construction cost between the pre-construction phase (that is from a project being identified as possible or under consideration to when it is committed) and the final cost reported when a project is identified as being under construction

[80] The Investment Monitor is published by Deloitte Access Economics. It is a quarterly publication that provides detailed data on the construction sector. It lists Australian construction and investment projects, by state, sector and status of each project. The Monitor contains data on projects that are listed as possible, under consideration, committed and under construction spanning 2001 to 2013. Data is also collected on the industry and sub industry level, along with details of the client which allows for private and public clients to be identified. No data is collected on the contracting method used by the client (DAE 2014b).

[81] While the investment monitor does include a project description making the identification of 'like' projects completed by private and public clients possible, the time required to work through the data set to identify these would be considerable. Therefore such analysis is beyond the scope of what can be achieved in this inquiry.

- differences in the reported construction cost during the project 'committed' phase
- differences in the pre-construction cost and the final under construction cost
- differences in the reported construction cost during the project construction phase.

Not all projects have costs reported under the various stages. Therefore the analysis presented is for a sub-set of the major projects identified in the Investment Monitor data set.

Box F.3 **Analysis of the Investment Monitor data**

The Commission tested whether the average percentage cost overruns at each stage were statistically different between private and public procurers. The Commission also undertook simple regression analysis to test whether project size (of those already over $50 million) and sub-industry also mattered.

Public clients were classified as government departments, agencies, authorities along with government business enterprises. All others were deemed as private.

Sub-industries examined were included on the basis of both public and private sector clients having completed a number of projects in these sectors. They included: business parks; culture and recreation; education; electricity supply; health and community; rail; road; telecommunications; water, water supply and drainage.

As noted any differences will also be influenced by scope changes and cost revisions driven by various external influences. Further, the projects identified in the data set do not represent a statistical sample of all major construction projects undertaken in Australia. Rather, they are of projects for which data is publically available. As such, the projects analysed may not reflect the true population of construction projects and outcomes. Given these limitations, the results presented in this appendix should be treated as indicative.

Project selection

A well-developed and scoped project is critical to ensuring good procurement outcomes. Some inquiry participants have pointed to anecdotal evidence suggesting lower levels of expertise among government clients leading, to projects that are insufficiently developed, costed, designed or thought-out going to tender (for example, The Office of the Infrastructure Coordinator, sub. 78; Central NSW Councils, sub. 37; McLeod Rail, sub. 49; and de Valence, sub. 16 among others). Indeed, the specifications produced by public sector clients have been described as vague compared with their private sector peers (Lend Lease, sub. 46). In response,

government clients have sometimes received tenders well above their own cost estimates.

And while public sector deficiencies have been shown to hold true for several individual (and often high profile) projects, it is unclear whether such outcomes are more pervasive or isolated to the public. Examples of deficiencies also exist in the private sector with many large resources projects subject to large cost overruns.[82] Whether, on average, private procurers perform better than their public sector counterparts is an empirical issue.

Available evidence

For public sector projects, Auditor-General's reports prepared by some governments on infrastructure projects suggest that project cost overruns are relatively common. For example, in Western Australia 90 per cent of the cost variation of the top 20 largest non-residential capital works projects undertaken around 2012[83] occurred during the evaluation phase (Office of the Auditor-General Western Australia 2012, p. 22). That is, the major cost variation occurred between when the project was initially announced, at an expected cost, and the point where more detailed investigations had been undertaken to establish a business case for the project.

Analysis of the Investment Monitor data set also sheds some light on cost changes during the pre-delivery phase (noting the limitations discussed in box F.3). To explore changes in cost during the project selection stage, two variables were constructed representing the:

1. difference in the maximum and minimum reported costs for costs reported under the status categories of possible, under consideration and committed
2. difference in the maximum and minimum reported costs reported when the project was listed under the committed category.

Of particular note is that for most projects, forecasts of potential construction costs in the period prior to construction are consistent. For both private and public sector clients, the vast majority of reported construction costs do not change — as evident for around 90 per cent of all projects in the data set (table F.4). However, when costs do change in the pre-construction phase or once committed, they are more likely to do so significantly (by more than 15 per cent).

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82 Clements, Si and Simpson (2013) provide several examples, and also provide an analysis of factors that help explain project success.

83 These projects represented $6.2 billion in spending.

Table F.4 **Change in reported costs during the pre-construction and committed phase**

Construction projects spanning 2001 to 2013

	Public	*Private*	*Total*	*Public*	*Private*	*Total*
	During pre-construct phase			***During committed phase***		
	All projects (%)			*All projects (%)*		
No change	90	88	89	89	88	89
Between 0 and 5%	0	0	0	0	0	0
Between 5 and 10%	0	1	1	1	1	1
Between 10 and 15%	1	1	1	1	1	1
Above 15%	9	11	10	9	9	9
	> $50m			*> $50m*		
No change	87	87	87	86	87	86
Between 0 and 5%	0	0	0	1	1	1
Between 5 and 10%	1	1	1	1	1	1
Between 10 and 15%	1	1	1	2	1	2
Above 15%	11	11	11	11	10	10

Source: Commission estimates.

However, despite the similar numbers of projects within each cost change category for both public and private sector procurers, the average amounts by which cost changed varied significantly. For both variables examined, the public sector clients had lower average changes and less variability (figure F.2). In percentage and absolute terms, average cost changes during the committed stage for private sector clients were 3–5 times higher respectively than those seen for public sector clients.

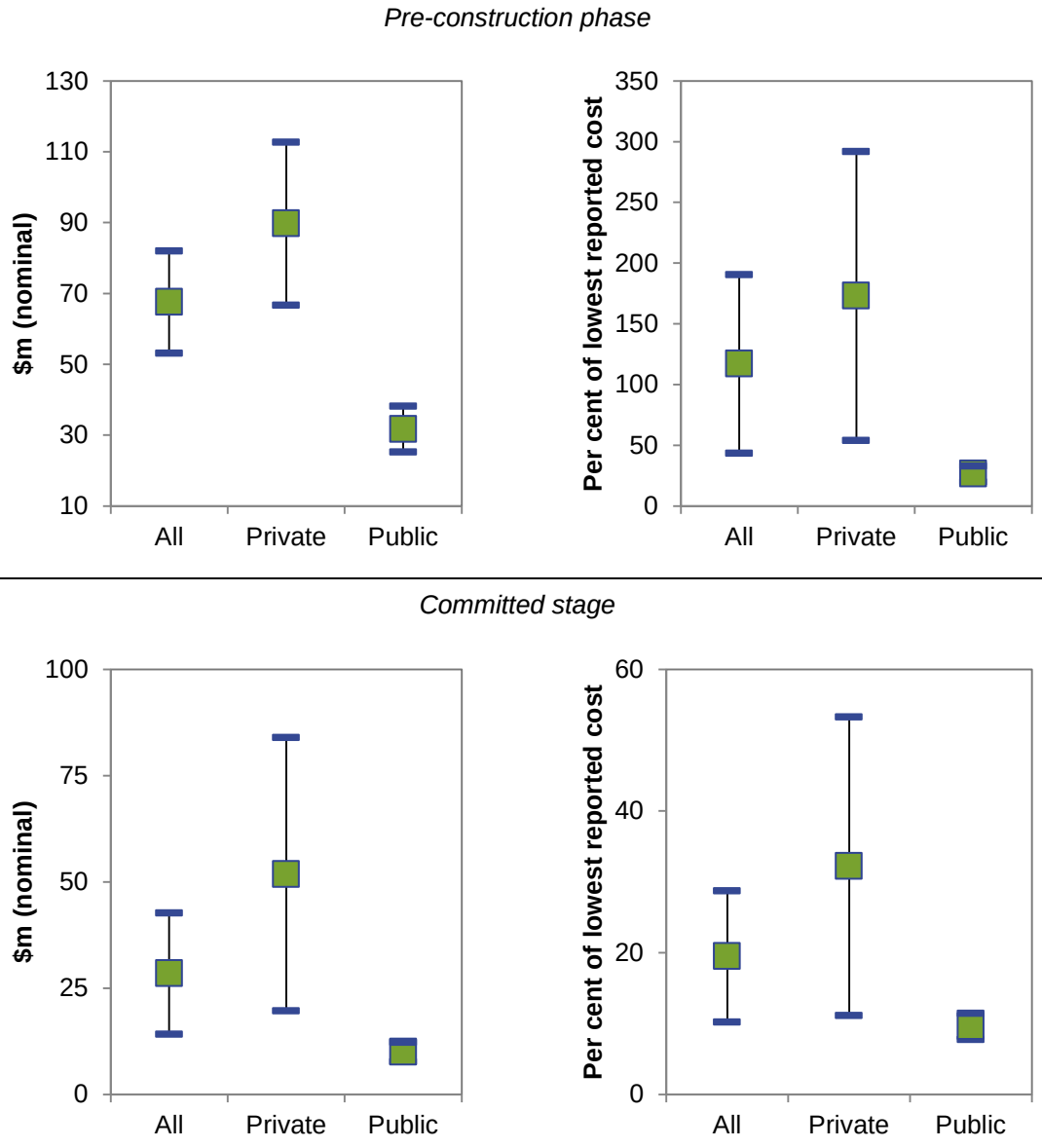
Despite the apparent differences, results from the regression analysis (which allows for any statistical differences in averages to be identified whilst controlling for other factors such as industry or project size) suggest that project size is primarily responsible for explaining differences in cost changes.[84] Further, the industry in which the project is being undertaken does not seem to have an influence (none of the industry dummies were significant in the analysis).

For cost changes in absolute dollar terms during the pre-construction phase, project size helps explain most changes that are not captured by differences in client type (public or private) (table F.5). Indeed the analysis suggests that public clients do not have statistically different outcomes to those of private sector clients after controlling for project size. This suggests that it is project complexity that drives announced cost changes during project scoping and not necessarily client type.

[84] A simple ordinary least squares regression was run where cost overruns were estimates as a function of client type (public/private dummy), project size (dummy for over $50 million) and industry (various industry dummies with client type interaction terms).

Figure F.2 **Reported cost differences during the pre-construction and committed phase**

Construction projects spanning 2001 to 2013[a]



[a] Box indicates the average result. The bars represent plus and minus 1 standard error.

Source: Commission estimates.

For cost changes during the committed phase, however, there is partial evidence to suggest that public sector clients experience lesser amounts of cost changes. Unlike for the pre-construction variable, project size is not a significant factor in explaining cost differences during this phase. However, project size does not necessarily account for complexity. Further, differences could be driven by resources projects which are only undertaken by private clients. This is supported by regression

analysis on percentage changes in costs during the project selection stage that reveal that both project size and client type are insignificant in explaining differences.

Table F.5 **Simple regression results for change in reported costs during the pre-construction and committed phase**

Construction projects spanning 2001 to 2013

	Coefficient	*Std. Error*	*P-value*	*Coefficient*	*Std. Error*	*P-value*
	During pre-construct phase			**During committed phase**		
	$m	$m	Prob.	$m	$m	Prob.
Regression 1						
Average difference (constant)	90	18	0.00	53	22	0.02
If public sector client	-58	30	0.05	-42	29	0.15
Regression 2						
Average difference (constant)	29	35	0.41	25	30	0.41
If public sector client	-42	31	0.17	-34	30	0.25
If large project	71	35	0.04	39	30	0.19

Source: Commission estimates.

Project delivery

Another area of criticism levelled at public sector agencies relates to their ability to manage projects (chapter 12). This section examines differences in reported costs for projects once contracts have been let — that is, during the delivery phase.

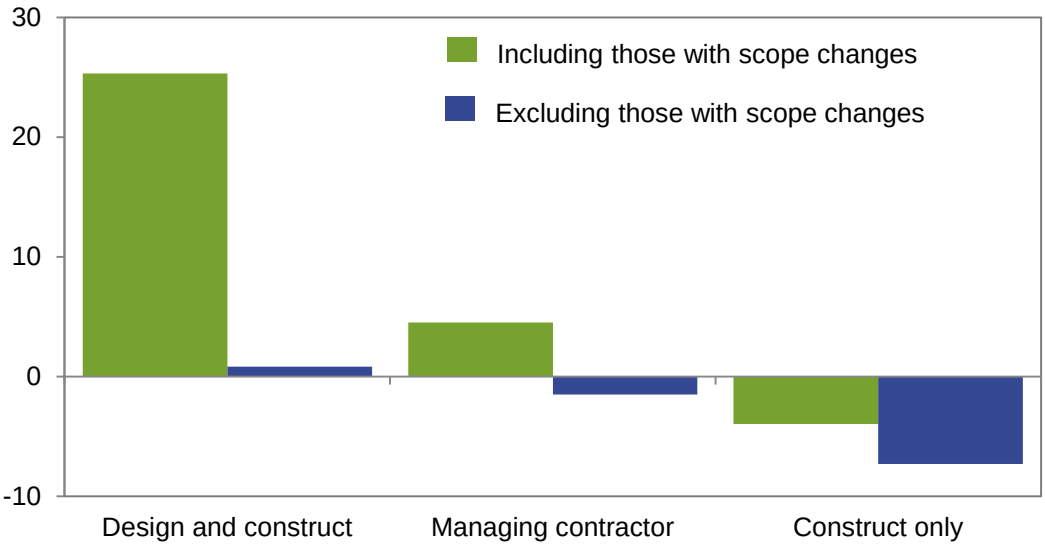
Available evidence

Information from the Western Australian audit of its major 20 infrastructure projects (Office of the Auditor-General Western Australia 2012) show that when changes in scope by the client are taken into account, cost overruns during project delivery are relatively small (figure F.3). Similarly modest cost overrun results have been found for Victorian and other government infrastructure projects — a benchmarking study of infrastructure projects indicated that most projects were delivered within 5 per cent of the original contract sum (table F.6).

Government clients appear manage projects with equal (or sometime greater) proficiency as private sector clients (Duffield and Xu 2010; Duffield 2009). For projects conducted between 2006 and 2010, government clients were able to achieve lower cost and time overruns, than those their private sector peers (table F.6). For the non-Victorian projects examined, the average cost overruns were found to be (statistically) significantly lower than for private sector projects.

Figure F.3 **Average cost increases during delivery for major projects in Western Australia by contract type**

Per cent of expected cost at end of project definition phase, 2012



a Costs where applicable for the 20 top non-residential public works construction projects evaluated by the Office of the Auditor-General Western Australia.

Source: Office of the Auditor-General Western Australia (2012, pp. 34–73).

Table F.6 **Delivery performance of government and privately managed projects**

Per cent of project sample completed within criteria, 2006 to 2010

Criteria	*Victoria*	*Other state*	*Private*
		Budget performance	
Within original contract sum	26.9	48.1	17.1
Within +5% of original contract sum	46.2	70.4	48.6
Within +10% of original contract sum	57.7	81.5	65.7
Within +15% of original contract sum	73.1	85.2	77.1
		Time performance	
Within original contract time	63.3	75.0	31.3
Within +5% of original contract time	73.3	79.2	56.3
Within +10% of original contract time	76.7	83.3	68.8
Within +15% of original contract time	80.0	83.3	68.8

a For projects conducted between 2006 and 2010. The sample for budget performance consisted of 26 Victorian, 27 other state and 35 private projects. The sample for time performance consisted of 30 Victorian, 24 other state and 16 private projects. Cost overruns were defined as the difference between the cost at contract signing versus the final cost (therefore not including any change in budgeted costs from inception to tender), and time overruns based on differences between the completion date at contract signing and actual completion date.

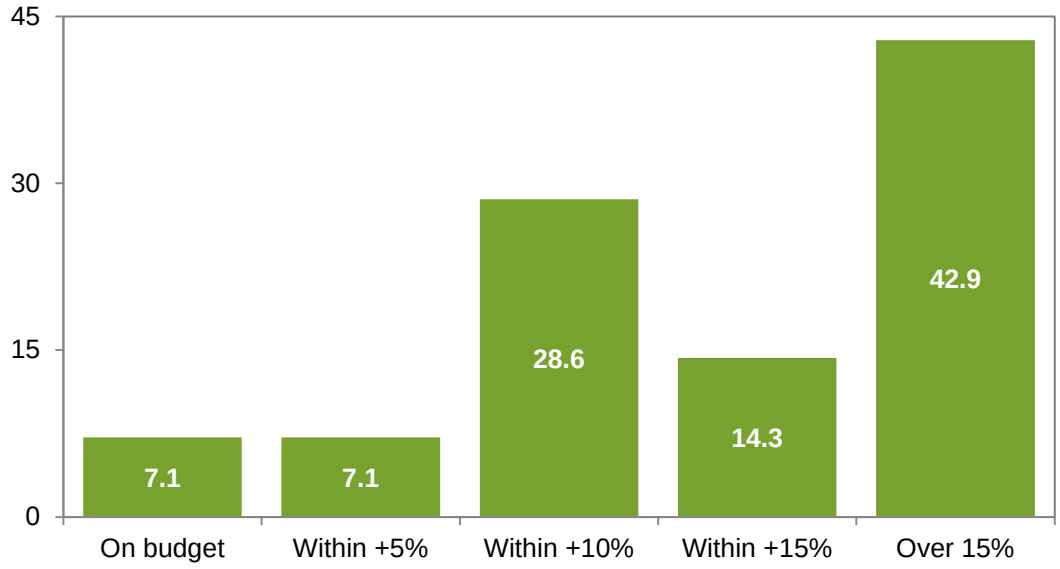
Source: Duffield and Xu (2010, p. 12).

However, analysis of overlapping data sets has reached different conclusions. The Victorian Auditor-General (2012) found:

- for almost all projects for which Major Projects Victoria supplied data during its audit, cost overruns were experienced during the delivery phase.
- cost overruns averaged close to 14 per cent
- fewer projects were delivered on budget (figure F.4).

The Victorian Auditor-General also queried the accuracy of the data supplied by Major Projects Victoria to the University of Melbourne on which they based their analysis. Based on the figures supplied to the Victorian Auditor-General, the distribution of project outcomes is worse than that observed for the private sector in the Duffield and Xu (2010) study.

Figure F.4 **Cost overruns for projects delivered by Major Projects Victoria**
Per cent of projects examined (cumulative), 2000 to 2009



a Based on the analysis of 14 projects conducted between 2000 and 2009.

Source: Victorian Auditor-General (2012, pp. 38–9).

In earlier work, Infrastructure Partnerships Australia (2007) found that between the contract signing and final turnout, government-run infrastructure projects were on average around 15 per cent over contract price. Further, they found that the larger the project, the larger the cost overrun (IPA 2007, p. 22).

The Commission undertook its own analysis in this area, using the Investment Monitor data set to explore differences in cost outcomes during construction (delivery). To do so, two variables were constructed to examine changes in costs that may be attributable to the delivery phase:

1. difference in the reported costs in the 'under construction' status category to the maximum of the announced pre-construction costs (that is, the maximum of costs listed under the possible, under consideration and committed categories)
2. differences in the maximum and minimum reported costs for costs reported when the project was listed under the 'under construction' category.

The first variable above has the potential to also include cost increases that result from poor scoping. For example, costs reported at the 'under construction' phase are at the point when the contract has been let. The variable will capture any differences where tenders were received above the scoped costs and the project continued — a cost overrun that relates to project selection. As such, the latter variable is likely to be a more accurate representation of the project delivery phase.

Most projects do not report cost increases either between pre-construction and construction or during construction (table F.7). But as with the pre-construction phase, if costs do change they tend to do so by more than 15 per cent. For all and larger projects, cost differences were more likely to occur for public sector clients than for the private sector.

Table F.7 **Change in reported costs during the pre-construction to construction phase and once under construction**

Construction projects spanning 2001 to 2013

	Public	*Private*	*Total*	*Public*	*Private*	*Total*
	From pre-construct to construction phase			***During under construction phase***		
	All projects (%)			*All projects (%)*		
No change	68	72	70	75	80	78
Between 0 and 5%	2	1	2	1	2	2
Between 5 and 10%	3	2	3	1	3	2
Between 10 and 15%	2	2	2	2	1	2
Above 15%	25	23	24	20	14	17
	> $50m			*> $50m*		
No change	55	60	58	60	76	69
Between 0 and 5%	2	2	2	5	1	3
Between 5 and 10%	4	4	4	5	2	3
Between 10 and 15%	2	3	2	2	2	2
Above 15%	37	31	33	28	19	23

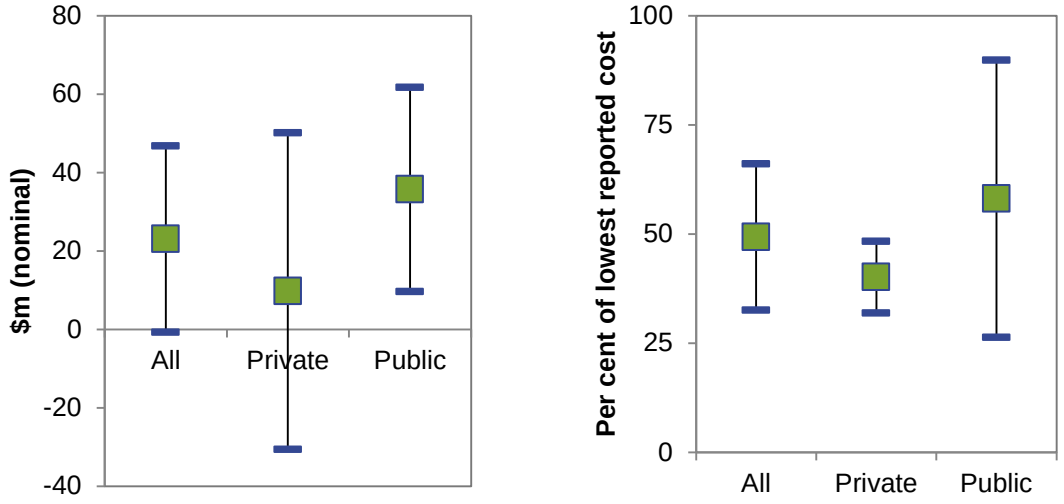
Source: Commission estimates.

However, while a greater share of projects conducted by public sector clients experienced some form of cost change during the construction phase, the average amount of that change was significantly lower than that seen for private sector clients (figure F.5). In both absolute and percentage terms, public sector clients saw less cost variation than private sector clients.

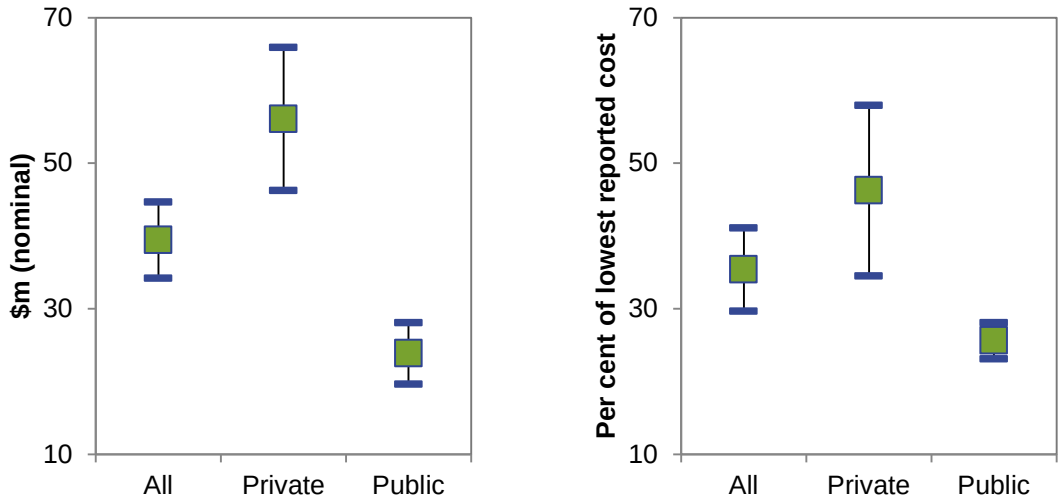
Figure F.5 **Reported cost differences during the pre-construction to construction phase and once under construction**

Construction projects spanning 2001 to 2013[a]

From pre-construct to construction phase



During under construction phase



[a] Box indicates the average result. The bars represent plus and minus 1 standard error.

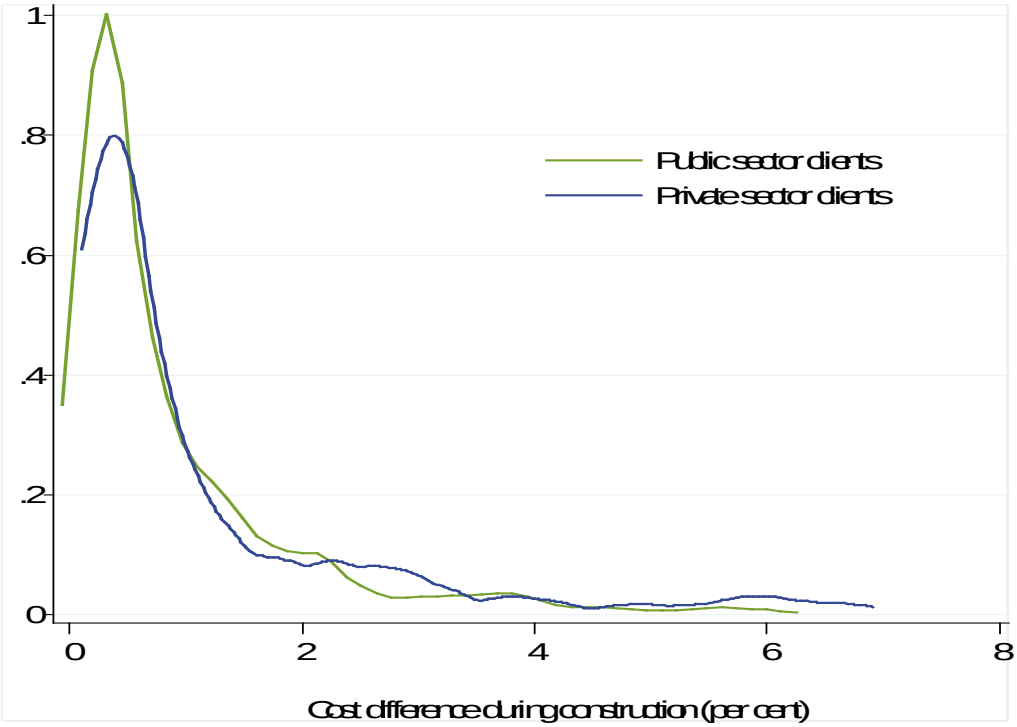
Source: Commission estimates.

There was significantly more variability for differences in reported costs between the pre-construct and construction phases. Public sector clients had higher averages, but the standard errors for both groups were large, meaning estimates were not statistically different.

This is illustrated by the fact that private sector clients had a much 'longer tail' to the distribution of cost changes during construction (figure F.6). While data are only presented for cost differences under 700 per cent (there were a number of projects

for which cost differences exceeded this), the greater concentration of cost differences for public sector projects at the lower end can be clearly seen.

Figure F.6 **Distribution of percentage cost differences during construction**
Probability density for construction projects spanning 2001 to 2013[a]



[a] Epanechnikov kernel used with bandwidth = 0.1697.

Source: Commission estimates.

As with the analysis conducted for projects in the pre-construction phase, project size and complexity appears to be the most important factor in explaining changes in construction costs. Regression analysis indicates that any differences between public and private sector clients in cost differences from pre-construction to under construction are better explained by project size rather than client type — this was true in both absolute and percentage terms (tables F.8 and F.9 respectively). However, there remains weak evidence that during the 'under construction' phase, public sector clients have lower cost differences compared to their private sector peers.

The inclusion of sub-industries as explanatory variables had little effect on the results — almost all were insignificant in explaining cost differences. There was, however, one exception. Public sector clients in the telecommunications sector had statistically significantly higher cost differences for cost differences during the construction phase, even after controlling for project size (regression 3 in table F.9).

Table F.8 **Simple regression results for change in reported costs during the pre-construction to construction phase and once under construction**

Construction projects spanning 2001 to 2013

	Coefficient	*Std. Error*	*P-value*	*Coefficient*	*Std. Error*	*P-value*
	From pre-construct to construction phase			**During under construction phase**		
	$m	$m	Prob.	$m	$m	Prob.
Regression 1						
Average difference (constant)	10	34	0.77	57	8	0.00
If public sector client	26	48	0.59	-33	11	0.00
Regression 2						
Average difference (constant)	-81	45	0.07	15	10	0.12
If public sector client	56	48	0.25	-18	11	0.10
If large project	151	48	0.00	78	11	0.00
Regression 3						
Average difference (constant)	30	35	0.40	15	10	0.12
If public sector client	-43	31	0.17	-21	11	0.06
If large project	72	35	0.04	76	11	0.00
If public sector telco. project	49	305	0.87	522	108	0.00
If private sector telco. project	-80	167	0.63	52	51	0.31

Source: Commission estimates.

A note of caution

Cost overruns do not *necessarily* imply that a project was delivered at higher than least cost. It is easily possible that cost and timing forecasts for large complex projects could be poor, but actual construction costs to be at efficient levels. There could be a significant contingency added for reasons of risk aversion – hence increasing the probability of the project being delivered within budget and within time.

Table F.9 **Simple regression results for percentage changes in reported costs during the pre-construction to construction phase and once under construction**

Construction projects spanning 2001 to 2013

	Coefficient	*Std. Error*	*P-value*	*Coefficient*	*Std. Error*	*P-value*
	%	%	Prob.	%	%	Prob.
Regression 1						
Average difference (constant)	40	24	0.10	46	8	0.00
If public sector client	18	34	0.59	-21	11	0.07
Regression 2						
Average difference (constant)	-20	32	0.52	31	10	0.00
If public sector client	38	34	0.27	-15	12	0.19
If large project	101	34	0.00	28	12	0.02
Regression 2						
Average difference (constant)	-20	32	0.53	31	10	0.00
If public sector client	38	34	0.27	-16	12	0.18
If large project	101	34	0.00	29	12	0.02
If public sector telco project	3	338	0.99	-5	117	0.97
If private sector telco project	-48	202	0.81	-27	55	0.63

Source: Commission estimates.

The collection of information as part of the Commission's recommendation on benchmarking should help provide some insights into these issues.

Is there a link between specification and delivery performance?

To explore any possible link between the planning and delivery phase, correlations in cost differences were explored. Again making use of the Investment Monitor data set, two correlations were estimated:

- between cost differences in the pre-construction phase and those during the construction phase
- between cost differences in the committed phase and those during the construction phase.

For all projects, there was a strong correlation between cost overruns observed in the pre-construction and construction phase. The correlation coefficient for all projects was around 0.7 (table F.10) suggesting projects with high cost overruns in planning also had high cost overruns during delivery.

However, there was a significant difference between public and private clients (table F.10). For private clients, the correlation between cost overruns in each phase was high, while for public sector clients it was significantly lower. This would suggest that for public clients, a high cost overrun in planning is not necessarily associated with a high cost overrun during delivery. It is possible that this result is driven by the fact that for public clients it is more likely that the department or agency that develops a project is distinct from that responsible for project delivery.

Projects that did not have a cost difference arising in the planning phase, but did so during construction were also examined. For this subset of projects, the average difference in cost overrun during delivery for public sector clients was lower than for private sector clients. However, as with the analysis above, it appears that project size is the key determinant, explaining almost all of the difference observed in average outcomes.

Also of interest is whether a cost overrun in planning increases the likelihood of a cost overrun during construction. A simple probit model suggests that there is a statistically significant link between cost overruns in the preconstruction and construction phases (table F.11). That is, if there is a cost overrun in the planning of a project there is a stronger probability that it will also see a cost overrun during delivery. This suggests that the importance of a well-planned and designed project has a lasting impact on project costs.

Table F.10 **Correlation coefficients of cost overruns in planning and delivery**

Construction projects spanning 2001 to 2013

Difference during construction to:	*All*	*Public*	*Private*
Difference during committed	0.71	0.20	0.73
Difference during pre-construction	0.52	0.10	0.56
For large projects			
Difference during committed	0.72	0.16	0.74
Difference during pre-construction	0.51	0.08	0.57

Source: Commission estimates.

Table F.11 **Probit regression results linking planning and delivery phase cost overruns**

Construction projects spanning 2001 to 2013[a]

	Coefficient	*Std. Error*	*P-value*
Mean effect (constant)	-1.15	0.06	0.00
Pre-construction overrun	0.87	0.13	0.00
If public sector client	0.41	0.06	0.00
If large project	0.47	0.06	0.00
If public sector client with pre-construction overrun	-0.56	0.21	0.01
If public sector electricity project	-0.63	0.19	0.00
If private sector electricity project	0.29	0.28	0.30

a probit model was used to estimate the likelihood that a cost overrun would occur during the construction phase conditional on a number of independent variables. Using the Investment Monitor data set, the likelihood of a cost difference during construction occurring (represented in dummy variable format equal to 0 if no overrun and 1 if an overrun occurred) conditional on whether an overrun occurred during the pre-construction phase (dummy, 1 for yes, 0 otherwise); client type (dummy, 1 for public, 0 for private) and whether the project was large (dummy, 1 for over $50 million, 0 otherwise) was explored. The effect of Industry dummies with client type interactions were also explored along with an interaction term between pre-construction overruns and client type. The estimated coefficients indicate the effect the independent variable has on the likelihood of an event occurring — in this case a cost overrun during the delivery phase. The probit model was estimated in Stata using robust standard variance estimates.

Source: Commission estimates.

The analysis also reveals a number of other interesting factors.

- Project size is important. Again, large projects are more likely to experience cost overruns during construction than smaller projects.
- Public clients are more likely to experience cost overruns in construction than their private sector peers , though the result is less strong compared to the effects of project size and pre-construction overruns. Concerns about the representativeness of the data sample casts particular doubt about the validity of small differences.
  - However, whilst not enough to break the strong link in overruns between the planning and delivery phases, for public sector clients that experienced a cost overrun during planning, cost overruns during construction were less likely. This could be due to either planning errors being found earlier or a 'tighter watch' placed on project delivery among others.
- The electricity sector projects, private sector clients were less likely to experience cost overruns during construction compared to their industry public sector counterparts and private clients in other industries.

G Labour costs

There are various conjectures about the pattern of labour costs in the construction industry, and their relationship to total construction costs, the bargaining power of unions and productivity. This appendix provides additional evidence on these matters — principally for chapters 9 and 13 — which set out broad findings. It is complementary to appendix H, which investigates the wages, conditions and workplace constraints associated with enterprise bargaining agreements in the construction industry.

G.1 Why do labour costs matter?

Rising real wage rates are often beneficial. They frequently reflect the dividend to employees from economywide productivity improvements, which are the long-run drivers of increasing real wages. Moreover, where a particular type of labour is scarce, as has occurred for some types of construction labour, higher wages provide the desirable impetus for training, labour mobility, labour-displacing innovation and substitution by capital and intermediate inputs.

Nevertheless, wage rates can settle at inefficient levels. For example, there may be deficiencies in the training system that fail to address labour scarcity quickly or well. The Commission has recommended some reforms in this area (chapter 15). Similarly, flaws in the IR system can sometimes lead to wage increases that reflect neither shortages nor productivity improvements.

In particular, in the construction industry, there is the potential for wage bargaining arrangements to lead to inefficient wages and conditions. Many factors contribute to this, including:

- the widespread use of pattern bargaining to spread high real wages across entire parts of the industry
- the pressures that unions may sometimes bring to bear on head contractors to compel all sub-contractors to provide equal wages and conditions, or where they do not, to exclude such suppliers
- the desire for wage certainty and reduced IR risk means that head contractors are willing to negotiate project agreements that lock in high wages and conditions

for the term of the project. Since each head contractor knows others have negotiated similar agreements, there may be competitive pressure to reduce wage pressures through the tendering process may be weakened. The client bears the cost

- a government may not be as precise sensitive as private sector customers and have other agendas beyond purely commercial goals
- the capacity for coercion, unprotected industrial action (or its threat), as a bargaining chip for constructors to enter into an EBA with improved wages and conditions.

Cole (2003) documented many of these factors.[85] Evidence put to the Commission in this inquiry suggests that these factors are still relevant, at least for some construction activities, projects and jurisdictions. For example, a survey by Deloitte Access Economics (DAE 2014b, pp. 17–18) of Australian constructors suggested, among other things, that labour cost increases had been underpinned by strong bargaining power rather than productivity improvement.

Some of the normal factors that limit substantial union bargaining power, most particularly, competition from imports, do not apply to many forms of public infrastructure. Public infrastructure construction and the services they provide are to a large degree not traded.[86] There is some scope for capital and material substitution, for example, through the use of more prefabricated assemblies, but it is unlikely that this will have any significant immediate effects on wage pressures.

Accordingly, the characteristics of the industry and its wage bargaining processes suggest that there are risks that wage outcomes might be higher than efficient.

To place the above discussion in context, this appendix is largely silent on two matters.

- Other factors may lead to inefficient (or 'excessive') wages beyond those listed above. In realistic labour market settings, the extent of any inefficiencies also depend on the countervailing power of businesses; the interaction of laws and regulations with the bargaining processes; the transaction costs of bargaining; the responsiveness of the various parties to prices (including of final customers to product prices); and the objective function of unions (which may not coincide perfectly with the workers they represent). 'Excessive' wages may also have a

[85] For example, p. 84 (vol. 2), p. 34 and 37 (vol. 3), and p. 51 (vol. 5).

[86] Construction projects directly related to commodity exports, such as LNG plants, are potential exceptions, but these are not within the scope of this inquiry. In principle, some activities could be imported (for example, manufacture components), but such potential competitive pressures are unlikely to be significant other than in specialised cases (for example, floating LNG trains).

more common sense meaning — the distribution of rents to labour or capital that appears unreasonable.

- There are many outcomes other than wages from the relationships between businesses and unions. The relative powers of the parties to manage project sites, to decide who works, and to determine which businesses are successful; and more broadly, problematic conduct (coercion, industrial disputes, sham contracting, 'phoenixing' and rivalry between unions), have effects that extend beyond wages. Wages may often reveal the effects of these aspects of the relationships between the parties, but they have their own independent impacts and regulatory responses. Accordingly, this appendix throws light on only one important facet of employee/business interactions. Chapter 13 covers the broader range of issues in more depth.

What are the economic implications of any wage increases for constructors?

Labour costs accounted for 23 per cent of total construction costs in 2011-12 (ABS 2013a). Putting aside any substitution by capital or intermediate inputs, an increase in the returns to labour of 10 per cent without a corresponding productivity improvement would increase construction costs by 2.3 per cent (and with a fixed markup, prices by the same proportion). This is not trivial because of the huge investments in public infrastructure. Moreover, the labour share varies by construction type and jurisdiction. As shown in chapter 9, the labour share of total expenses for civil and engineering projects varies from 23 per cent (road construction) to 39 per cent (energy construction activities).

Moreover, from the perspective of the constructor, any increase in labour costs that cannot be recovered from the client represents a decline in their rate of return. While head contractors signing project agreements ahead of a project might insulate themselves from that risk (because the labour cost is built into their bid), this may not be true for all sub-contractors, which may have entered into commercial contracts with the head contractor, but not secured wage certainty with their employees. (EBAs for some sub-contractors can lapse during a project.) Labour costs amount to around 70 per cent of the total returns to capital and labour ('total factor income'), so the re-distributional effects for holders of capital are much larger than implied by the labour share of all expenses (ABS 2013a).

G.1 Levels and trends in aggregate labour costs

By its nature, testing whether construction wages are 'excessive' or 'inefficient' is difficult. Equally, it is hard to assess to what extent there is a causal link between the changing IR environment in the construction industry over the past decade and wage bargaining outcomes.

Regardless, there is value in finding out what has actually happened to construction wage rates. In itself, this is not a straightforward story, and it is easy to misinterpret the various measures of labour costs.

Earnings

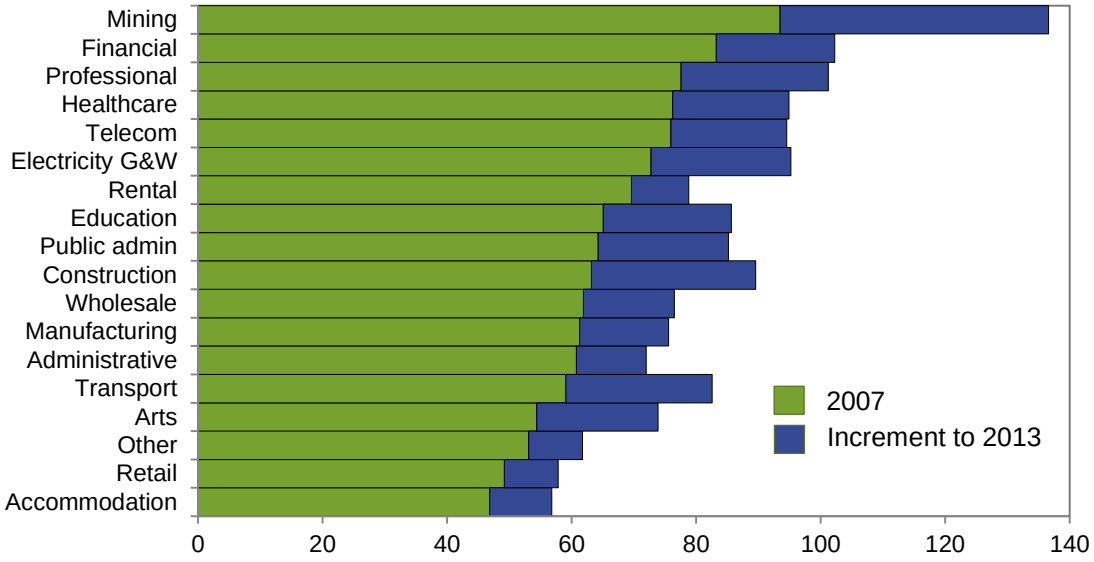
In the mid-2000s, male full-time earnings per week in the construction industry were roughly on par with average economywide earnings per week — with earnings around the median of the values for the 18 major industries making up the economy (figure G.1).[87] However, growth rates in earnings from November 2007 (just prior to the global financial crisis) to November 2013 have exceeded most industries (figures G.1 and G.2). This is consistent with the finding that enterprise bargaining agreements in the construction industry systematically provided higher average wage rate rises from 2007 to 2013 (chapter 13 and appendix H). Nevertheless, in 2013, average construction earnings were still only the 7th highest among the 18 industries covered by the data.

At least for the five years from 2008, growth rates in construction industry earnings appear to follow trends in mining (figure G.3). The link in wage growth between the two industries partly reflects that they use some common types of labour. However, the relationship has not always been clearcut. This suggests that factors unrelated to the resources boom are at work, including changes in the industrial composition of both industries, their changing skill mixes, the varying locations in which they operate, and differences in their industrial relations arrangements.

[87] Using data on full-time male earnings has the advantage that it controls for differences in the share of workers employed part-time and full-time, and of the changing gender mix of the industry (although the latter is largely irrelevant in this male-dominated industry).

Figure G.1 **Average annual total weekly earnings for full-time males by industry**

November 2007 and 2013, annual income, current prices ($'000) [a]

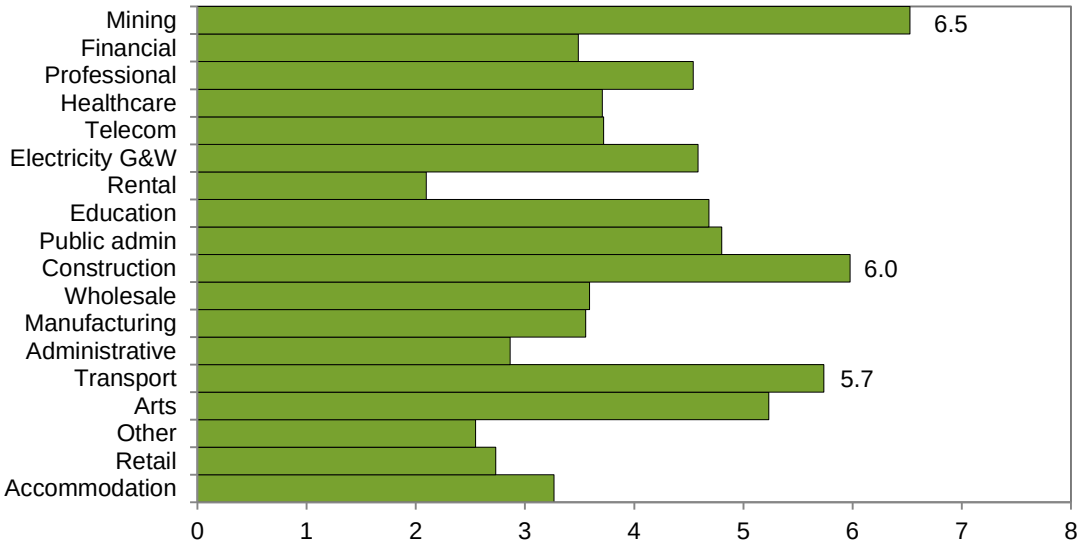


[a] Earnings include overtime, site allowances, enterprise bargaining payments, shift allowances, earnings under profit sharing schemes, and any workers' compensation payments. It does not include reimbursements to employees for travel, entertainment, meals and other expenditure incurred in conducting the business of their employer.

Source: ABS 2014, *Average Weekly Earnings, Australia*, Cat. No. 6302.0, table 10B (released 20 February 2014).

Figure G.2 **Growth in male total weekly full-time earnings by industry**

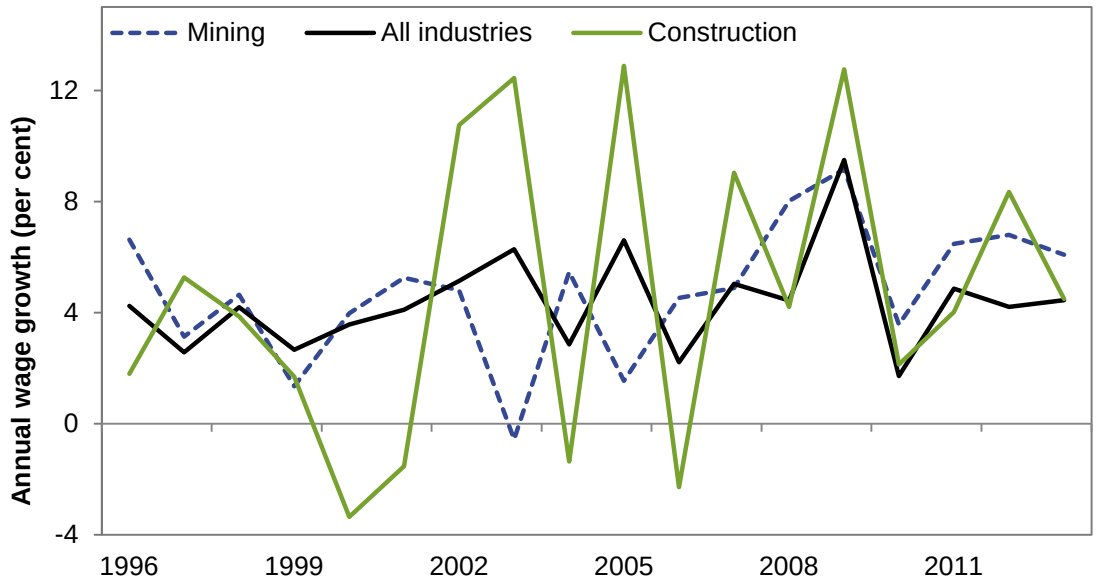
November 2007 to November 2013, compound average annual growth rate in current price earnings (per cent)



Source: ABS 2013, *Average Weekly Earnings, Australia*, Cat. No. 6302.0, table 10B (released 20 February 2013).

Figure G.3 **Year to year wage growth**

Current price total male full-time weekly earnings, May 1996 to May 2013



Source: ABS 2013, *Average Weekly Earnings, Australia*, Cat. No. 6302.0, table 10B (released 20 February 2013).

The price of labour and earning rates are different concepts

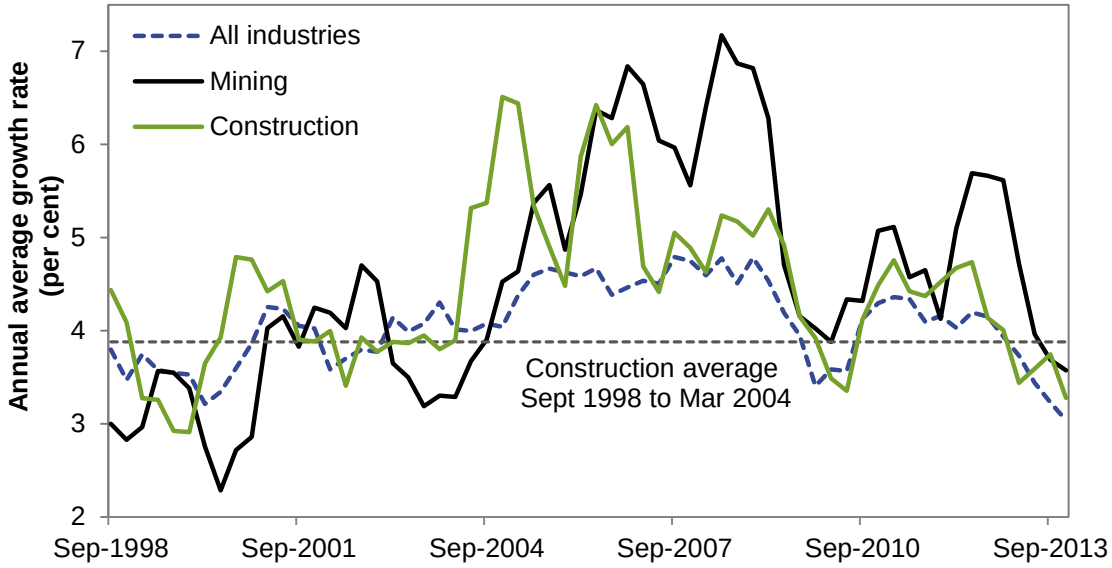
Short-run movements in earnings per week can be misleading. The annual nominal growth in total full-time weekly male earnings in construction has spiked at around 12 per cent in various years, but only following a period of low wage growth. On occasions, it has been negative. This volatility is likely to reflect the effects of fluctuations in demand for construction services. Earnings include payments that vary with the amount of work undertaken (such as overtime payments), so that periods of high or low construction demand affect earnings per person. Accordingly, while earnings represent the cost of labour services to construction businesses per worker, they do not properly measure the price of labour after controlling for short-run demand effects. After all, the weekly labour costs per worker borne by a business will inevitably rise if more hours are worked, with only the incremental penalty associated with overtime representing a genuine cost burden on business.

The so-called 'Wage Price Index' controls for variations in hours worked and compositional effects, such as changes in employees' ages and location of work. Fluctuations in this measure are much less than for total male earnings and have never been negative in nominal terms (figure G.4). For nearly all of the period from the June quarter 2004, the price of construction labour has exceeded that of the

economy as a whole, revealed as a steep increase in its relative price (figure G.5). In contrast, the price of labour in the mining relative to the construction industry has generally grown over this period — testimony to the fact that the wage pressures from the resources boom were less strongly experienced in the construction industry as a whole.

Figure G.4 **Growth in the nominal price of labour**

Year ending each quarter, September 1998 to December 2013[a]



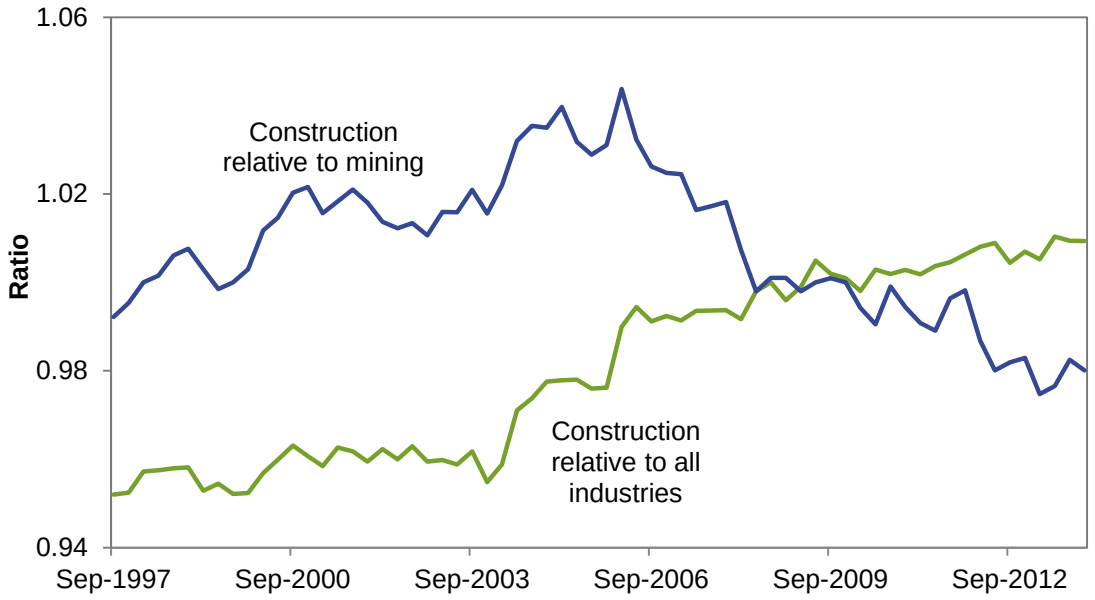
[a] Unlike average weekly earnings, the wage index excludes changes arising from changes in the amount of overtime taken or any other payment that varies with the amount of work undertaken and other compositional effects. They are pure price indexes, and appropriate for considering the *price* of labour, rather than the total labour costs borne by employers.

Source: ABS 2014 (*Wage Price Index, Australia*, table 5a, Cat. No. 6345.0).

Looked at from an historical perspective, the post-2004 growth rates in the construction labour price have still been above the historical average growth experienced for the years prior to 2004. Consequently, the construction labour price index has continued to rise at a greater pace than the previous period. However, from constructors' perspectives, the most decisive issue is not the growth rate in the price of labour per se, but its growth rate relative to the price of their services (figure G.6).

Figure G.5 **Wage price relativities**

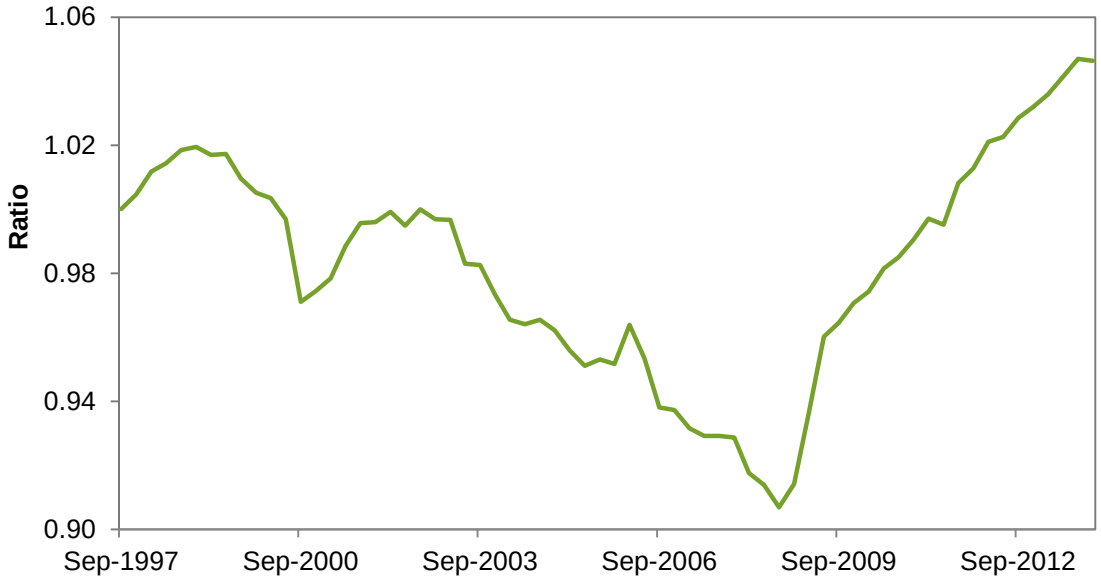
Ratio of wage indexes, September 1998 to June 2013



Source: ABS 2014 (*Wage Price Index, Australia*, table 5a, Cat. No. 6345.0).

Figure G.6 **The relative price of labour compared with the price of construction outputs**

September quarter 1997 to December quarter 2013



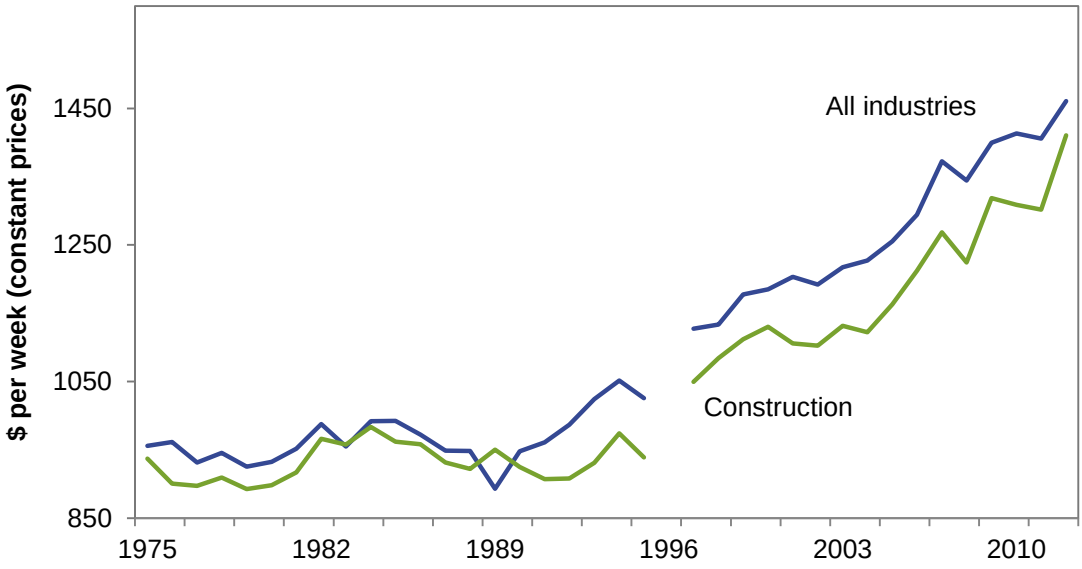
Sources: ABS 2014 (*Wage Price Index, Australia*, table 5a, Cat. No. 6345.0); ABS 2014 (*Construction Activity: Chain Volume Measures, Australia, December 2013*, Cat. No. 8782.0.65.001).

The story here is striking. For most of the decade from 1997 to 2008, construction price increases outpaced wage pressures, but that trend abruptly reversed in September 2008. This helps explains some of the concerns expressed by constructors about mounting wage costs in recent years. Whether this matters to businesses depends on any compensating productivity growth (section G.4).

Long-run relative wages

Patterns in the short-run data can too readily be identified as unique. Even data over the time spans above may not place recent wage trends in context. Unfortunately, the best indicator of the price of labour (the wage index) is not available over the long run. Nevertheless, cyclical effects are, by their nature short-run, so that data on full-time weekly male earnings are likely to give a reasonable representation of the long-run price of labour (figure G.7).

Figure G.7 **Long-run real full-time male earnings**
August 1975 to August 2012, CPI-adjusted, 2011-12=100.0[a]



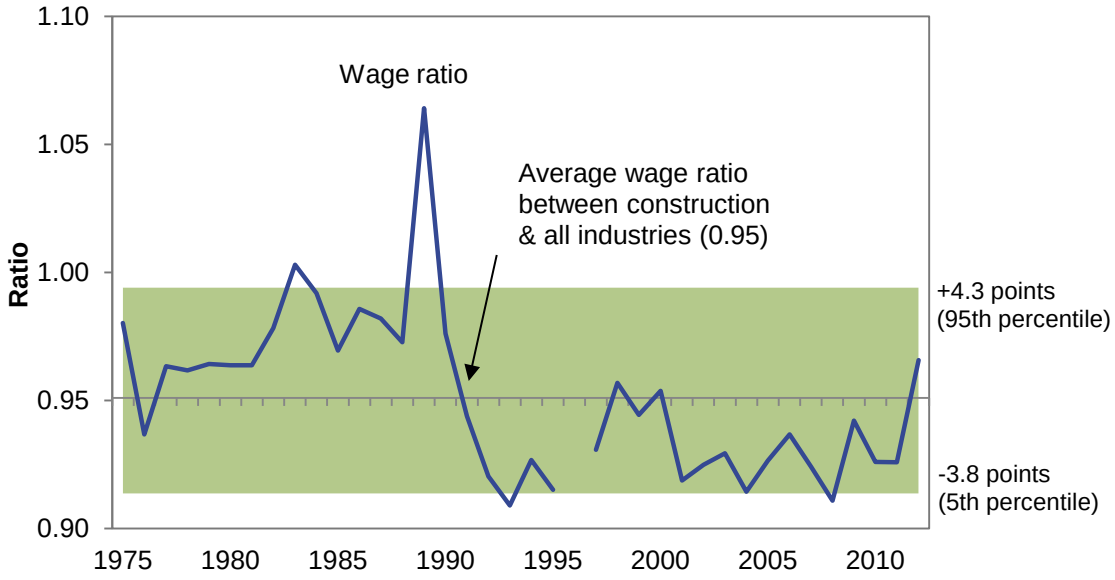
[a] No survey was undertaken in 1996. From 2007, the ABS asked employees to include salary sacrifice in their estimates of earnings. Prior to 1994, the ABS classified industries using the ASIC 1983, while from 1994 to 2006 it used the ANZSIC 1993, and from 2006, the ANZSIC 2006. Very few coverage differences arose for the industries above, so the series should be reasonably comparable. The data shown in this chart are based on a survey of employed people, whereas earnings data from the Average Weekly Earnings publication are from employers.

Sources: ABS (*Employee Earnings, Benefits and Trade Union Membership, Australia*, various issues, Cat. No. 6310.0); ABS (*Consumer Price Index, Australia*, Cat. No. 6401.0).

On average, construction weekly earnings have been around 5 per cent below the all industry value, and have remained within a relatively narrow band of about

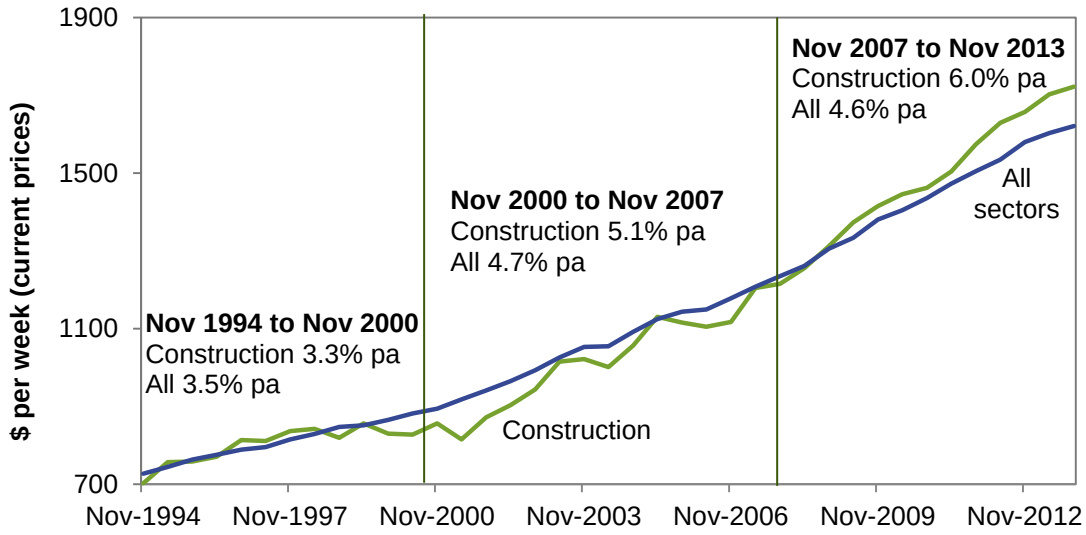
4 percentage points around this, and by even a smaller margin from 1990 (figure G.8). Most recently, weekly construction earnings have moved closer to the all industry average (figure G.7) and, indeed, have been somewhat above the all industry value using an alternative data source (figure G.9).

Figure G.8 **The construction to all industries wage ratio, 1975–2012**



Source: ABS (*Employee Earnings, Benefits and Trade Union Membership, Australia*, various issues, Cat. No. 6310.0).

Figure G.9 **Total weekly earnings for full-time males by industry**
November 2000 to May 2013



Source: ABS 2013 (*Average Weekly Earnings, Australia*, Cat. No. 6302.0, table 10B).

From the long-run perspective, these data suggest that the wages in construction and the economy as a whole tend to follow each other. It is therefore unlikely that a large permanent gap will open between average economywide wages and construction wages (unless the skill levels of the construction industry labour market rise or fall at a faster rate than the economy as a whole). As noted by some constructors in their discussions with the Commission, many of the wage pressures they face simply reflect that Australia is a high wage country.

G.3 A diverse industry with diverse wage outcomes

As emphasised throughout this report, the construction industry is diverse, encompassing low skill and low capital-intensive tasks, such as, on the one hand, labouring on a housing construction site and, on the other hand, tunnelling under major cities using advanced tunnelling machinery and skilled labour. Unfortunately, official statistics only provide glimpses of this diversity, and are especially problematic for examining some important labour market aspects of the industry.

There are some insights from probing beneath the aggregate figures

In many (but not all) of its statistical collections, the ABS differentiates between three main industry segments: building construction, civil and heavy engineering, and trade services.

Heavy and civil engineering labour costs have risen most steeply of all construction labour costs (from 2006 to 2012), even apparently eclipsing that of mining (table G.1 and figure G.10). However, ABS does not generally provide separate information for non-residential building construction and residential buildings. Accordingly, the data below may hide some important differences in the wage trends for these two segments of the industry. Even with the coarse breakdown of the industry shown in table G.1 and figure G.10, the varying degrees of labour cost increases mean that considerable care must be taken in comparisons of costs at an aggregate level.

Industry segments are still too broadly defined

While it is useful to make comparisons of the kind shown above, the industry categories used are ill-suited to analysis of the diverse labour markets that they subsume. Building construction is a particularly diverse segment in terms of its labour market features. It includes housing construction, other residential construction and non-residential buildings.

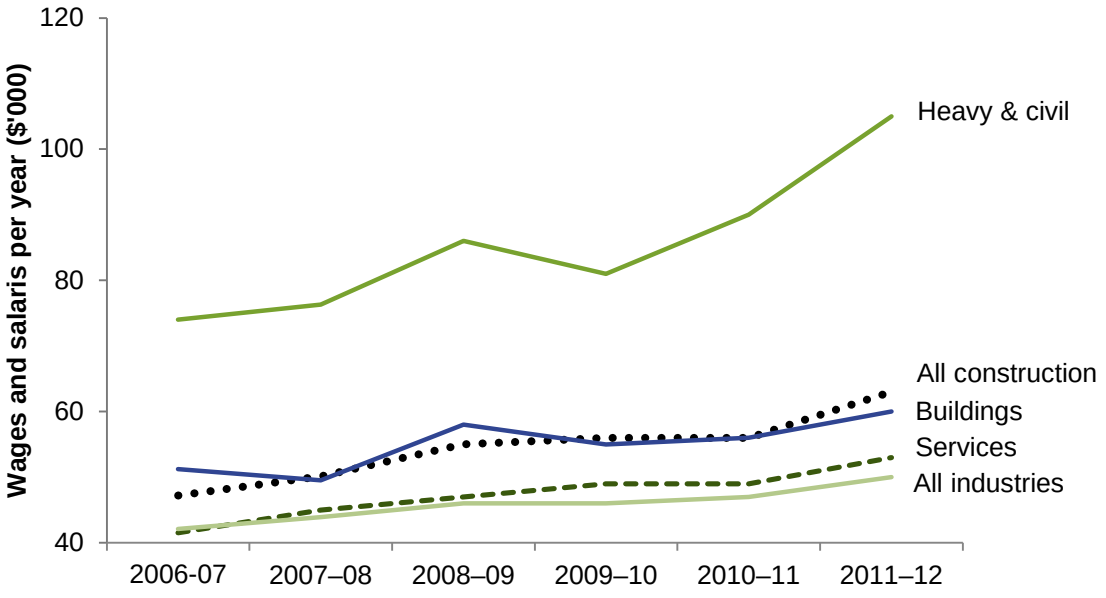
Table G.1 **Annual growth rates in nominal male full-time earnings**
2006–2012[a]

	Mining	*All construction*	*Building construction*	*Heavy and civil engineering construction*	*Construction trade services*	*All industries*
	%	%	%	%	%	%
2006–2009	7.5	5.6	2.9	3.2	6.0	5.4
2009–2012	3.2	5.1	5.3	11.9	4.0	4.2
2006–2012	5.3	5.3	4.1	7.4	5.0	4.8

a Relates to earnings in main job in August of the relevant years. Growth rates are compound averages.

Source: ABS, *Employee Earnings, Benefits and Trade Union Membership, Australia, August 2012*, Cat. No. 6310.0 (released 17 May 2013).

Figure G.10 **Wages and salaries by industry sub-division**
2006-07 to 2011-12 [a]



a All industry excludes financial services and public administration.

Source: ABS 2013 (*Australian Industry, 2011-12*, Cat. No. 8155.0).

- The housing construction industry is dominated by small enterprises (and many self-employed workers), which are often engaged on comparatively small projects. Union representation is modest and arrangements for working are highly flexible. Competition is cutthroat. This report does not cover this part of the industry, although its functioning may sometimes serve as a comparator with less flexible parts of the industry. (This strategy was used by Independent Economics to test the impacts of certain IR changes — appendix I.)

- Non-residential building involve a wide range of construction activities, including the building of warehouses, factories, commercial offices and retail buildings, railways stations, airport terminals, sewerage and desalination plants, and social infrastructure (for example, prisons, hospitals and sports stadiums). Many of these activities are covered by this report. Notwithstanding some common features, the projects vary in their sophistication, size, skill sets of workers, technologies and union arrangements.
- Other residential construction straddles the two other segments. Large residential complexes are much more akin to offices, while small blocks of flats are most akin to housing.

Most official labour market statistics, including employment and wage levels, do not differentiate between these very different parts of the building industry. Nor do they differentiate between workers engaged in new construction on the one hand, and alterations and maintenance on the other, although the employment arrangements for these activities can be quite distinct.

There is no significant equivalent to the highly flexible housing segment in the civil and heavy engineering construction industry (which mainly comprises the construction and maintenance of transport infrastructure), which at least reduces the severe problems that beset analysis of the building construction labour market.

The third segment of the industry defined by the ABS is 'trade services'. This is not a meaningful industry at all. Instead, it covers a wide range of trade occupations that provide inputs into the other two segments of the industry. People in trades are footloose across project types. An electrician may work on a major infrastructure project in one year, a commercial building the next, and a large residential unit at another time. The employment figures and wage data for building construction and civil and engineering projects exclude such workers. As a result, even something as simple as the number of workers employed on public infrastructure projects is not known.

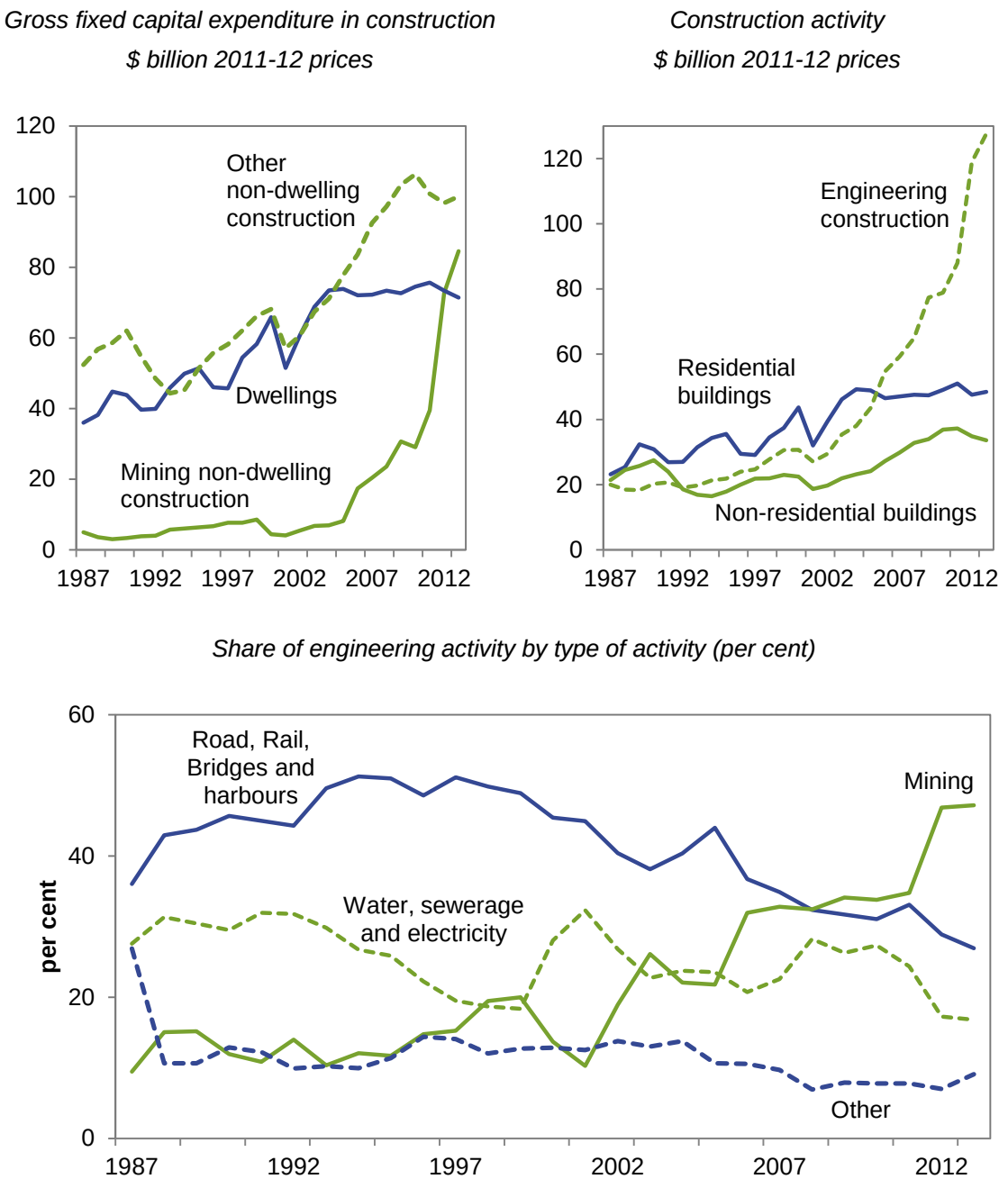
A fourth important segment of the construction industry — specialist design services — is not categorised as part of the construction industry.

Compositional shifts will therefore be problematic

While official labour market statistics generally only relate to a few segments of the industry, ABS data provide more detailed information about *activity* in the industry. This reveals that there have been major compositional shifts, which will influence

trends in aggregate labour costs (figure G.11) (and aggregate productivity trends too).

Figure G.11 **Diverse activity patterns for a diverse industry**
1986-87 to 2012-13[a]



[a] There are various inconsistencies (some from trivial) between estimates of construction activity given by the varying data series above (reflecting their scope and definition), but the results are nevertheless indicators of the major structural changes in the construction industry.

Sources: ABS 2014 (*Engineering Construction Activity, Australia*, Cat. No. 8762.0); ABS (*Australian System of National Accounts*, Cat. No. 5204.0); ABS (*Construction Activity: Chain Volume Measures, Australia*, Cat. No. 8782.0.65.001).

In contrast with other buildings, construction of dwellings (whether housing or otherwise) has been stagnant from the early 2000s. So the most flexible and lowest paying part of the construction labour market has assumed much less importance. For example, gross fixed capital expenditure in dwellings increased by a paltry 4 per cent from 2002-03 to 2012-13 in constant price terms. In comparison, investment in non-dwelling construction (which includes non-residential buildings and civil engineering construction) increased by around 150 per cent over the same period. A particularly important part of this growth was investment in non-dwelling construction in mining (up more than 1000 per cent), but even growth in non-mining non-dwelling construction was around 50 per cent from 2002-03 to 2012-13.

Civil engineering construction activity has grown faster than any other category of construction spending (using a different measure of construction activity), with growth in mining again growing faster than public infrastructure spending.[88]

Even had there been no growth in wage rates at the disaggregated level, the shift away from lower paying residential construction would have raised the average earning rates of the construction industry.[89] This underlines the importance of carefully interpreting the aggregate earnings data.

G.4 The real wage overhang and the labour share of factor income

The real wage overhang

Where the growth in real product wages (measured as nominal wages divided by the price for construction services) exceeds labour productivity growth, constructors face the prospect of declining profit margins (a 'real wage overhang'). At the industry level, a gap can open up between real product wage growth and labour

88 There are various inconsistencies (some far from trivial) between estimates of construction activity given by the varying data series (reflecting their scope and definition), but the comparative trends are nevertheless qualitatively similar.

89 While the ABS does not generally publish data on the relative earnings of employees in the various segments, it has provided some estimates for some periods. In 2008, weekly earnings of full-time non-managerial adult employees were around $1150, $1720, $1760 and $1210 for residential buildings, non-residential buildings, heavy and civil engineering construction, and trade services respectively (based on ABS, *Employee Earnings and Hours, Australia*, Cat. No. 6306.0).

productivity growth rates for several reasons, including the relative capacity of unions and businesses to bargain with each other.

While cycles in the data make it difficult to determine an appropriate starting point for the analysis, there is a positive trend in the real wage overhang in recent years using either EBA data or the ABS wage index (figure G.12). (However, for most of the period concerned, productivity growth exceeds wage growth — just to a decreasing extent).

This result is (weakly) consistent with rising union bargaining power, but it could be consistent with other economic developments too. For instance, constructors may need to negotiate wage increases that reflect the competing demands for construction labour from other sectors (most notably the resources sector).

The labour share

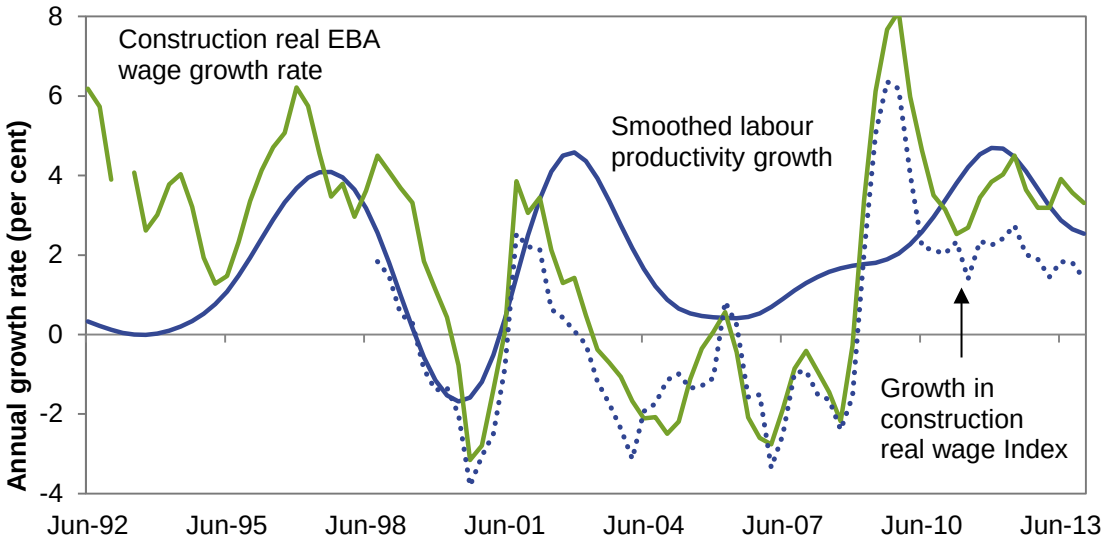
Other evidence on this issue is mixed. The so-called labour share of 'factor income' (which comprises the gross payments to labour and capital) provides another perspective on the degree to which labour has been able to secure higher returns relative to other factors. The 'unadjusted' labour share of income is measured as employees' earnings as a share of all returns to factors. An alternative (more appropriate) measure takes into account the labour income of employers and own-account workers (Australian Council of Trade Unions sub. 95, p. 7).

In New South Wales and Victoria, the labour share increased from the mid-2000s, regardless of whether the adjusted or unadjusted measure is used (figure G.13).[90] This too is consistent with greater union bargaining power, as suggested above. However, in some other jurisdictions, the pattern was quite different, particularly for Queensland.

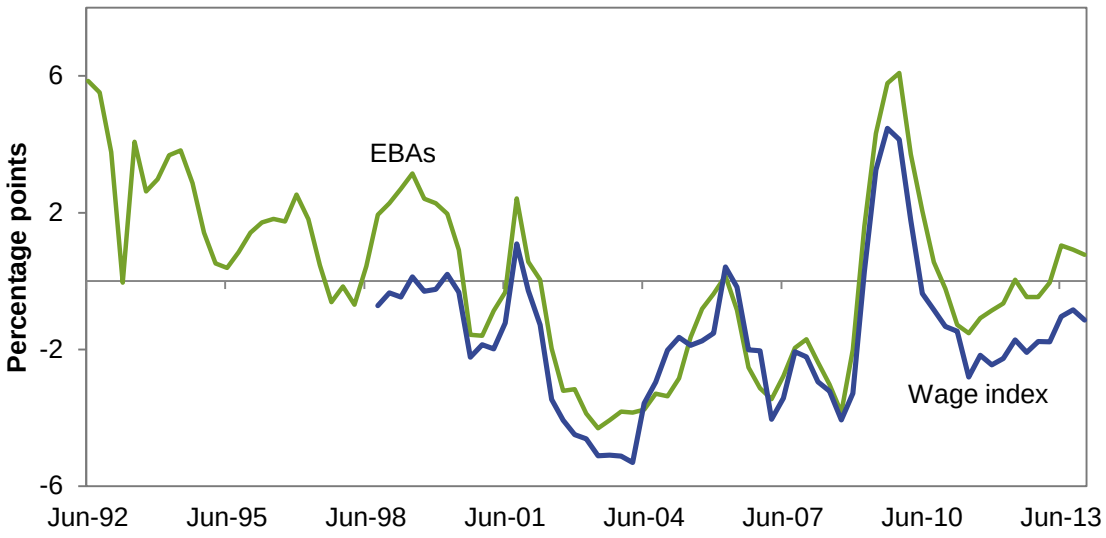
[90] Another interpretation of the labour share of factor income is that it too shows the extent to which real wages (measured in producer prices) outpace labour productivity growth (the 'real wage overhang'). That is, real wages = w/p, where wages are nominal wages and p the price deflator for construction. Labour productivity = y/L where y is gross value added for construction and L is hours by all construction employees. So the real wage overhand is [w/p] / [y/L] = wL/p.y, which is the labour share of income. Different data sources and wage measurement probably explains the divergence between the measure of the real wage overhang given by the labour share of factor income and the more direct measure discussed earlier.

Figure G.12 **Real product wage growth and labour productivity growth**
June 1992 to December 2013[a]

Growth in real wages and labour productivity



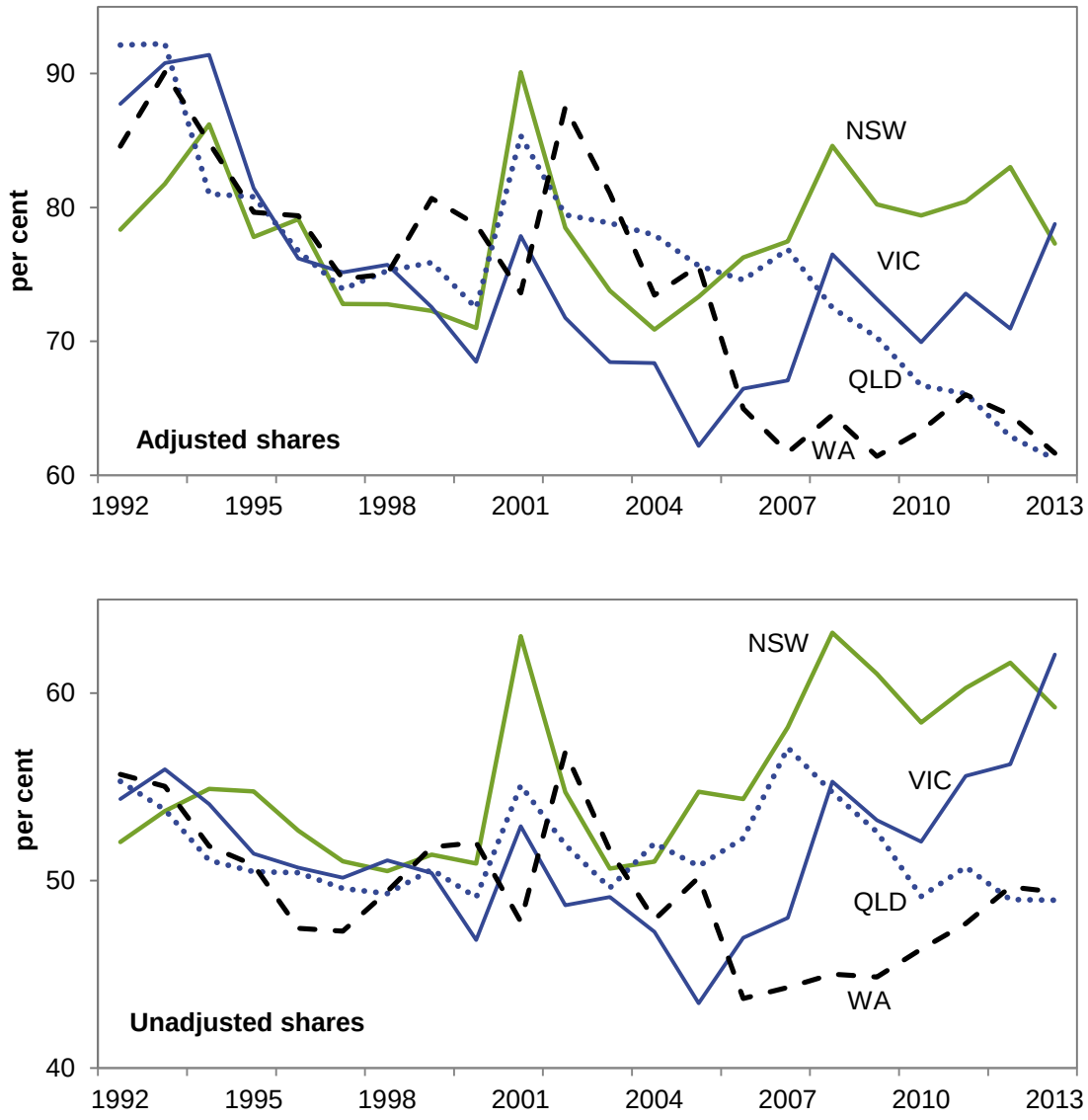
The gap between growth in real wages and labour productivity



[a] The wage rates are deflated by the implicit price deflator for construction activity.

Sources: ABS 2014 (L*abour Force, Australia, Detailed*, quarterly, February, Cat. No. 6291.0.55.003); Department of Employment (2014), *Historical Table on all wage agreements lodged in the quarter December 1991 to September 2013*; ABS (*Wage Price Index, Australia*, Cat. No. 6345.0); ABS (*National Accounts*, Cat. No. 5206.0).

Figure G.13 **Construction labour shares of total factor income, 1992 to 2013**[a]



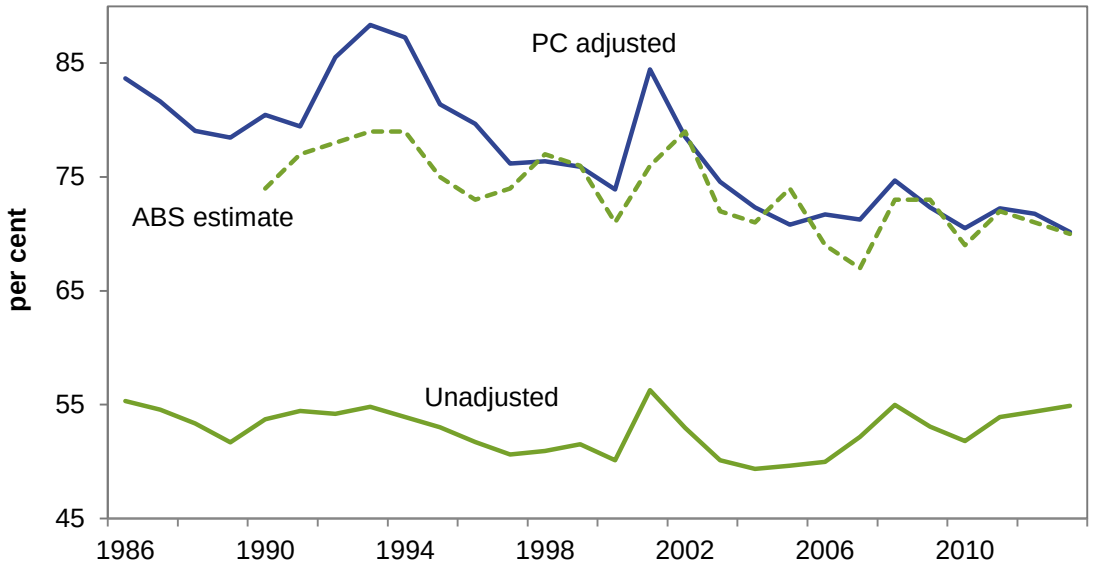
[a] It is difficult to measure the labour income share of factor income accurately. The unadjusted measure is wages, salaries and supplements as a share of total factor income for each of the major jurisdictions. However, the residual factor income includes gross operating surplus (of incorporated businesses) and gross mixed income (which includes labour provided by independent contractors and others who supply labour, while not strictly being an employee). The adjusted measure calculates the average earnings per employee and imputes the same labour income to all other employed workers. The adjusted labour income share uses this re-calculated value of labour returns.

Sources: Data derived from ABS 2013 (*Australian National Accounts: State Accounts, 2012-13*, Cat. 5220.0); ABS 2014 (*Labour Force, Australia, Detailed*, quarterly, February, Cat. 6291.0.55.003).

At the national level, the results depend on the choice of approach. Depending on the starting point, the 'unadjusted' labour share of income has increased from the mid-2000s (figure G.14). Nevertheless, once the labour income of employers and own-account workers is taken into account (using either the ABS or PC approach), the Australia-wide labour income share of the construction industry has decreased

in recent years (Australian Council of Trade Unions sub. 95, p. 7). This suggests that, overall, construction workers have *not* been able to make wage demands in excess of labour productivity growth.

Figure G.14 **Construction labour shares of total factor income**[a]
1986 to 2013



a The unadjusted and PC measures are described in the note below the previous chart. The ABS estimate is from its calculations of multifactor productivity, and involves a more complex imputation method that directly takes account of returns to capital. The data relate to the fiscal year ending from 1986 to 2013.

Sources: ABS (*Australian National Accounts*, 1992-93, and 2012-13); ABS 2013 (*Estimates of Industry Multifactor Productivity*, Cat. No. 5260.0.55.002); ABS 2014 (*Labour Force, Australia, Detailed*, quarterly, February, Cat. 6291.0.55.003).

The results depend on several assumptions about the returns to capital and the appropriate wage rate to use for working proprietors.

- *Method 1*: One approach is to assume that the wage rate of employees and of proprietors are the same, with the residual income comprising capital returns to businesses. This is the approach used by the Commission to derive the 'back of the envelope' adjusted estimates of the labour share (as shown in figures G.13 and G.14). However, this approach has some deficiencies. It ignores variations in the skill mixes of these workers by industry segment and over time, and fails to take into account the fact that the wages of employers and own-account workers are not determined through wage bargaining. Moreover, some of these workers may be able to manage their affairs to reduce their tax liabilities. This would allow them to lower their implicit earnings (and thereby their bid prices for jobs), while earning a post-tax income equivalent to the amount they would have received had they fully paid their taxes.

- *Method 2*: Despite its sophistication, the ABS's alternative method may still be susceptible to significant (if not greater) deficiencies. The ABS starts with the above approach to provide an initial estimate of total labour income of proprietors (LI). It then also estimates total capital income (KI) by multiplying the rental price of capital times the capital stock. The ABS measures capital as the sum of a series of previously depreciated investments (a vintage permanent inventory model using an assumed retirement function). For understandable reasons it does not re-estimate the effective capital stock by discounting underutilised or mothballed physical capital each year. Accordingly, 'phantom' assets still generate capital income in these calculations. The rental price of capital takes account of the current purchase price of new capital, the cost of debt, leverage, and tax rates and concessions. Therefore, if capital equipment prices rise, then the firm has more capital income, even if its holdings of capital are entirely firm-specific and unsaleable. Any rents from market power are not counted. The ABS scales the LI and KI estimates so they add to the observed value of gross mixed income from the national accounts.

The direction of mismeasurement in these two adjusted estimates of the labour share is not clear. It will probably depend on the economic circumstances of the construction industry in certain periods and jurisdictions. That, combined with the high level of aggregation of the data, means that no definitive conclusions about *national* trends in the relative bargaining power of unions and businesses — one way or another — can be reached from the various measures of the real wage overhang. There is a stronger, if still uncertain, case that union bargaining power may have strengthened in New South Wales and Victoria.

The most problematic behaviour by unions, and the main target for the actions by the various construction-specific IR regulators, has been non-residential buildings. The aggregate data hides this story for that segment of the industry.

G.5 Links between earnings and the creation of IR arrangements specific to construction?

Tougher IR arrangements were introduced for the construction industry with the formation of the BIT (in 2002) and its more enduring twin, the ABCC (in 2005). The ABCC was replaced by FWBC in 2012, a body that has weaker powers.

As suggested in section G.1, by weakening the capacity of unions to use certain bargaining tactics, all other things being equal, the BIT/ABCC might be expected to reduce wage pressures. However, this does not show up clearly in the aggregate data (table G.2).

Table G.2 **Measures of relative nominal wage growth under different IR regimes**

Construction versus all industries, annualised per cent change

	Pre-BIT (Pre-October 2002)	*BIT (October 2002 to October 2005)*	*ABCC (October 2005 to June 2012)*	*FWBC (June 2012 to present)*	*All regimes*
AWE (ABS 6302.0)					
Periods used	*May 1998 to May 2002*	*May 2002 to May 2005*	*May 2005 to May 2012*	*May 2012 to Nov 2013*	*May 1998 to Nov 2013*
Construction	1.21	6.56	5.83	5.03	5.02
All industries	3.48	5.01	4.66	4.77	4.51
Wage index (ABS 6345.0)					
Periods used	*Dec 2007 to Sept 2002*	*Sept 2002 to Sept 2005*	*Sept 2005 to June 2012*	*June 2012 to Dec 2013*	*Sept 2007 to Dec 2013*
Construction	3.43	4.42	4.05	3.00	4.08
All industries	3.22	3.65	3.70	2.79	3.64
National Accounts (ABS 5204.0 and Labour force data)					
Periods used	*1997-98 to 2001-02*	*2001-02 to 2004-05*	*2004-05 to 2011-12*	*2011-12 to 2012-13*	*1997-98 to 2012-13*
Construction	3.00	2.14	6.06	0.32	4.51
All industries	3.85	4.12	4.34	2.31	4.22
Multifactor productivity calculations (ABS 5260.0) and Labour force data					
Periods used	*1997-98 to 2001-02*	*2001-02 to 2004-05*	*2004-05 to 2011-12*	*2011-12 to 2012-13*	*1997-98 to 2012-13*
Construction	1.90	3.44	5.99	1.17	4.62
All industries	4.69	4.72	4.62	1.97	4.82
Employee Earnings Benefits and Trade Union Membership (ABS 6310.0)					
Periods used	*August 1997 to August 2002*	*August 2002 to August 2005*	*August 2005 to August 2011*	*..*	*August 1997 to August 2012*
Construction	4.05	4.11	4.80	..	4.65
All industries	4.46	4.22	4.82	..	4.68
Australian Industry (ABS 8155.0)					
Periods used	*..*	*..*	*2006-07 to 2011-12*	*..*	*..*
Construction	..	..	5.13	..	..
All industries			3.04		
Employee Earnings and Hours (ABS 6306.0)					
Periods used	*May 1998 to May 2002*	*May 2002 to May 2004*	*May 2004 to May 2012*		*May 1998 to May 2012*
Construction	2.92	3.14	5.99	..	4.89
All industries	3.20	4.23	4.85	..	4.55

Explanations: Box G.1.

Box G.1 **Derivation of labour input growth rates to match the different IR regimes**

There was no construction-specific IR regime before 2002. The BIT operated from October 2002 to October 2005, with the ABCC operating from October 2005 to June 2012. The FWBC has operated since 2012, although the Government has a bill before Parliament to reinstate the ABCC. Some refer to the entire period from October 2002 to June 2012 as the 'ABCC era' because of the similarity of the regimes (MBA sub. 88, p. 14).

The various wage input growth measures attempt to isolate any impacts of the IR regimes by comparing growth rates in labour returns over the period from just before a regime change to just before the next regime. For example, in the case of the Wage Index, the influence of the BIT was gauged by considering the growth rate from September 2002 (before the BIT) to September 2005 (before the ABCC).

In all cases, the data relate to employees, and not employers and own-account workers.

Each of the labour input cost measures has various inclusions and data availability, and so are not on a completely comparable basis.

- The periods used to test the influence of the various IR regimes do not typically relate perfectly to the regime dates. The actual periods used are provided in the table.
- The AWE values relate to full-time male employees and represent the total wage and salary bill divided by employees.
- The Wage Index is a price index adjusted for compositional changes in hours worked over time and also relates to all employees.
- The National Accounts data are based on wages, salaries and supplements for all employees divided by hours worked by employees (the latter from the labour force survey).
- The estimates based on the ABS Multifactor productivity calculations use the ABS allocation of gross mixed income, rather than assuming that the implicit wage rate of working proprietors are equivalent to the wage rate of employees. There are many complexities and assumptions in the ABS calculations, and these results may be less reliable than others.
- Values from the Employee Earning Benefits and Trade Union Membership relate to male full-time employees, and exclude salary sacrifice amounts before 2007. These were not large before 2007.
- Estimate from Australian Industry are based on wages and salaries for all employees.
- Data from Employee earnings and hours relate to weekly earnings of full-time male non-managerial employees, with salary sacrifice amounts imputed for all years.

All growth rate estimates are based on regressing the logged wage values against a time trend (and therefore reflect a trend rate of growth across all the relevant years).

- Various measures of wage growth rates in the construction industry showed these were higher after the introduction of the new IR arrangements.

- While wage growth rates were also higher for the economy as a whole, the wage gap with construction typically still widened after the new IR arrangements.
- As shown in appendix , the average annual wage rate growth rates achieved through EBAs in the construction industry (either as a whole or specific to civil engineering) trended upwards after the institutional changes. The gap widened between EBA wage growth rates in the construction industries and industries as a whole.

This does not mean that the BIT/ABCC *caused* the higher relative wage growth in the construction industry. There is simply no possible mechanism for that to occur. There are many hypotheses that could be applied to this trend. It is possible that the BIT/ABCC did reduce wage pressures, but that other factors hid that impact. Alternatively, the issues involved may generally have not been about wage growth but about other industry factors. The counterfactual is not available. The resources boom is likely to have contributed (figure G.11).

The Commission looked at several ways of attempting to remove the effects of the resources boom on wages. One approach was to consider wage growth rates in construction occupations affected by the resources boom, but not subject to union bargaining, and construction occupations affected by *both* the resources boom and union bargaining. The modelling did not identify the resources boom as an important confounding factor (box G.2), but the data had some unusual features that casts doubt on the validity of the results.

The Commission also examined the gap between growth rates in wages from EBAs in the construction industry compared with those in the mining industry (appendix H). The gap has trended down, but this trend commenced before the creation of the BIT and has persisted with the creation of the FWBC.

Given data inadequacies and the difficulty in controlling for other influences, it is not possible to measure the extent to which the BIT/ABCC may or may not have restrained wages growth.

In any case, features of the current IR system, such as widespread pattern bargaining and greenfields agreements negotiated under serious time pressures,, may mean that EBA outcomes have sometimes been excessive, irrespective of the influences of the construction industry IR regulator.

Box G.2 Did the resources boom conceal the real impact of the BIT/ABCC?

The pattern of wage growth rates by occupational categories provides a test of the significance of the resources boom as a confounding variable on wage growth during the BIT/ABCC era.

Construction engineers and construction trades both tend to face higher demand during resources booms.

Construction engineers are not usually unionised and do not normally participate in unlawful industrial action. Accordingly, their bargaining capacity could not realistically be affected by the creation of a construction-specific IR regulator. In contrast, the bargaining arrangements of workers with trade skills are more likely to be subject to the influences of the BIT/ABCC than professionals, and so wage growth for these groups could be expected to be lower than professionals after the creation of the BIT.

In that context, the wage experiences of professional engineers may act as a control for the resources boom and the effects of the BIT/ABCC.

Define W_t^e as the growth rate in wages in the pre-BIT period (2000–2002) for Building and Engineering Professionals (occupational category 212) and W_{t+1}^e as the wage growth rate for this occupation following the creation of the BIT (2002–2004).

Define W_t^O and W_{t+1}^O as the comparable growth rates in wages in the two periods for various other trades-related construction occupational categories (namely: 431 Electrical and Electronics Tradespersons; 441 Structural Construction Tradespersons; 442 Final Finishes Construction Tradespersons; 443 Plumbers; 711 Mobile Plant Operators; 712 Intermediate Stationary Plant Operators; 791 Intermediate mining and construction workers; and 991 Mining, Construction and Related Labourers).

For each occupational category define $\Delta W^O = \left(W_{t+1}^O - W_t^O\right) - (W_{t+1}^e - W_t^e)$, which is the difference in the difference between the growth rate in wages of any given trade occupation and the growth rate in wages of engineers. Generally, ΔW^O should be negative if the hypothesis that the BIT/ABCC cut wage pressures is correct. In fact, it is only (weakly) negative for one of the trades (Intermediate Stationary Plant Operators).

This does not prove the alternative hypothesis that the BIT/ABCC had no wage effects. The 'model' is very simple, the data period is short and there are some counterintuitive aspects to wage growth for some occupational categories. It is likely that the data are not sufficiently granular to find any effects.

Source: ABS (*Employee Earnings and Hours, Australia*, May, Cat. No. 6306.0).

H Enterprise Bargaining Agreements

This appendix analyses enterprise bargaining agreements (EBAs) in the construction industry (as used in chapter 13).

EBAs are interesting in several respects:

- their differences can reveal the differential bargaining power of parties at the project and enterprise level. Some of these differences may reflect the scarcity of labour, and some may reflect the exploitation of industrial muscle of either party to the agreements. In principle, EBAs can reveal any such power by their divergence with the usual wages and conditions of similar employees.
- their commonalities, which tend to reflect statutory requirements for minimum standards, but also industry awards and the capacity of unions to diffuse common features across multiple enterprises.

EBAs, therefore, provide an insight into the processes that lead to wage pressures.

H.1 What are enterprise bargaining agreements?

When considering the content of EBAs, it is important to understand what they are, and how their terms and conditions are established.

Enterprise bargaining is a process of negotiation between an employer (or a nominated representative) and its employees (or a nominated representative) for determining the wages and conditions of employees and the mutual obligations of the parties to each other. Most commonly, unions represent workers. The outcome is an enterprise agreement.

Enterprise agreements replace the various collective and individual workplace agreements in place before 1 July 2009. EBAs must be approved by the Fair Work Commission to be legally binding. (On a point of nomenclature, the ABS refers to agreements between many employees and an enterprise as a collective agreement.)

Agreements come in three forms, comprising single-enterprise agreements, multi-enterprise agreements and greenfields agreements. The first two are self-explanatory. The third is more complex and of special significance to the large

infrastructure projects that are the focus of this report. As noted by the Fair Work Ombudsman:

> A greenfields agreement is an enterprise agreement that is made in relation to a new enterprise of the employer or employers before any employees are employed. This can either be a single enterprise agreement or a multi-enterprise agreement. The parties to a greenfields agreement are the employer (or employers in a multi‑enterprise greenfields agreement) and one or more relevant employee associations (usually a trade union). (Fair Work Ombudsman 2014b)

The process is regulated through the *Fair Work Act 2009* (Cth), and prescribes aspects of the process and the content of agreements. Negotiation must be made in 'good faith'. There is a white list of matters than must be in agreements and a black list of matters that must not, such as any term that provides for an entitlement of entry to a workplace, or terms that exclude the National Enterprise Standards. Notionally, pattern bargaining is not permitted, though this is a matter of semantics more than a reality:

> … a bargaining representative of an employee who will be covered by the agreement must not engage in pattern bargaining in relation to the agreement. Pattern bargaining is when a bargaining representative is representing two or more proposed enterprise agreements and seeks common agreement terms with two or more employers. However, it is not pattern bargaining if the bargaining representative is genuinely trying to reach an agreement. (ibid)

Accordingly, the only real restraint on pattern bargaining is some preparedness of the employees' negotiating party to take account of the circumstances of the individual enterprise.

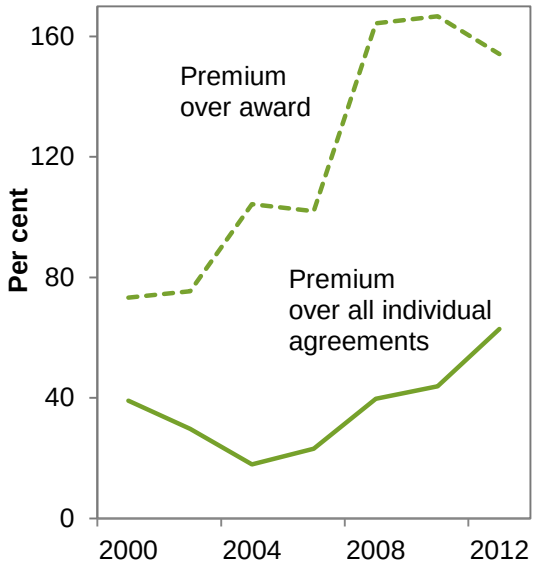
The requirements of the National Employment Standards, the conditions established by any relevant awards, and the prevalence of de facto pattern bargaining means that many enterprise agreements are either clones of each other or very similar (chapter 13). This is important in understanding the similarities in many agreements as analysed later in this appendix.

H.2 Some indirect evidence on wage bargaining trends

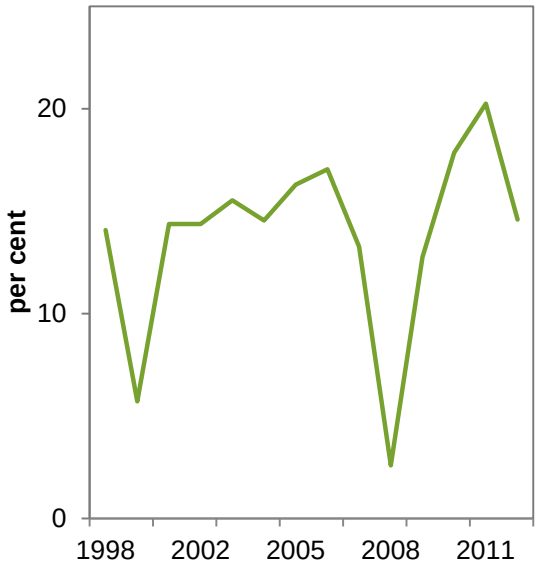
There are substantial variations in the levels and trends of employee earnings of union versus non-union members, and between workers on collective agreements versus individual arrangements (figure H.1).

Figure H.1 **Wages vary depending on agreement type and union membership in the construction industry**[a]

The collective bargaining wage premium over pay setting methods (biennial, 2000 to 2012)



The union premium over non-union wages, 1998 to 2012



a The ratio of all employee earnings under collective agreements to those under individual arrangements. Working proprietors of incorporated enterprises are classified to unregistered individual arrangements. Earnings of parties covered by individual arrangements may be underestimates due to underreporting of income for this group. The introduction of the taxable payments reporting system in July 2012 may partly test whether their stated earnings are lower than actual ones, but the data are not yet available. **b** The ratio of average male earnings of union versus non-union members in construction for 1998–2012. The data for the year 2000 is missing.

Sources: ABS (*Employee Earnings, Benefits and Trade Union Membership, Australia*, Cat. No. 6310.0); ABS (*Employee Earnings and Hours, Australia*, Cat. No. 6306.0).

The evidence shows that:

- in 2012, earnings per worker under collective agreements in construction were more than 60 per cent higher than under individual arrangements (which includes wage setting by owner-managers for their own labour). Of the 18 industry categories comprising the economy, this is by far the greatest margin. This outcome is not due to any marked differences in the full-time versus part-time shares of those on different agreements in the construction industry. It is likely to reflect the bargaining power of unions, but also the fact that collective agreements are less likely in the part of the construction industry that would tend to pay less anyway — housing construction. In this industry segment, labour is unorganised, skill sets are different, owner-managers are a prominent source of labour, and earnings may be understated to lower tax liabilities

- the proportional difference between collective and individual bargaining wage outcomes in the construction industry has been high for all years from 2000 to 2012 and rose steadily from a low of 17.9 per cent in 2004 to 62.9 per cent in 2012. In the mining industry — which uses many of the same skills — the opposite trend is apparent. The collective agreement 'premium' in mining progressively fell from 18.6 per cent in 2000 to 4.1 per cent in 2010, and by 2012 was -11.9 per cent
- the union wage premium (the ratio of earnings of union to non-union labour) has not trended up to any great extent (unlike the collective bargaining premium), potentially reflecting that non-union members are also parties to collective bargaining agreements.

It is hard to discern in either set of figures any evidence of a break in wage outcomes following the formation of the BIT and the ABCC. Certainly, the data does not point to any reduction in wage bargaining power by employees since 2004.

Unfortunately, there is little consistent time series at the occupational level, but a snapshot for 2012 suggests that there are sizable premiums from being in a collective over an individual agreement for workers with trade skills, but not always for those with professional qualifications (table H.1). For example, a concreter in a collective agreement has earnings on average around 65 per cent higher than a concreter on an individual agreement. Again, this may not just reflect collective bargaining power, but that collective agreements tend to cover building projects where concreters must have greater skills and experience. Nevertheless, to the extent that even half of this margin reflected bargaining power, the transfers between procurers and employees could be large.

H.3 A sample of EBAs reveals their commonalities and variations

To understand the variations in pay and conditions negotiated in individual EBAs, the Commission examined 31 EBAs (with the details of these included in a supplement on the Commission's web page).

Of these EBAs:

- 30 agreements were negotiated between an employer and a union (or unions), which had (or have) been assessed by Fair Work Australia to be entitled to represent the industrial interests of a majority of employees covered by the Agreement, and binding for all employees while the other agreement was negotiated between the employer directly with its employees

- 16 agreements were negotiated for a specific project (for example, the Dalrymple Bay Coal Terminal Expansion Project in Queensland) and 15 agreements were negotiated to cover all employees working for an employer in a specific jurisdiction (for example, all employees working for Leighton Contractors Pty Ltd in Victoria).

Table H.1 **Average weekly earnings**
All persons, $, 2012[a]

Occupational category	*Collective agreement*	*Individual arrangement*	*All methods of setting pay*
	$	$	$
Select construction industry occupations			
Construction managers	2670	2333	1932
Engineering managers	2345	3236	3036
Civil engineering professionals	1634	2260	2063
Architectural, building and surveying technicians	1885	1563	1551
Civil engineering draftspersons and technicians	1163	na	1340
Safety inspectors	2086	na	1799
Other building and engineering technicians	2137	na	2254
Carpenters and joiners	1646	1137	1116
Painting trades workers	1326	959	984
Wall and floor tilers	1344	1041	1192
Plumbers	1673	1252	1282
Electricians	1892	1486	1452
Crane, hoist and lift operators	3064	na	3055
Earthmoving plant operators	1865	1572	1553
Forklift drivers	1310	935	1178
Building and plumbing labourers	1655	1119	1362
Concreters	2023	1213	1396
Railway track workers	1996	2393	2013
Structural steel construction workers	2528	1631	2468
Other construction and mining labourers	2192	1352	1848
All industry occupations	**1151**	**1277**	**1123**

a Data were not available for all construction occupations. All methods of setting pay include awards, wages of managers of incorporated enterprises, as well as collective and individual agreements.

Source: ABS 2013 (*Employee Earnings and Hours, Australia, May 2012*, Cat. No. 6306.0).

The sample is not balanced across commencement dates, jurisdictions, employees or unions. As such, the sample is unlikely to be representative of all elements examined. Where this is the case, such as with averages, caution should be taken in interpreting the results. (Analysis later in this appendix examines all agreements in

the civil engineering part of the construction industry, but at a more superficial level.)

The analysis

The focus of this analysis is on establishing the nature of the matters covered by agreements, and some of the key differences in the specific provisions, terms and conditions that were, or could have been, incorporated in the EBAs listed in the accompanying spreadsheet.

EBAs can be difficult to compare and contrast — particularly in relation to the conduct, roles and powers of the various actors in the workplace. In particular, the provisions, terms and conditions contained within individual EBAs can be diverse and wide ranging. The extent to which EBAs vary in their coverage is partly reflected in the differences in the length of the individual agreement documents. In this sample, document length ranged from 21 pages (Bauer and AWU 2009 (Qld)) to 200 pages (Thiess, Degremont, AWU, CFMEU, AMWU, CEPU 2009b (Vic)). Some of the variation in length reflects the inclusion of details that are specified in other documents (such as awards), which, though omitted in some agreements, could also apply to their employees. It cannot be assumed that a longer agreement is necessarily more prescriptive or provides more benefits.

In addition, each individual EBA may interact in complex and diverse ways with an extensive array of laws, regulations and awards. To retain focus on differences across EBAs (rather than differences in other legal instruments), this analysis has focused on provisions, terms and conditions that were expressly included in a reasonable number of the EBAs in the sample.

Some of the provisions, terms and conditions are underpinned by minimum conditions specified in national and other industry awards and, hence, largely uniform across the EBAs included in the sample. In particular, most EBAs provided:

- ordinary working hours of 36 hours per week with 8 hours worked each day and 0.8 hours on all days worked accruing towards a Rostered Day Off (RDO)
- overtime rates at time and a half for the first two hours worked on weekdays (in excess of the 40 hour week) and Saturday mornings, and double time otherwise
- four weeks annual leave per week with an additional week for shift workers and 17.5 per cent leave loading
- loading for casual workers of 25 per cent on their ordinary pay rate as prescribed in the EBA.

Again, to retain a focus on key differences, where the EBAs included in this sample were generally similar, these provisions, terms and conditions have not been analysed any further.

It is also important to understand that some of the variations will reflect the differing regulatory arrangements in place for older agreements, and so do not reflect bargaining differences in the context of the current IR arrangements.

Diversity across EBAs

The data (and the associated figures H.2 to H.4) reveals some aspects of the diversity in agreements in relation to the nominal pay rates of the lowest paid employee, and the various conditions and terms contained within individual EBAs:[91]

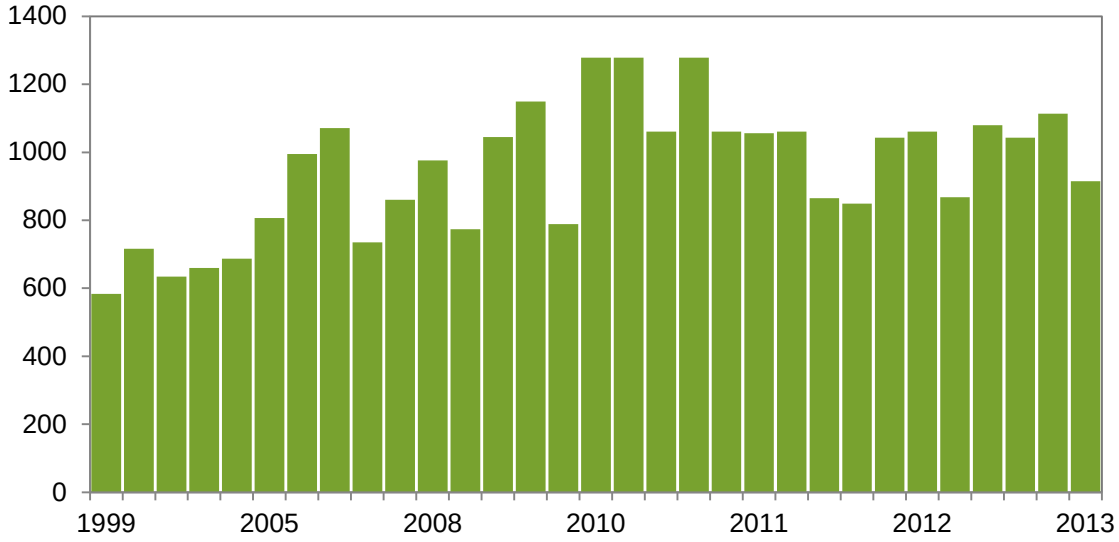
- some agreements provided standard employer superannuation contributions, but others provided for flat payments that were more than 50 per cent more generous for lower wage employees
- there were variations in income protection contributions by employers
- there were daily site allowances of $6.25 per hour in one agreement compared with $4.50 an hour for another agreement (for the same year)
- controversial 'jump up' clauses occurred in many, but not all agreements. Under such clauses, all employees on a work site have the same pay and conditions, even if they are already covered by agreements with lower benefits. Jump up clauses were in 20 of the 31 EBAs examined
- another clear facet of the agreements is the degree to which add-on benefits, such as redundancy benefits, LAFHA, and site allowances can increase base wages (sometimes by around 60 per cent).

Given that one of the goals of enterprise bargaining is for enterprises and employee representatives to negotiate agreements that reflect their own circumstances, some variations are inevitable and quite possibly desirable. However, the returns to workers in projects that appear to require similar skills vary significantly — potentially a sign of the particular bargaining strength of the employee representative. The high wages associated with desalination plants might reflect the bargaining strength that urgent projects bestow on the bargaining representatives of employees (figure H.3).

91 These include living away from home allowances (LAFHA), redundancy payments and travel entitlements among others.

Figure H.2 **Nominal wage rate of lowest paid construction worker for each individual EBA, by commencement date**

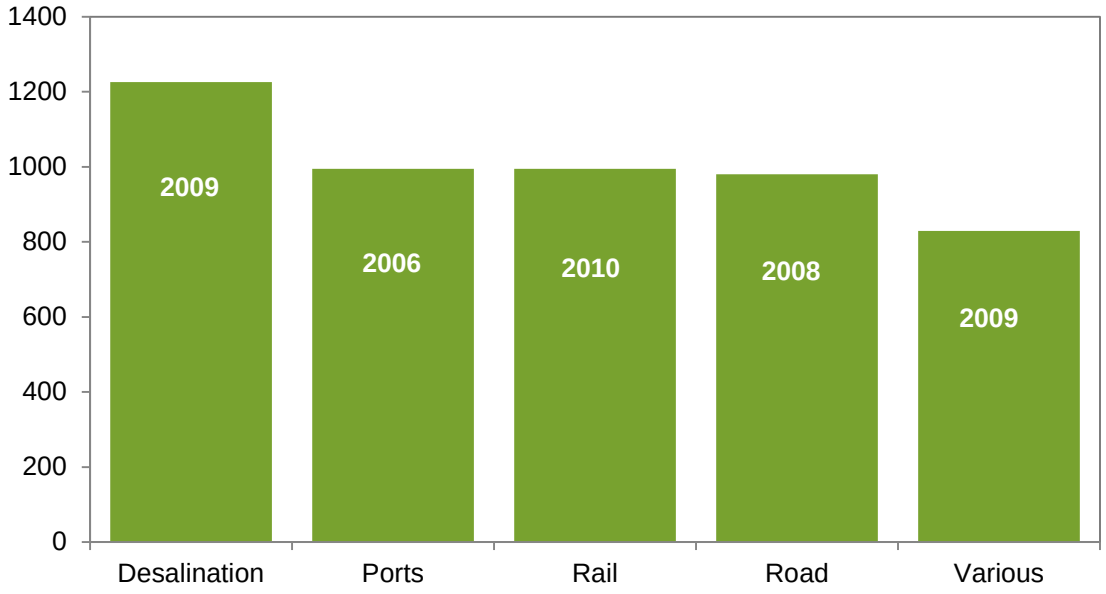
$ per week, nominal, 1999 to 2013



Source: Commission analysis.

Figure H.3 **Average nominal wage rates for lowest paid worker for all EBAs, by project type**

$ per week, nominal, years indicate average year of commencement



a Various refers to EBAs that were generally for employees of a particular employer across any sites in a particular jurisdiction.

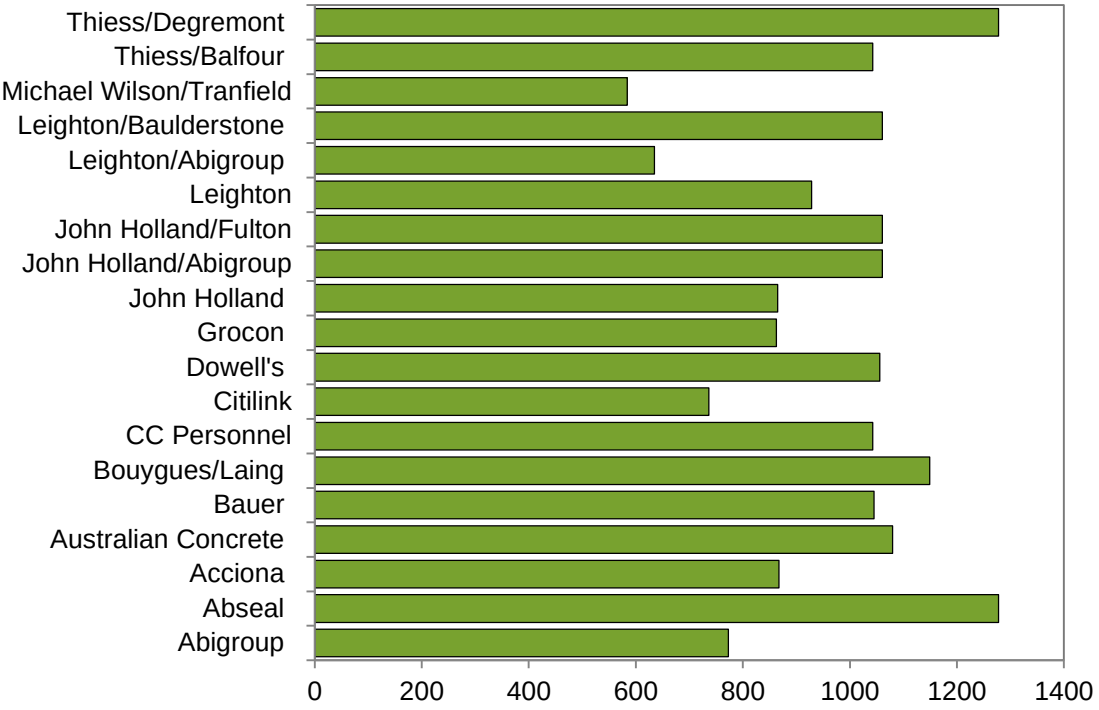
Source: Commission analysis.

As a control for the variations in skills that occur in different projects, the Commission examined the average weekly wages of the lowest paid workers specified in each agreement. The divergence for agreements for a common year were sometimes very significant.

For example, of the eight agreements in the sample relating to 2011, the wage rate for the lowest paid worker varied from around $850 a week to $1300 a week (the latter being for desalination plants).[92] This is before any consideration of living away from home allowances.

Figure H.4 **Average nominal wage rates for lowest paid worker for all EBAs, by employer**

$ per week nominal, 1999 to 2013



Source: Commission analysis.

92 This ignores benefits from superannuation, site and travel allowances, and the insurance value of redundancy pay provisions.

H.4 Analysis of all agreements in the heavy and civil engineering construction sector

The Commission analysed wages growth data for EBAs negotiated in the heavy and civil engineering construction sector over a ten year period from 2003 to 2013.[93] This data were obtained from the Workplace Agreements Database (WAD) maintained by the Department of Employment (DoE). Where useful, the Commission compared these data with EBA data on the construction industry as a whole.

The WAD contains data on all federal enterprise agreements certified, or approved, since 1 January 1997.[94] Data can be extracted from the WAD on the general nature of the agreement (the parties involved; jurisdiction; certification and expiry dates), wage increases over the term of the agreement, and conditions of employment (including, but not limited to, individual flexibility arrangements, redundancy, superannuation, leave entitlements and training).

The Commission analysed data on 3904 Enterprise Bargaining Agreements in the heavy and civil engineering construction sector over a ten year period from 2003 to 2013 extracted from the WAD. It also examined already published data from the Department of Employment on average wage increases agreed in EBAs for the construction industry as a whole (and as a comparator, mining).

It is important to note that even a fixed difference between wage growth rates in two industries implies an ever widening divergence in wage *levels*. When the wage growth rate gap increases over time, it implies that wage gap is widening at an accelerating rate. (In any realistic context, this can only be a transitory phenomenon, though seemingly this situation can apply for an extensive span of years — as shown below.) It should also be emphasised that many people employed in the residential building housing segment of the industry are 'own account' workers and are not covered by EBAs. So wage growth rates apparent in construction EBAs should not be seen as necessarily representative for employees in the construction industry as a whole.

While the key summary charts are in chapter 13, several other features of the EBA wage growth outcomes are notable, most particularly the degree to which there are

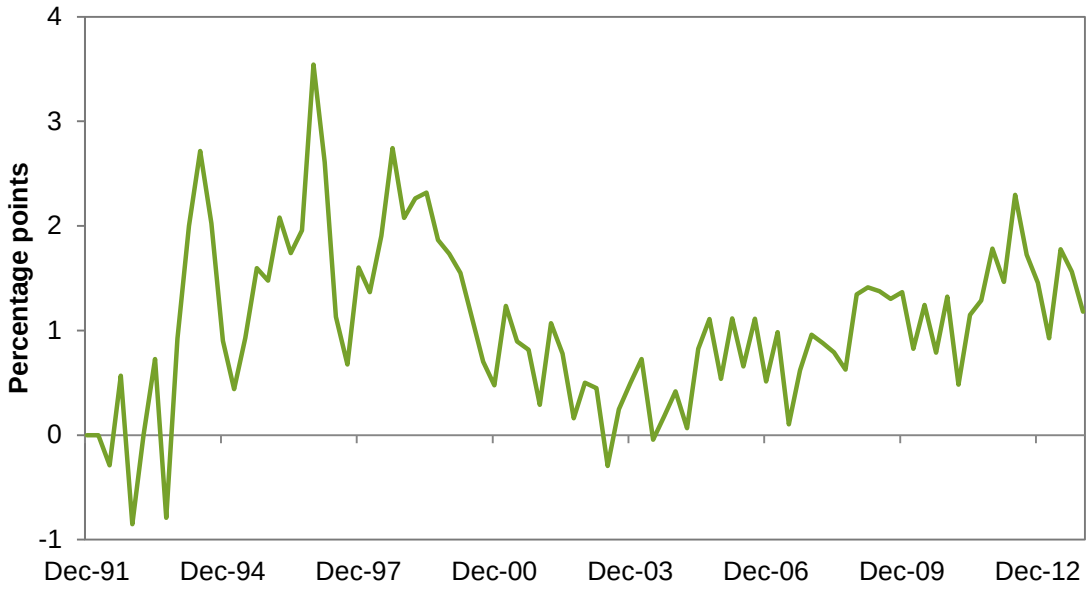
93 As defined by the ANZSIC (Australian and New Zealand Standard Industrial Classification) 2006 (cat. no. 1292.0).

94 There are currently 125 000 agreements in the database. On average about 8000 agreements are added to the WAD each year with approximately 200 separate data fields coded.

enduring wage growth premiums between segments of the construction industry, and between the industry as a whole and other industries (figures H.5 and H.6).

Throughout nearly all the period from 1991 to 2013, wage growth rates have been higher in collective agreements in construction compared with those in all industries (figure H.5) The premium was particularly large in the mid-1990s, and then fell. However, it has progressively widened after 2003. This is likely to reflect the increased bargaining power of unions associated with rapidly growing demand for non-dwelling construction (appendix I).

Figure H.5 **Wage growth premiums between construction and all industries**
Percentage points differences, December 1991 to December 2013

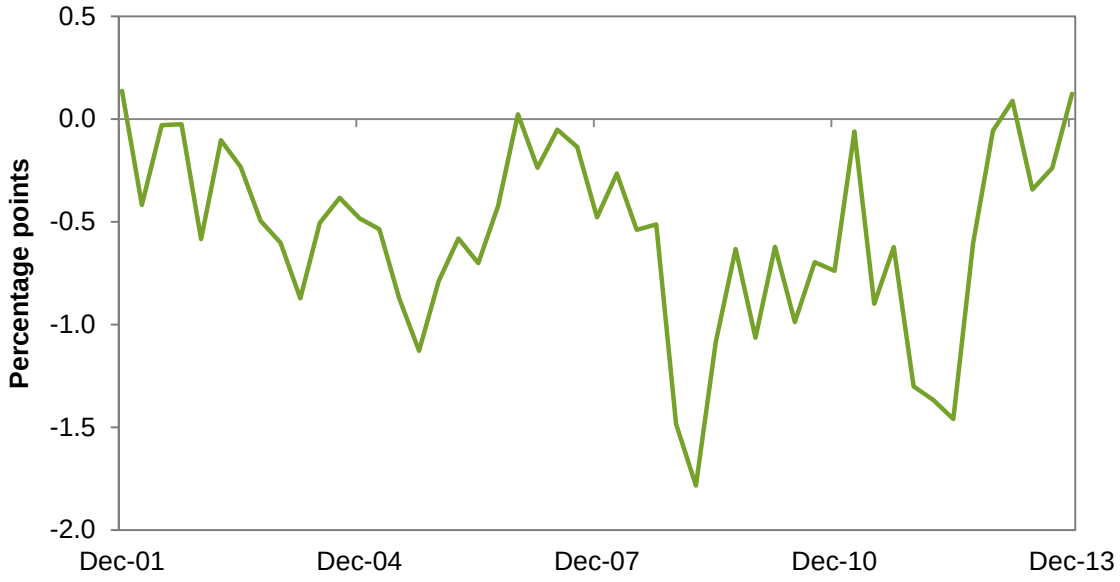


Source: Department of Employment, *Historical Table on all wage agreements lodged in the quarter December 1991 to September 2013*.

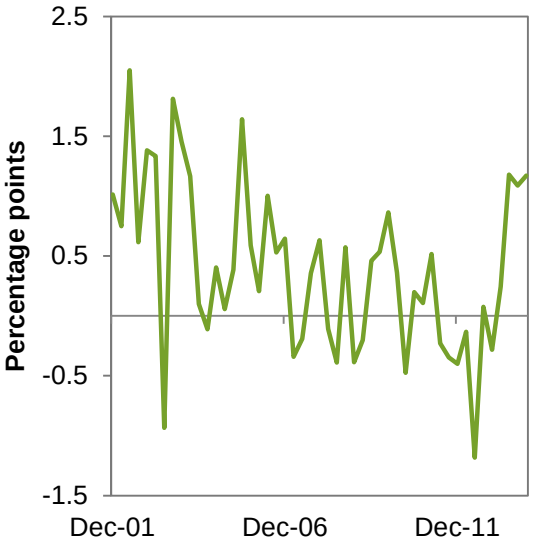
The differential in wage growth rates between the civil and heavy engineering construction industry and the remainder of the construction industry has been negative for much of the period between 2001 and 2013 (figure H.6). The wage growth gap has narrowed recently. Indeed, for the first time in seven years, wage growth in the civil segment has outpaced (by a small amount) that of construction as a whole. Given that the civil segment of the industry is also included in the construction industry as a whole, this reversal of fortunes is probably understated.

Figure H.6 **Wage growth rate premiums for civil and heavy engineering**
EBAs, December 2001 to December 2013, percentage points difference

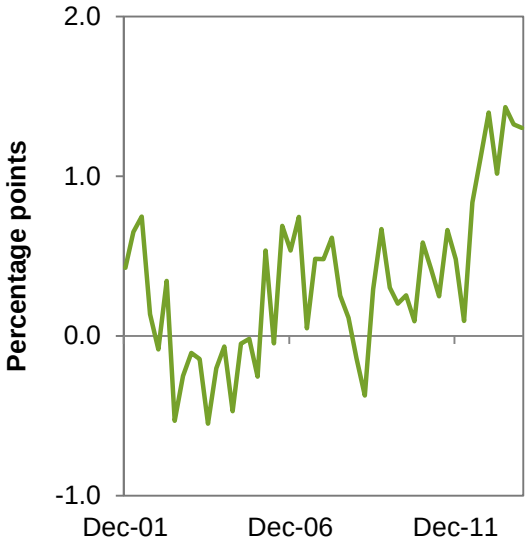
Between civil/heavy engineering and construction as a whole



Between civil/heavy engineering and mining



Between civil/heavy engineering and all industries



Sources: Department of Employment unpublished data and its *Historical Table on all wage agreements lodged in the quarter December 1991 to September 2013*.

That latest development aside, the implication of figure H.6 is that wage growth rates in non-dwelling building construction have also outpaced that of civil

engineering, despite the fact that demand pressures have been greatest for the latter.[95]

There is some apparent divergence between the wage growth outcomes revealed by some ABS surveys (appendix G) and the wage growth rates suggested by EBAs. The ABS statistics from 2007-08 to 2011-12 suggest that wage growth rates in the civil construction segment exceeded that of buildings for 2007-08, 2010-11 and 2011-12 (and was close to identical for 2009-10). On face value this does not seem consistent with the results from EBAs. However, the patterns *may* be reconciled:

- the ABS wage growth for buildings includes dwellings. On the whole, dwelling construction has been relatively stagnant, and so wage pressures might also be expected to be flat, which would depress wage growth rates in the construction building segment as a whole. This may still be compatible with strong wage growth for non-dwelling building construction
- in the particular ABS survey collection, wages will rise if overtime or hours increase, regardless of trends in ordinary time hourly rates. In contrast, wage growth rates set down in EBAs are not subject to this compositional effect. Accordingly, the comparison is not 'like with like'.

The apparent paradox cannot be resolved without better data — a problem the Commission has encountered throughout this inquiry.

The relationship between wage growth outcomes in mining (the sector most subject to the demand effects of the resources boom) and construction is complex:

- for much of the period from the early 1990s to 2013, construction wage growth rates in EBAs have been higher than in mining, though the wage growth gap has narrowed (figure H.7)
- while still showing a broadly similar pattern, mining wage growth rates have exceeded those of the civil segment of the construction industry much more frequently (figure H.6).

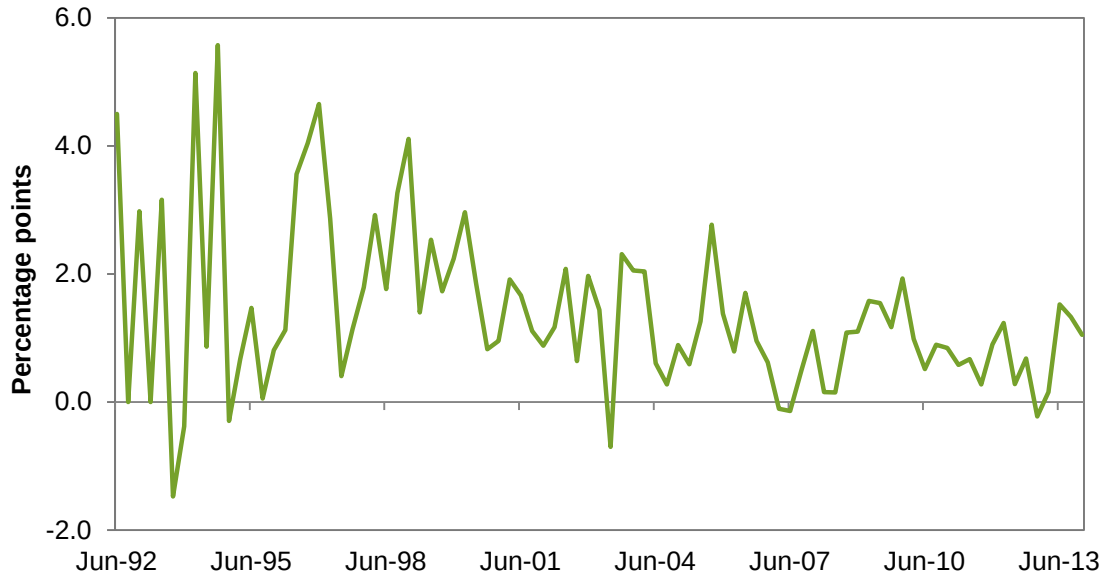
It appears that notwithstanding greater demand pressures in mining than civil construction, and greater demand pressures in civil than in non-dwelling building construction, wage pressures seem to have been highest in the latter. It is not known why this is the case, but it could be that the capacity to exercise union bargaining power at any given level of demand is stronger in non-residential building

[95] The assumption here is that (on an employee weighted basis), the outcomes for residential building EBAs will have a relatively low weight in the average results of the construction industry.

construction. That would certainly be consistent with information from stakeholders and with the regulatory focus of the BIT, ABCC and FWBC.

Figure H.7 **The wage growth premium between the construction industry as a whole and mining**

EBAs, June 1992 to December 2013, percentage points



Source: Department of Employment, *Historical Table on all wage agreements lodged in the quarter December 1991 to September 2013*.

Econometric analysis

The Commission undertook some exploratory analysis of the factors that influence wage growth outcomes in EBAs (table H.2). It adopted regression analysis because (depending on the characteristics of the data), the resulting coefficients explain the effect of any one factor (controlling for all others) on the annual growth rate of real wages in any EBA in percentage terms.[96]

As noted by the CFMEU, agreement outcomes depend on factors, such as location.

> … a number of factors such as the location (e.g wage rates under EBA's tend to be higher in QLD, WA and Victoria than in NSW, NT, TAS and the ACT); the region (rates in country areas tend to be lower than for capital city projects), the type of project (wage rates on commercial building projects tend to be higher than civil construction projects but less than major infrastructure and engineering projects), and whether or not

[96] In reality, the independent regressors are partly correlated with each other, so that regression analysis will not do this perfectly.

> the project is established as a greenfield project (greenfield projects tend to have higher wage rates). (sub. DR174, p. 11)

The value of the regression approach is that it can tease out these effects and separate them from others.

The key results are summarised in chapter 13.

Most of the variables are so-called 'dummy variables', taking the value of one or zero. In this case, the parameters of the model are easy to interpret. For example, the modeling results suggest that dredging projects yielded a nearly 2 percentage point premium on the average outcome, while road project were associated with lower than average wage growth outcomes (all things being equal). It is important to understand that EBAs have many other facets than those described in table H.2. These effects are subsumed in the constant, which is a 'benchmark' value. For example, there is no dummy variable for non-union agreements, but it is clear from the union variables that union agreements are associated with higher wage outcomes.

The Commission's results accord with some of the findings of Deloittes Access Economics, which undertook its own analysis of EBAs in the industry (though their analysis looked at outcomes on a variable by variable basis, rather than through econometric modeling). It found that:

> At a State level, heavy and civil engineering EBA wage growth has been significantly faster than the national average in Western Australia and Victoria; and considerably lower than the national average in Queensland, New South Wales and South Australia.
>
> Western Australia's strong growth is unsurprising, driven by the burgeoning demand for workers in the resources sector and exacerbated by the remote locations of many projects. It is possible that Victoria's strong growth is more union driven, with unions seen as having more bargaining power in Victoria than in other States. (Australian Constructors Association sub. DR169, attach. 1, p. 24)

The Commission also finds that growth is higher than the national average in Victoria and Western Australia, but does not find low growth for Queensland. It maybe that the outcome for Queensland reflects other factors in the model, rather than location per se.

Table H.2 **Regression results**

Impact of characteristics of agreements on real (CPI-adjusted) average annual wage outcomes in EBAs, 2000 to 2015

Variable	*Unit*	*Parameter*	*White's heteroscedasticity corrected t statistic*
Constant	Value	0.988	7.0
Project type			
ASPHALT	1 if yes, 0 if no	-0.657	-3.5
DREDGING	1 if yes, 0 if no	1.908	9.3
DESALINATION	1 if yes, 0 if no	0.643	1.8
ROAD	1 if yes, 0 if no	-0.563	-5.0
RAIL	1 if yes, 0 if no	0.259	2.4
Jurisdiction			
NT	1 if yes, 0 if no	0.365	2.3
ACT	1 if yes, 0 if no	0.081	0.4
NSW	1 if yes, 0 if no	-0.337	-3.6
VIC	1 if yes, 0 if no	0.443	4.7
QLD	1 if yes, 0 if no	0.317	3.6
WA	1 if yes, 0 if no	0.014	0.1
SA	1 if yes, 0 if no	-0.111	-0.7
TAS	1 if yes, 0 if no	-0.361	-1.8
Union type			
CFMEU	1 if yes, 0 if no	0.270	4.1
AWU	1 if yes, 0 if no	0.092	1.4
AMWU	1 if yes, 0 if no	0.318	4.3
CEPU	1 if yes, 0 if no	0.448	5.7
Other characteristics			
GREENFIELDS	1 if yes, 0 if no	-0.088	-1.3
DURATION	Length of agreement in years	-0.323	-11.2
LOGEMP	Natural log of employees covered by agreement	-0.117	-4.2
YEAR	1 to 16 years (corresponding to mid year of agreements 2000 to 2015)	0.156	18.7

a Based on a sample size of 2827 agreements. The adjusted R^2 was 0.22. This is reasonable explanatory power in the context of cross-sectional data of this kind. The year of an agreement was the midyear of the span of years. Projects are defined by their various types, depending on the major activity covered by the agreement, such as a road, rail, dredging or desalination project. Some activities — like asphalt — relate to a task that may occur amongst a variety of project types. In some instances, a project could span several jurisdictions, so that more than one jurisdiction would be associated with that agreement.

Source: Department of Employment unpublished data.

I Productivity and industrial relations

I.1 Aggregate construction productivity and changing industrial relations arrangements

A poorly configured industrial relations (IR) system and adversarial relationships in any industry can have detrimental impacts on productivity. Such a situation may frustrate innovation, lead to restrictive work practices that limit flexibility, distort wages, lead to strikes, go-slows or work-to-order, may compromise the safety of workers, and create unbalanced power relations (in either direction) between business owners and employees. In contrast, a well-configured system and cooperative cultures within the enterprises of an industry are likely to promote innovation and productivity.

Few would characterise arrangements in the construction industry as falling into the second camp, which implies that productivity and cost performance would be improved with appropriate reform.

The creation of the Building Industry Taskforce (BIT) and the Australian Building and Construction Commission (ABCC) mitigated some of the problematic practices in the construction sector in the early 2000s (as described by the Cole Royal Commission). The changes reduced the capacity for unions to use certain stratagems and tactics to gain unreasonable bargaining leverage for higher wages and conditions, manning ratios, membership numbers and union dues. For example, changes that reduce industrial disputes and interruptions to work arising from contrived workplace health and safety issues (among other tactics) must be beneficial for productivity. Surveys and case studies provide evidence of a positive impact (chapter 13).

Some stakeholders argue that it is possible to provide meaningful quantitative estimates of these policy changes on aggregate productivity. They suggest that there is strong empirical evidence that *aggregate* industry productivity *significantly* improved following the reforms in the 2000s.[97] Some industry stakeholders also

[97] For example, the Department of Employment (2013, p. 3); the HIA (2013, p. 3), the Australian Chamber of Commerce and Industry (ACCI 2013, pp. 8–10) and MBA (sub. 88, p. 6; sub. DR 211; MBA 2013) perceived significant aggregate impacts.

voice concern that the weakening of the more stringent IR arrangements established in 2002, most particularly through the reduction of the powers of the industry-specific regulator (in its new form, Fair Work Building and Construction — FWBC), has started to reverse the *aggregate* productivity performance of the industry.

Much of the debate is centred on the modeling undertaken by Independent Economics (IE) (and its previous incarnations) for Master Builders Australia (MBA). Based on this modeling (described in section I.4 and I.5) and some of its own research, MBA (sub. DR211, p. 26) argues that a large causal effect on aggregate productivity is present:

> So during the BIT/ABCC era, the construction industry's productivity improved markedly and outperformed other sectors of the economy as a result of improved workplace practices. Econtec/Independent Economics work estimates the gain ranges between (nearly) 10 and (more than) 20 per cent, depending on the measure and the source of information that is used. [98]

The argument that the relevant IR reforms significantly increased aggregate productivity in the construction industry rested on five main propositions:

(a) there was a significant increase in aggregate productivity following the introduction of the BIT/ABCC, with this linked to the IR changes, the view most strongly put by MBA (sections I.3)

(b) forecasts based on the claimed relationship between labour productivity in the construction industry and the economy as a whole during the pre-BIT period showed a lower level of construction productivity than actually materialised. IE interpreted the difference between the actual and forecast productivity as the impact of IR reform (section 1.4)

(c) the margin between the costs of six specific building tasks common to residential buildings and non-residential buildings narrowed, and that this could be ascribed to a productivity dividend from reform (section 1.5)

(d) it was expected by Cole (2003) that an effect could have been anticipated given policy reform and it would be reasonable to observe one (section 1.6)

(e) case studies, the opinions of businesses, and a reduced rate of industrial disputes provided further support for a large change (section 1.6).

[98] The economywide impacts were then estimated using IE's computable general equilibrium model. That model is useful for understanding the wider effect of any industry shock, but the validity of its results are dependent on the validity of the assumed shock.

Some have contested whether the evidence about a large aggregate effect is as persuasive as suggested, including the Commission itself in its draft report.[99] MBA argues that these critiques are not well founded. It observes that 'no reasonable interpretation exists to refute there was a considerable positive impact' (sub. DR211, p. 6) and that to do so would be 'highly unprofessional'.

The Commission's view is a mixed one. The Commission finds the case that more stringent arrangements improved productivity in some parts of the industry to be compelling. This informed the Commission's recommendations in chapter 13. Some of IE's case studies illuminate the problems that have beset parts of the construction industry, as does other evidence cited in chapter 13.

On the other hand, the Commission is very sceptical of inferences based on apparent aggregate patterns and IE's modeling that the BIT/ABCC had large aggregate effects on productivity. Such impacts are not necessary to underpin the changes to IR arrangements recommended by the Commission and by others seeking more productive workplaces in the industry (chapter 13). Indeed, the use of unconvincing evidence of a large effect may undermine the credibility of proposals for IR policy change. It may also distract policymakers from other factors important for productivity in the construction industry — such as better procurement practices, innovation and diffusion of technologies.

This appendix explains why the Commission considers the analysis purporting large aggregate productivity effects from the creation of the BIT/ABCC and associated IR reforms to be unsatisfactory. At times, the appendix is technical in nature, since some of the major deficiencies in the modeling of the effects of the IR changes are best identified using statistical methods.

I.2 What were the main institutional changes?

It is important when gauging the apparent effects of policy changes to be clear about their timing and nature. As noted by IE (2013, p. 1), four major 'eras' can be distinguished:

(i) the institutional arrangements prior to the creation of an industry-specific regulator

(ii) the establishment of the BIT on 1 October 2002

(iii) the creation in October 2005 of a permanent body, the ABCC

99 Allan, Dungan and Peetz (2010) and the ACTU (sub. 95) are examples.

(iv) the replacement of the ABCC with FWBC in June 2012. This body had weaker powers (chapter 13), but also included greater oversight by government. For example, the relevant Minister was given the capacity 'to give directions to the Director about (a) the policies, programs and priorities of the Director and (b) the manner in which the Director is to perform the functions or exercise the powers of the Director.'[100]

While the above encapsulates the key changes in the IR regime, at least after October 2002, there are other, more subtle, changes in the IR environment that may also have had impacts in the construction industry:

- There may be announcement effects. For example, the Australian Government announced that the BIT would become a permanent body (the ABCC) in March 2004, 18 months ahead of its actual creation. That commitment may have increased the impact of the BIT in the intervening period. Announcements about the abolition of the ABCC preceded its ultimate removal by three years, which may also have had some effects.
- The BIT was given additional powers after its initial establishment, including new information gathering powers and protection for whistleblowers (Prince 2005, p. 3)
- The way in which a body uses its statutory powers depends on its priorities and approaches, an observation made by IE (2013, p. 9). It noted that while the ABCC used its compulsory powers frequently in its early years, their use dropped sharply after 2010-11. The agency attributed this to 'a number of factors involving a change in investigative technique, a shift in agency emphasis and consistent communication to industry by the ABCC and increased voluntary compliance by parties (ABCC 2011b, p. 49).
- Less stringent Construction Code Guidelines for Commonwealth procurement operated from 1 August 2009 (O'Neill and Neilson 2011, p. 4). The initial head of the ABCC saw compliance with the original code as an important source of efficiency (Lloyd 2010, p. 2)
- Generic IR laws changed too. WorkChoices was introduced in March 2006, but replaced by arrangements set out in the *Fair Work Act 2009*.

There were accordingly a broader series of policy shocks than those associated with the formation of strong industry-specific regulators (the BIT/ABCC period[101]) and

100 S.11(1) of the *Building and Construction Industry Improvement Amendment (Transition to Fair Work) Act 2012*.

101 In a submission to the inquiry, MBA referred to the combined period of the operation of the BIT/ABCC as the 'ABCC era' (MBA sub. 88, p. 14).

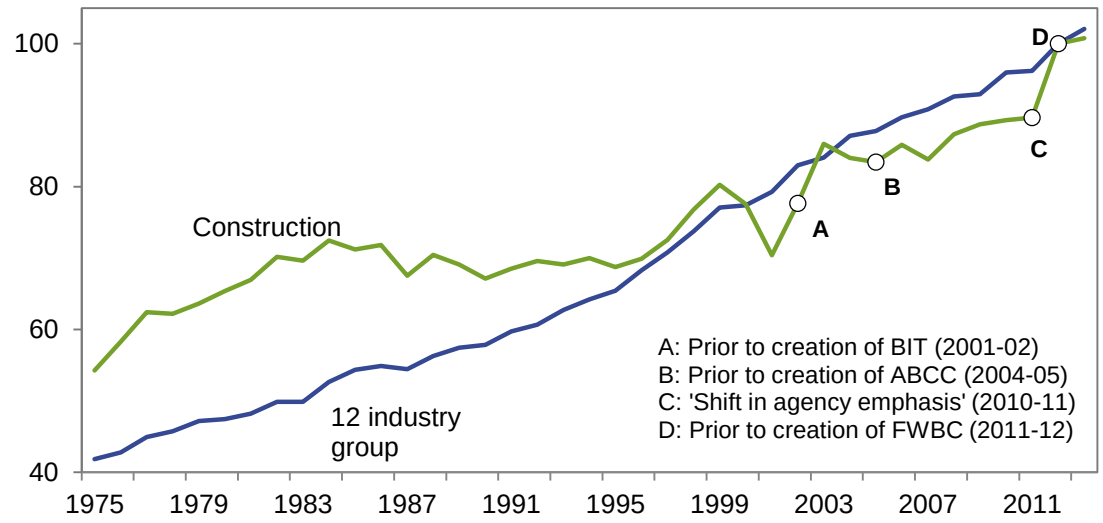
the creation of a weaker regulator (the FWBC period). While the latter shocks would still have been the most fundamental, it may be worthwhile also considering any patterns apparent after the 'shift in agency emphasis', which some see as important for IR outcomes after 2010-11.

In examining any shocks, it is difficult to assess the extent to which there may be lag (or lead) effects in responses to policy shocks. Some delay might be expected in achieving cost reductions or productivity improvements following the creation of the BIT/ABCC. For example, in considering the cost margins between certain common tasks in commercial and residential buildings reductions, IE noted that lagged productivity responses could be expected (2013, p. 21).

I.3 Aggregate productivity performance

All measures of productivity increased significantly from 2001-02 (just before the creation of the BIT) to 2011-12 (just prior to the establishment of FWBC. The relevant period is marked as A and D in figures I.1 to I.3.

Figure I.1 **Labour productivity**
1974-75 to 2012-13, indexes, constant prices (2011-12=100)[a]

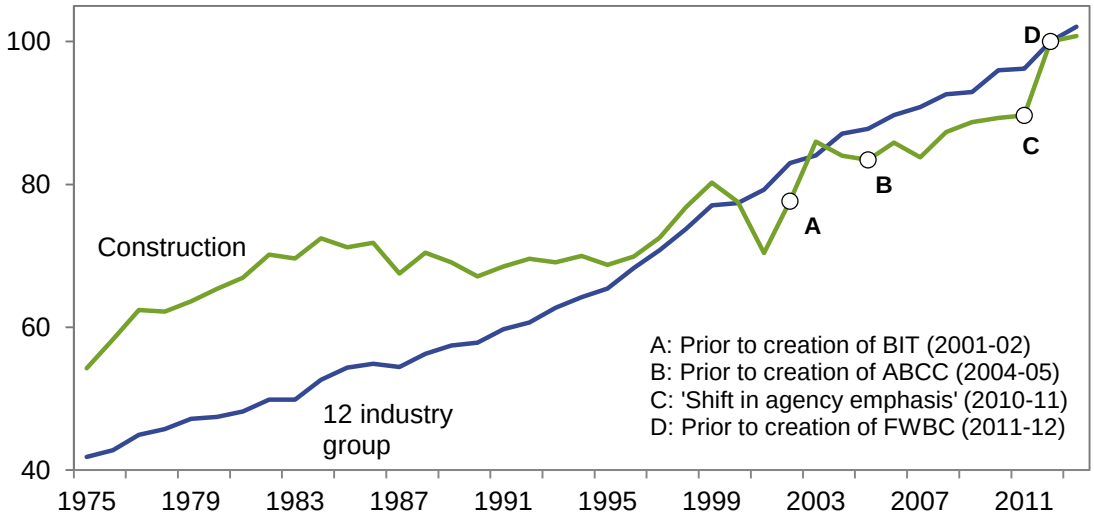


[a] Labour productivity is measured as gross value added per (non-quality adjusted) hour of work. The ABS does not provide a single series of labour productivity estimates from 1974-75 to 2012-13 for the construction industry or the 12 industry group. In the case of the construction industry, the Commission combined data from the most recent ABS productivity estimates (in Cat. No. 5260.0.55.002) with historical national accounts and labour force data. The same approach was taken for the 12 industry group, except that the data prior to 1985-86 are spliced from a dataset held by the PC Modeling Branch.

Sources: ABS (*National Accounts*, Cat. No. 5204); ABS 2013 (*Estimates of Industry Multifactor Productivity, 2012-13*, Table 9, Cat. No. 5260); ABS (*Labour Force*, Cat. No. 6291).

Figure I.2 **Multifactor productivity indexes**

1985-86 to 2012-13, Gross value-based indexes (2011-12=100)[a]

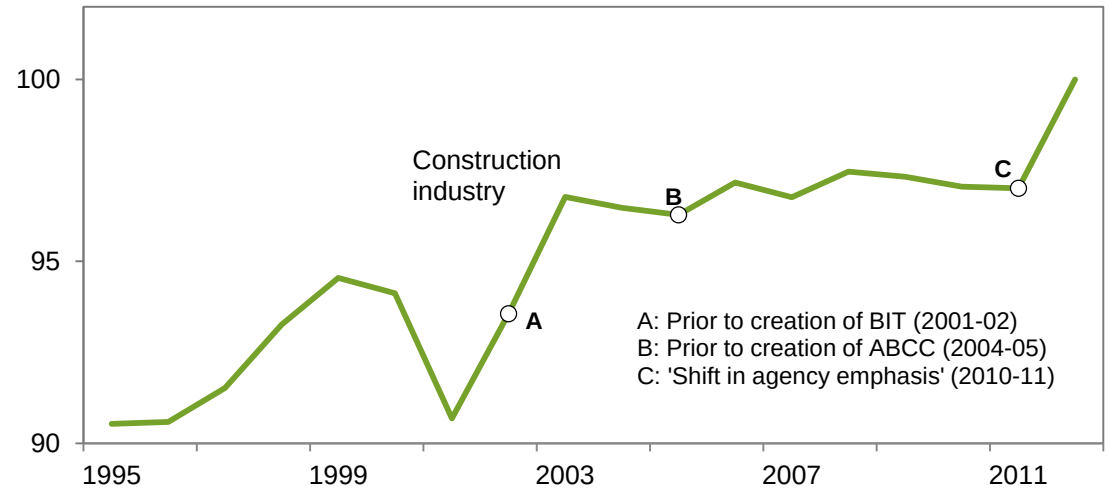


[a] The ABS distinguishes between a 12 industry group and a 16 industry group. The latter is now referred to as the 'market' sector.

Sources: ABS 2013 (*Estimates of Industry Multifactor Productivity, 2012-13*, Cat. No. 5260); ABS 2007 (*Experimental Estimates of Industry Multifactor Productivity*).

Figure I.3 **Gross output multifactor productivity indexes**

1994-95 to 2011-12, Gross output-based (2011-12=100.0)[a]



[a] Gross output MFP takes account of intermediate inputs, as well as labour and capital, in estimating the residual growth of output. No estimate is available on a 12 or 16 industry group basis.

Source: ABS 2013 (*Estimates of Industry Multifactor Productivity, 2012-13*, Cat. No. 5260).

Did IR reform increase *aggregate* annual productivity growth?

MBA interpreted the productivity improvements as causally related to the IR changes. This was underpinned by its numerical estimates of the change in aggregate construction industry productivity in the pre-BIT and BIT/ABCC era (table I.1). Its results also show that, in contrast with the construction industry, there was a slowdown in productivity growth in the economy as a whole.

Table I.1 **MBA estimates of productivity growth before and after the new IR regime, construction industry and market sector**

Average annual growth rates in productivity over various periods[a]

	Pre-Task Force/ABCC		*Task Force/ABCC*	
	Labour productivity	Multifactor productivity	Labour productivity	Multifactor productivity
Data relates to data from:	1994-95 to 2001-02	1989-90 to 2001-02	2001-02 to 2011-12	2001-02 to 2011-12
Growth rates calculated as:	Average of annual growth rates for 1995-96 to 2001-02	Average of annual growth rates for 1990-91 to 2001-02	Average of annual growth rates for 2002-03 to 2011-12	Average of annual growth rates for 2002-03 to 2011-12
	% per annum	% per annum	% per annum	% per annum
Construction	1.9	0.8	2.7	2.1
Market sector (12 industry)	2.7	1.5	1.1	-0.2

[a] These estimates were checked by the Commission using MBA's calculation methods and match those of MBA. MBA uses the two ABS publications listed below. MBA measures labour productivity as gross value added per hour, and uses data from 1994-95 to 2011-12. It uses ABS's estimate of multifactor productivity (MFP), adjusted for quality improvements of labour, for the period from 1989-90 to 2011-12. The use of quality adjusted labour inputs in one measure and not the other makes little substantive difference, and nor does the use of different starting years alter the qualitative judgments. (It is possible to check this because a series of quality adjusted labour productivity and MFP indexes for the years 1989-90 can be derived from the ABS MFP publication below). There are several possible ways of estimating growth trends. MBA calculates the growth rates for each of the fiscal years, and averages these over the two relevant periods. So long as the comparable years are used, the results are very close to those obtained by using compound average annual growth rates (as typically used by the Commission) or the log approximation typically used by the ABS.

Sources: MBA (sub. DR211, p. 23); ABS 2013 (*Estimates of Industry Multifactor Productivity, 2012-13*, Cat. No. 5260); ABS (*National Accounts*, Cat. No. 5204.0).

Ignoring for the moment the question of the appropriate way of measuring growth rates, a major issue is whether strong productivity growth around this period can provide an understanding of long-run shifts in aggregate productivity and the effects of the BIT/ABCC. Three related observations are pertinent to this question, each of which undermines the meaningfulness of the upsurge of productivity for policy purposes.

First, strong annual growth was only coincident with the *commencement* of the new regime, and was not ongoing. That, by itself, does not disprove an effect as the new regime might simply have led to a one-off jump in productivity levels, and then a resumption of low historical growth rates. However, if this were true, the effect of the BIT/ABCC is strongly dependent on the validity of a causal link between the early growth surge and the policy change.

Second (and related to the above), it would be reasonable to expect lags in the response of unions and businesses to the more stringent regime commencing with the BIT. This implies that productivity growth rates would be initially modest and then grow rapidly, before stabilising. As noted by IE in relation to its examination of the cost comparisons between residential and non-residential buildings (as discussed further in section I.6):

> Given that the full extent of the productivity gains under the Taskforce/ABCC developed gradually over several years, it can be expected that the full extent of the productivity losses under the FWBC are likely to develop over a similarly long timeframe (Independent Economics 2013, p. 20)
>
> The Taskforce was established in October 2002 but it is reasonable to expect a lag before its activities started to make an impact.(Independent Economics 2013, p. 21)

However, it is important to have a consistent treatment of lags. Either productivity responses lagged the policy change or they did not. IE claims that they did (and the existence of a lagged response is important to the validity of its inferences). In contrast, MBA points to an immediate aggregate productivity improvement as casually related to the policy change.

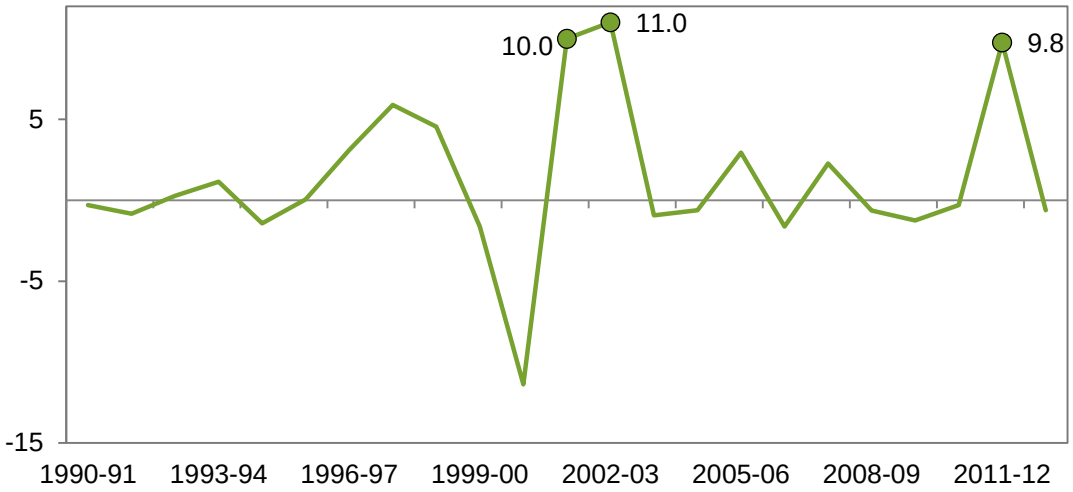
Third, there is another, more persuasive explanation for the large productivity growth coincident with the introduction of the BIT. Economies and industries do not grow smoothly over time, but are constantly subject to transitory supply and demand shocks. This is why it is essential to consider cycles when considering productivity trends — an issue that is now examined in detail.

The importance of transitory shocks

Transitory shocks can markedly affect the utilisation of capital and labour, and thereby productivity. Failure to consider such extraneous shocks can lead to misleading estimates of trends in productivity growth.

The productivity growth trends identified by the MBA are strongly influenced by annual growth rate outcomes of around 10 per cent for 2001-02 and 2002-03 (figure I.4).

Figure I.4 **Annual growth in multifactor productivity**
1990-91 to 2012-13



Source: ABS 2013 (*Estimates of Industry Multifactor Productivity, 2012-13*, Cat. No. 5260).

Much of this early productivity performance reflects the aftermath of the sharp contraction in the construction sector in 2000-01. Gross value-added in the industry fell by more than 14 per cent as people brought forward investments to avoid the GST (box I.1). The Olympic Games may have also played a role in the boom/bust/regrowth apparent in the data. Low interest rates and support for first home buyers may also have contributed to the revival. IE acknowledges the importance of cyclical and transitory effects, but only in respect of its use of 2001-02 as the final year of its regression analysis, as discussed later (IE, attachment B in MBA sub. DR211).

The evidence also shows that the revival in construction that followed the temporary sharp fall in output in 2000-01 was mainly in the residential buildings and engineering construction segments of the industry, and was not due to a major upturn in non-residential building. The percentage change in total construction activity (C) can be decomposed into the contributions made by residential buildings (B), non-residential construction (N) and engineering construction (E):

$$100 \times \left(\frac{C_t}{C_{t-1}} - 1\right) = 100 \times \left(\frac{\Delta B_t}{C_{t-1}} + \frac{\Delta N_t}{C_{t-1}} + \frac{\Delta E_t}{C_{t-1}}\right)$$

ABS data on construction activity (in chain volume terms) shows that after strong growth in prior years, total construction fell by nearly 20 per cent from 1999-00 to 2000-01. Of this, 12 percentage points was due to the change in residential building construction, with the other two construction types accounting for around 4 per cent each (figure I.5).

Box I.1 The pre 2003 bust and the boom in output of the construction industry

The anticipated introduction of the GST (and to some extent the effects of the Olympic Games) pulled forward construction activity, creating an inevitable slump afterwards, and then a resumption of growth. The impacts of the GST have been widely recognised.

> A large amount of construction work was brought forward into 1999–2000 preceding the introduction of the GST. This resulted in a large decline in the construction industry across all states in 2000-01. This was followed by two years of strong growth across all states except Tasmania, which only increased by 0.2% in 2002-03. ABS (2007)

The Deputy Governor of the Reserve Bank gave a more colourful description of the impacts of the pending introduction of the GST on the construction industry, and the likelihood of economic recovery after its effects had passed:

> Residential construction was, even without the GST, reaching the mature phase of its usual cycle as the economy entered 2000. Such was the frenzy to get construction done before the GST, that avoiding the tax became an end in itself: people were paying more than 10 per cent extra in order to attempt to complete work ahead of a 10 per cent tax. [There were] many stories of seven-day working weeks and very significant pressures on construction contract prices, as builders attempted to ration the demands on their capacity. It was to be expected – indeed it was inevitable – that this frenzy had to end in the second half of the year, with the reversal coinciding with what was probably the natural inflection-point of the building cycle. This conjuncture gave rise to the sharpest quarterly fall in housing activity ever recorded in the Australian statistics (and the largest half-yearly fall too – by a large margin). Overall, the September quarter was hard to evaluate, because of the effect of the Olympics – where sports-crazed fans added to demand by spending their money on getting to the Games, and subtracted from it by staying at home to watch on TV. … As the temporary once-off effects of GST, construction 'pull forward', the Olympics and the threefold price pressures pass through the system, the fundamental health of the economy can reassert itself. (Grenville 2001, pp. 1–2,8)

Some have also observed the increase in construction activity that occurred ahead of the 2000 Sydney Olympic Games as a contributing factor to the uplift (ABS 2000; Giesecke and Madden 2007; Madden and Crowe 1998; OFM 1997; Parham 2005), It appears any significant effect was from 1997 and mainly in NSW. However, some are sceptical about any major effect (Edds 2012).

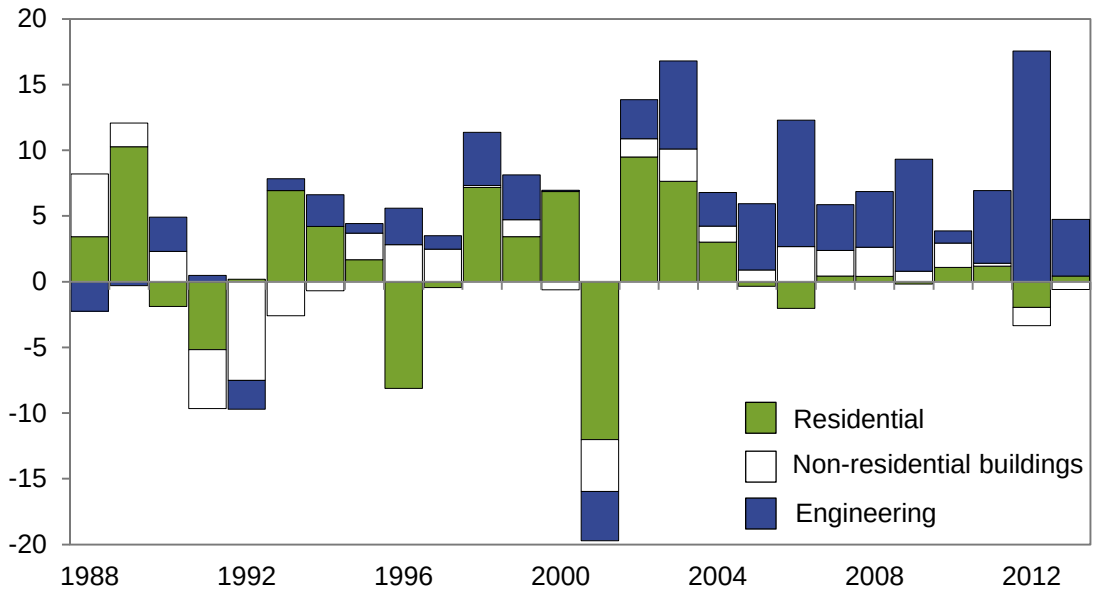
Others have pointed to the importance of the low interest rates in the early 2000s and the Australian Government's enhanced First Home Owners Scheme (Australian Government 2002).

A trade journal considered the factors that would assist the post-Olympics recovery, including an emerging infrastructure pipeline and growing investment needs in the resources sector (Sutherland 2001). Equally, Treasury noted that several large engineering construction projects had come on-line, assisting recovery (Treasury 2002).

The improved use of resources in the residential building and engineering construction segments of the industry that occurred in the revival would also be likely to stimulate their productivity growth rates compared with non-residential buildings. Accordingly, while the evidence is incomplete, it is certainly plausible that the productivity improvement apparent in 2002-03 (and the previous year) related to segments of the construction industry that were the least problematic from an IR perspective.

Given these cyclical and compositional effects, the case that the BIT was the source of the aggregate improvement in productivity from 2001-02 to 2002-03 looks tenuous.

Figure I.5 **Contribution to percentage change in total construction activity**
Percentage points, fiscal years 1987-88 to 2012-13[a]



[a] Based on the decomposition method outlined in the main text.

Source: ABS 2014 (*Construction Activity: Chain Volume Measures, Australia*, Dec 2013, Cat. No. 8782.0.65.001).

What are the trends across the growth cycles?

In the light of the above findings, it is important to assess productivity growth after taking account of the impacts of transitory shocks. Like other statistical agencies worldwide, the ABS examines productivity over 'growth cycles' to avoid the problems associated with short-term shocks:

> A common method of examining changes in productivity over an extended period involves identifying and dividing the data into productivity 'growth cycles'. The reason

> for this relates to the natural variations in productivity growth present within the business cycle and how these relate to measurement issues, such as the ability to capture capacity utilisation within the input statistics. This means that year to year changes in estimates may not be truly indicative of a change in productivity. By analysing average productivity statistics between growth cycle peaks, the effects of some of these influences can be minimised, and therefore allow better analysis of the drivers of growth in different periods. (ABS 2005b)

Research undertaken by the Commission suggests that it is important to examine growth cycles at the industry level, as these may not coincide with the aggregate economy cycle (Barnes 2011). The results from that research (supplemented by further statistical analysis to take account of the most recent years of data) shows that construction industry cycles have not always coincided with the market sector (with the GST effect discussed above likely to have been the most important contributor).

Calculating growth rates

Before considering the relevant growth rates across cycles, it is useful to clarify the methods for calculating productivity growth rates between two points in time. There are multiple methods, but they give much the same results *if calculated over the same periods*.

MBA (sub. DR211, p. 33) contends that in its draft report, the Commission incorrectly calculated the growth rate between 2002-03 to 2010-11 — a period that the Commission considered relevant as one test of the impact of the IR reforms. The Commission found that productivity growth from 1989-90 to 2001-02 (before the BIT) was higher than in the period 2002-03 (nine months after the creation of the BIT) to 2010-11. Leaving aside for the moment the appropriateness of the choice of periods, the claim that the Commission had miscalculated the growth rate is no small concern since MBA identifies the apparent error as 'colouring a substantial section' of the Commission's analysis, a significant issue if well founded.

Table I.2 shows the growth rates for the relevant periods. These indicate that, regardless of the method, the growth rates in the first period are higher than in the first period. MBA says that, to the contrary, the growth rate calculated using method C in table 1.2 was 1.3 per cent per annum in the first period and 1.7 per cent per annum over the second period. The growth rate it finds is three times higher than that calculated by the Commission using the same method (0.55).

The difference reflects that, notwithstanding the apparent illusion that growth rates are being calculated across the same periods, MBA has added an initial year to the start of the period used by the Commission, and has actually calculated the

productivity growth rate from 2001-02 to 2010-11. Since growth was very high from 2001-02 to 2002-03, due to the factors discussed earlier, it is not surprisingly that the numbers are different.[102]

Table I.2 **Growth rates in productivity per annum, construction industry**[a]

Period	*1989-90 to 2001-02*	*2002-03 to 2010-11*	*Change*
	%	%	%
(A) Compound average growth rate = $100 \times (\left(\frac{P_{t+n}}{P_t}\right)^{\left(\frac{1}{n}\right)} - 1)$	1.22	0.53	-0.69
(B) Using log method growth = $\left(\frac{100}{n}\right) \times ln\left(\frac{P_{t+n}}{P_t}\right)$	1.21	0.52	-0.69
(C) Average of annual growth rates = $\frac{100}{n} \times (\sum_{j=t+1}^{t+n} \left(\frac{P_j}{P_{j-1}}\right) - 1)$	1.33	0.55	-0.78

a In looking at any formula, the starting year is t and the end year t+n (or n years later).

Source: ABS 2013 (*Estimates of Industry Multifactor Productivity, 2012-13*, Cat. No. 5260).

To be fair to MBA, it seems likely that its intention was to estimate the growth rate from 2001-02 (just before the BIT), and that it described the starting period for these calculations imprecisely. This led to the difference between the Commission and MBA estimates. Both parties are measuring over different periods, without MBA appreciating this.

That confusion resolved, an important question is what is the appropriate span of years for considering trend productivity growth rates in the pre-BIT and BIT/ABCC periods.

Trends across the growth cycles

Using the results and approaches described in the Commission's previous analysis of growth cycles in industries (Barnes 2011), the Commission identified five growth cycles. The first growth cycle in the BIT/ABCC era is 2002-03 to 2007-08. The aggregate productivity performance over this period (using either labour or multifactor productivity measures) was relatively weak compared with some previous periods (table I.3).

102 It should be noted that MBA does calculate the growth rate between 1989-90 to 2001-02 correctly because the first term in its calculation is the percentage change between 1989-90 and 1990-91.

Table I.3 **Comparison of annual average growth rates over business cycle peaks**

Construction and the market sector, compound average annual growth rates (%)[a]

	Construction			*Market sector*	
Peak to peak period	Labour productivity	MFP	Peak to peak period	Labour productivity	MFP
1987-88 to 1993-94	-0.10	-0.72	1988-89 to 1993-94	2.25	0.95
1993-94 to 1998-99	2.77	2.59	1993-94 to 1998-99	3.72	2.49
1998-99 to 2002-03	1.75	1.67	1998-99 to 2003-04	2.48	1.12
2002-03 to 2007-08	0.31	0.45	2003-04 to 2007-08	1.54	-0.05
2007-08 to 2011-12	3.45	1.99	2007-08 to 2011-12	1.94	-0.53
2002-03 to 2011-12[b]	1.69	1.13	2003-04 to 2011-12	1.74	-0.29

[a] The cycle periods are from Barnes (2011, p. 48), with the latest cycle peak (2011-12) determined using the Barnes method with a smoothing factor of 6.25 used for the Hodrick Prescott filter. The cycle periods for the market sector are from table 5 of the ABS multifactor productivity paper (cited below). Growth rates are the compound average annual growth rate over the cycle period. [b] This is not a single peak to peak period, as it combines two others. It is intended to assess whether the high growth in the second period of the BIT/ABCC period was sufficient to elevate the growth rate to high rates by historical standards.

Sources: ABS 2013 (*Estimates of Industry Multifactor Productivity, 2012-13*, Cat. No. 5260); ABS 2007 (*Experimental Estimates of Industry Multifactor Productivity*).

In contrast, performance over the subsequent growth cycle (2007-08 to 2011-12) was strong, though highly influenced by the exceptional growth of 11.5 per cent in 2011-12 — the last year of the BIT/ABCC period. It is hard to explain the exceptional growth rate in 2011-12:

- Unlike the cyclical effects that prompted the high growth rates in 2001-02 and 2002-03, there was no 'bust' in 2010-11 that could trigger rejuvenation in the following years.
- The upturn is not due to a large increase in the capital/labour ratio, since MFP grew by around the same rate.
- Technical change may underpin some of the growth. However, while technological change and innovation is the fundamental source of long-term productivity improvement in an industry, it could not realistically explain an upturn in productivity of more than 10 percent in just one year.
- Despite the importance of IR for the performance of firms, it would strain credibility to imagine that IR policy itself was a major contributor to a one-off improvement of this order. Moreover, were it to be the case, it would considerably undermine the case put by IE and MBA that the BIT and ABCC were effective. This is because while the ABCC was still in existence at that time, the IR environment had shifted during this period in ways that IE perceived as inimical to its effectiveness (section I.2). In particular, it should be noted that the 'shift in agency emphasis', the enactment of the *Fair Work Act 1999* and changes to the guidelines for the Commonwealth Building Code all occurred

prior to the productivity growth upturn in 2011-12. Even with lags in the supposed negative impact of the changing IR regime on productivity, it would be hard to explain why productivity *rose* strongly.

- The estimated growth rate for 2011-12 may simply be wrong, and be subsequently revised by the ABS. Revision error was mentioned as a possibility by MBA (sub. DR211, p. 33). It is common for the ABS to update its estimates of productivity as it gathers more information. In particular, the estimate for the latest growth figure is often revised significantly in the subsequent National Accounts publication. For example, the first estimate of construction productivity growth for 2011-12 was 5.8 per cent, but in the subsequent year of the accounts, the ABS revised it *up* to 11.5 per cent.[103] The question is whether it is likely to be revised down in the next accounts, which would be the third estimate of the growth rate for 2011-12. One way of assessing the likelihood of this is to examine the degree to which previous third estimates of construction productivity growth vary from the corresponding second estimates. The Commission examined the nine issues of National Accounts productivity data from 2004-05 to 2012-13. This provides six observations on the revisions from second to third estimates of construction labour productivity. These were generally small. The largest change was -1.49 percentage points, and the average of the absolute values of the differences was less than 0.4 percentage points. Accordingly, while a large revision is conceivable, the historical record suggests this is unlikely.[104]

The most likely reason for the high growth rate in 2011-12 is a major compositional shift in output in that year. Engineering construction grew very strongly in 2011-12, while output in residential dwelling and non-dwelling building construction fell (figure I.5). The *level* of productivity in engineering construction is higher than for building construction. Accordingly, a compositional shift to the higher productivity industry segment will lead to growth in aggregate productivity, leading to the false impression that the industry is improving its efficiency by more than it is.

103 These estimates are based on the ABS National Accounts data (Cat. No. 5204). These vary slightly from the preferred publication on productivity (Cat. No. 5260.0), but the latter is only produced sporadically, and therefore cannot be used to examine revisions.

104 To give some idea of the sensitivity of the trend across the last growth cycle, the compound average growth rate from 2007-08 to 2011-12 would be 2.4 per cent per annum (compared with 3.45 per cent per annum) if the 'real' growth rate in 2011-12 were 7 per cent (instead of 11.5 per cent).

IE acknowledges the importance of compositional effects:

> The additional labour productivity outperformance over the last two years is driven by a compositional shift within the building and construction industry towards engineering construction, which is less labour intensive. For example, several large LNG projects began construction during 2011 and 2012. Other measures of labour productivity that are not affected by these compositional effects, including the measures discussed in section 2.2.2 of this report, show that the productivity outperformance in the construction industry has stabilised, rather than expanded further, in recent years. (Independent Economics, 2013, p. 15)

Given the above, there are grounds for omitting 2011-12 from the trend analysis, although table I.3 does not do so. (However, the results from its omission are shown in table I.2.)

Summing up: what does trend analysis of the annual data show?

The first period of the BIT/ABCC was characterised by productivity growth rates considerably superior to the period from 1987-88 to 1993-94, but worse than the other growth cycles shown in table I.3, for example, 1993-94 to 1998-99. The second period of the ABCC showed impressive productivity growth, but this is strongly influenced by just one observation (2011-12).[105]

An enthusiast for casual empiricism might argue that these patterns suggest that more stringent IR regimes did *not* have any productivity effects. However, association is not correlation.

The Commission still considers that the BIT/ABCC had positive effects in its heyday from 2002-03 to 2007-08 (effects that probably endured to some extent in its later years). But its impact is likely to have been masked by many other factors affecting aggregate productivity. Likewise, it cannot be maintained that the data show — even in an indicative sense — that aggregate productivity improved because of the BIT/ABCC.

A quarterly perspective

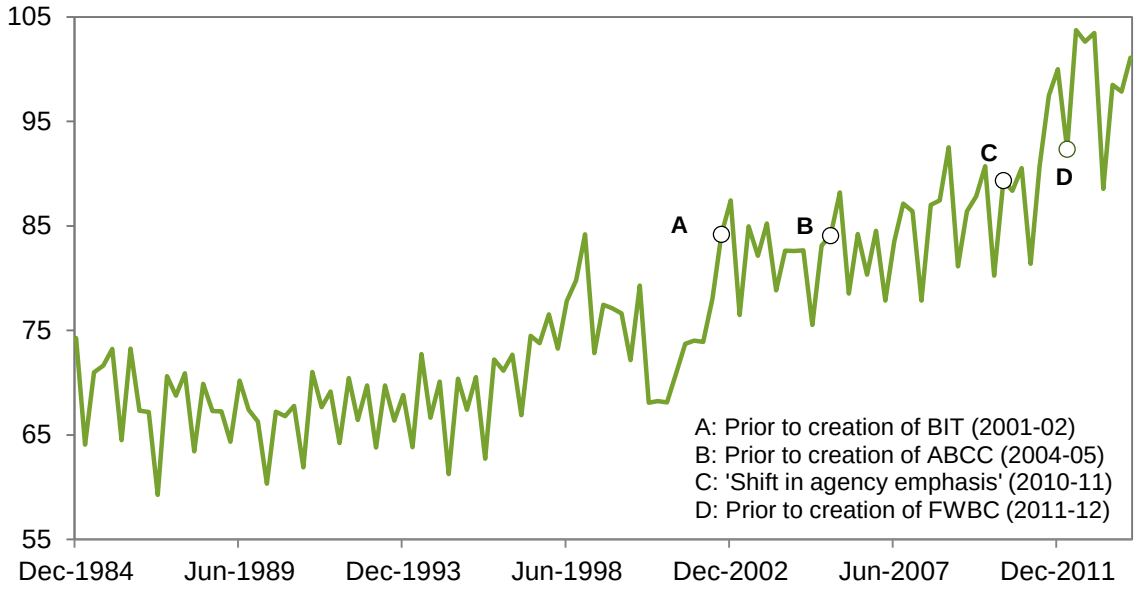
While the Commission is not convinced that the annual data reveals any significant aggregate productivity effects causally linked to the establishment of the BIT/ABCC, for completeness the Commission also examined quarterly data.

105 The Commission did not explore state-based productivity trends in any detail, but remarks parenthetically that there is evidence that MFP growth rates in construction in most states appear to have been lower after the 2000s than before (Cunningham, M. and Harb, D. 2012).

Quarterly data has the potential to pinpoint the timing of some transitory shocks more clearly than annual data, although it is also subject to seasonal factors that disguise trends in other ways. The data suggest that much of the recovery in productivity levels occurred prior to the establishment of the BIT, something that is unclear in the annual data (figure I.6). Productivity growth from just before the establishment of the BIT (just before a peak) to the creation of the ABCC was relatively weak. It then improved and, like the annual data, continued to do so after the 'change in agency emphasis' of the ABCC and the introduction of FWBC.

Again, the data does not provide robust evidence that trend productivity during the BIT/ABCC periods was superior to trends across some preceding growth cycles.

Figure I.6 **The quarterly evidence on labour productivity**
December 1984 to December 2013, Index, December 2011=100[a]



[a] The labour force data relates to November, February, May and August, rather than to December, March. June and September, as in the National Accounts. The data were weighted to put them on a basis equivalent to the National Accounts. To identify whether the results depended on this adjustment, one quarter lags and leads were also analysed, with no significant impact on the results.

Sources: ABS (*Labour Force*, Cat. No. 6291.0.55.003); ABS (*Quarterly National Accounts*, Cat. No. 5206.0).

I.4 Comparing labour productivity outcomes with the economywide performance

IE developed an econometric model that linked the productivity performance of the construction industry to that of the economy as a whole. It used its forecasts to infer the quantitative effect of the BIT/ABCC on aggregate productivity in the construction industry.

> The historical productivity performance of the construction industry is assessed using data for the period prior to the establishment of the Taskforce/ABCC (from 1985 to 2002). For this period, regression analysis was used to establish the trend in productivity in the construction industry, relative to the trend in productivity for the economy as a whole. This analysis identifies whether there is a component of building and construction industry productivity that cannot be explained by factors driving productivity in the economy as a whole and trends in construction industry productivity prior to 2002 (i.e. in the pre Taskforce/ABCC era). This would assist in identifying whether or not improved workplace practices during the Taskforce/ABCC era have had a positive impact on productivity in the construction industry. … [S]ince 2002 actual construction industry labour productivity has consistently outperformed predictions based on past trends.

In undertaking its analysis, Econtech/IE did not publish the specification of the model, the measure of productivity or its definition of the economy as a whole. Two other authors sought to replicate the work (Peetz 2012; Australian Council of Trade Unions sub. 95). They used different specifications and data inputs, although both were able to get qualitatively similar results to IE in certain cases. Their results nevertheless suggested the fragility of the IE results to the choice of independent variables and model specification.

The Commission did not seek the data or specification from IE before the draft report. IE provided it to the Commission post-draft so that the Commission could reproduce and further examine IE's analysis. IE has been entirely transparent in its dealings with the Commission. The MBA made the specification available as an attachment to its submission (sub. DR211).

IE estimated the relationship between construction and market sector productivity by regressing the following equation over the pre-BIT period from 1984-85 to 2001-02:

$$\ln(Y_{ct}/N_{ct}) = \alpha + \alpha_1 * \ln(Y_t/N_t) + \alpha_2 * \text{Time} \qquad (1)$$

where Y_{ct} = construction sector GVA at time t, N_{ct} = persons employed in the construction sector at time t, Y_t = GDP at time t, N_t = total employment at time t and Time = a time trend.[106] Further, the parameter α_1 is constrained to 1 so that the regression compacts to:

$$\ln(Y_{ct}/N_{ct}) - \ln(Y_t/N_t) = \alpha + \alpha_2 * \text{Time} \qquad (2)$$

106 The labour productivity numbers used by IE vary from those described in previous sections in that they use employment rather than hours as the labour input. While using hours provides a more precise measure of labour productivity, using employment has the advantage that it tends to smooth out some of the variations associated with cyclical demand shocks.

The Commission has replicated IE's results. These are depicted in figures I.7 and I.8. The left hand variable is an approximation of the percentage deviation between labour productivity levels in the construction sector and the economy as a whole. To the extent that $\alpha_2 \neq 0$ (as holds in the estimated model), this relationship assumes that, barring some shock that reversed it, the percentage deviation between labour productivity in the economy and the construction industry would keep on widening forever. Over short periods, for practical reasons, modellers often impose conditions that have implausible long-run implications, if nothing else because the data to build in more complex steady states is absent. This can be satisfactory for short-run forecasts. However, the forecasts from the IE model are from 2002-03 to 2012-13, so that the projection period is large compared to the estimation period. The unrealistic long-run properties of the model almost guarantee questionable results for projection periods of this length.

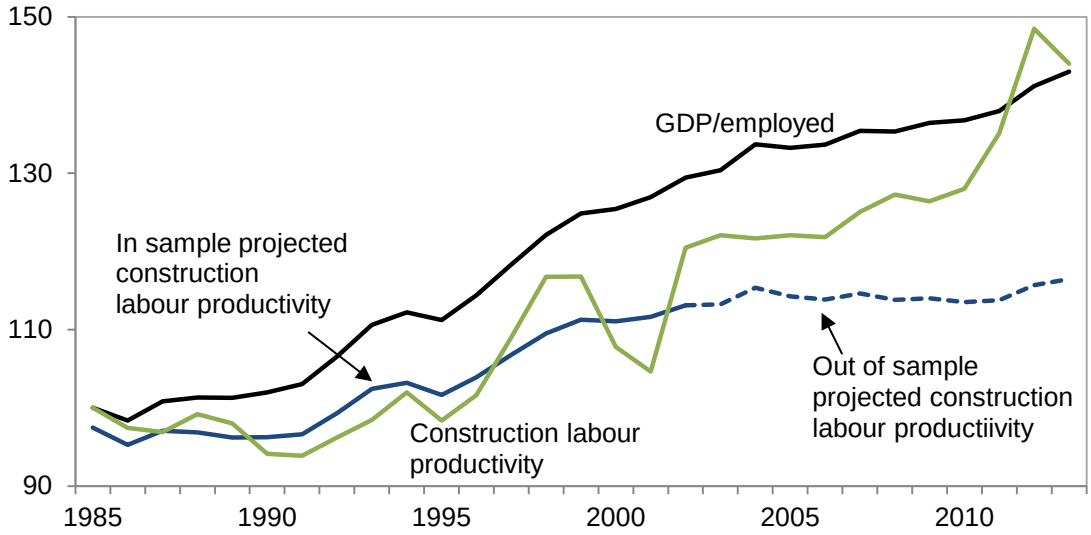
Moreover, the assumption that a stable model could be estimated for the period prior to 2001-02 is a strong one given that there are several growth cycles over the period concerned (as described in section I.3). Omitting their effects suggests that the model is misspecified and clouds the interpretability of the counterfactual line, and therefore the inferences made. Shifting the time period reveals the instability of the model's parameters and the markedly varying statistical significance of the trend factor (figure I.9). Indeed the trend factor becomes statistically insignificant (at the usual significance level) if the regression is estimated from any year from 1988-89. The statistical significance of the key parameter is therefore dependent on the first four observations of the 18 years of data used to estimate the relationship. If the trend factor were dropped from the regression,[107] the apparent productivity 'gap' between actual and forecast labour productivity narrows substantially (and indeed, as late as 2005-06, there is no gap at all).

Another test of the model is whether the data can support the assumption that α_1 can be constrained to unity. When left as a free parameter, α_1 is estimated to be around 2 (an odd result in its own right). The implication of removing the constraint is that the divergence between actual and projected productivity during the BIT/ABCC period becomes much larger than that implied by the constrained IE model. Indeed, the apparent impact of the IR regime would be a 30 per cent improvement in labour productivity by 2012-13 (compared with around 20 per cent if the constrained model is used). If there are a priori concerns about the realism of a 20 per cent estimate, these are even greater when the unconstrained model is used. This raises additional concerns about the model.

107 Using the model regressed from 1989-90 to 2001-02.

Figure I.7 **Actual and projected productivity levels**

Productivity indexes[a]

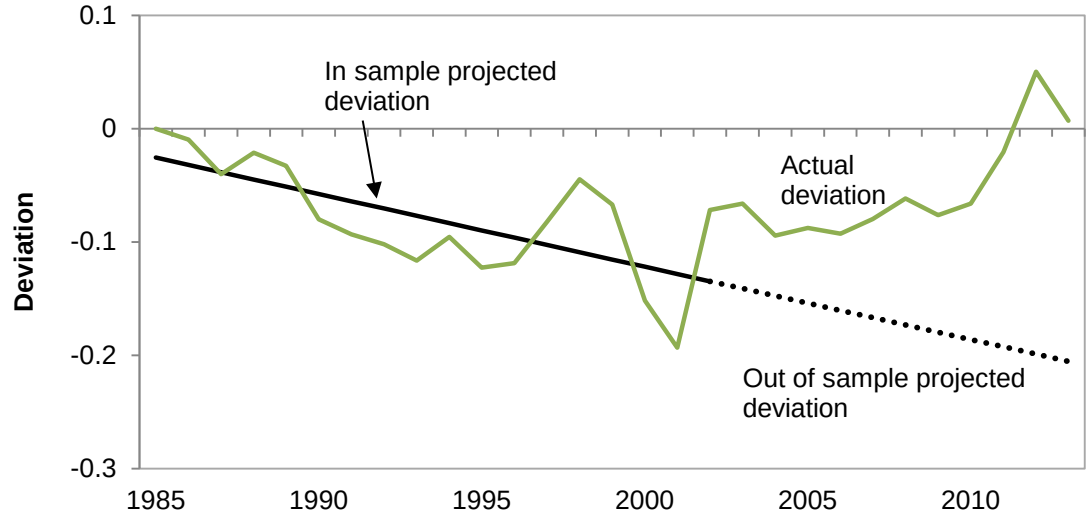


[a] The actual economywide and construction productivity indexes are set at 100 for 1984–1985. The out of sample projection is based on the estimated model (from 1984-85 to 2001-02). The trend variable was -0.006 and the constant was -0.019. While the equation was estimated in logs, its interpretation is approximately that productivity in construction in the sampled period was around 2 per cent below the economy as a whole, with the gap widening by 0.6 percentage points per year.

Source: PC estimates based on IE data.

Figure I.8 **The deviation between construction and economywide productivity**

Percentage deviation, 1985 to 2013

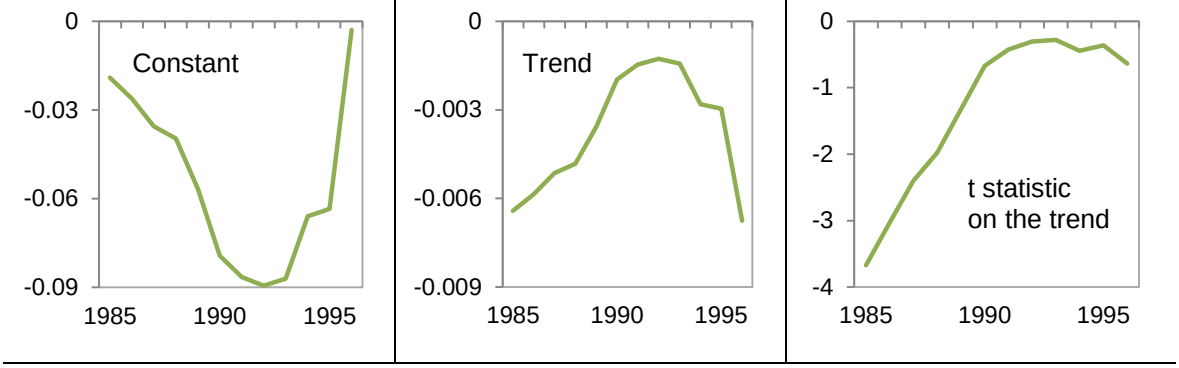


[a] This is another representation of the model shown in the previous figure, and approximately represents the projected percentage deviation of construction productivity from the economywide productivity.

Source: PC estimates based on IE data.

Figure I.9 **Parameters and t statistics depend on the sample**

IE model based on shifting sample from 1984-85 to 1995-96[a]



[a] These estimates are based on regressing the IE model over different periods, stating with the full sample, and then progressively subtracting observations from the starting period. The last regression is based on the period from 1995-96 to 2001-02. The t statistic relates to the trend estimate.

Source: PC estimates based on IE data.

So too does the ever widening productivity gap, when the underlying premise is that weakening of the IR regime towards the end of the sample should have reversed that trend.

This goes to a more fundamental point. The underlying assumption of IE's econometric approach is that any divergence between the out-of-sample projection and the observed level of labour productivity is due to IR changes. This would be only be true under exceptional circumstances:

- any shocks that affect economywide productivity are common to the construction industry
- no other factors specific to the construction industry have affected its labour productivity performance.

These are strong assumptions and not ones consistent with other evidence. For instance, the poor productivity performance of the electricity, gas and water industries would have lowered economywide productivity, which would open a gap with construction productivity in a way entirely unrelated to IR reforms. In many respects, the real issue is the source of the productivity malaise in the economy as a whole.

As it stands, IE's predictive model should be given little weight. In saying this, it should be appreciated that the presence of a major confounding event — the boom, bust and boom of the industry associated with the GST and other events — would always have made it difficult to get precise estimates. Reasonably enough, IE was seeking to measure the effect of a major change to IR arrangements. However, the

data and the underlying assumptions of the model were always likely to defeat that objective. No reliable parameter can be derived from the analysis.

I.5 The costs of residential versus non-dwelling buildings

IE's second modelling approach drew on micro cost data for non-residential building construction compared with dwelling construction. (In that regard, the results may have little significance for civil and heavy engineering projects, which are also a major focus of this inquiry.) The basic logic and empirical conclusions of IE's approach are as follows.

Dwellings are largely free of union influence, and are built predominantly by independent contractors. In contrast, unions often play a major role in non-residential building projects, and can exert their bargaining power in multiple ways, which are likely to affect onsite productivity. As shown in the case studies presented by IE, the MBA and in various court cases, there is little question that this can occur on some projects.

Some tasks are common to dwelling and non-building construction such as building reinforced slabs, erecting a carpentry wall and painting doors. While IE initially undertook studies based on eight building tasks, it took account of criticisms about their appropriateness, and subsequently reduced the comparisons to six tasks. IE combined the costs of the various tasks into a composite index.

The costs of performing those tasks are higher in non-dwelling construction than in dwellings (using Rawlinsons detailed costing data for the industry[108]). However, Toner (2003, p. 3) points out that the nature of at least some of the tasks in the two segments of the industry is different in character. Non-dwelling construction is more complex in design, involves multi-story buildings and requires the organisation of large construction sites, sometimes involving the coordination of thousands of workers at the one time.[109] These complexities undermine the usefulness of any comparisons in the *levels* of unit costs. However, IE did not give emphasis to the different levels of unit costs, but to the differences in the growth

108 Rawlinsons is a business comprising quantity surveyors and construction cost consultants. It produces an authoritative annual report on costs by building type at a highly disaggregated level. No party arguing about the validity or otherwise of the IE reports cites Rawlinson's data as the source of the problem.

109 For example, the peak project workforce in the construction of the new Royal Children's Hospital in Victoria exceeded 2100 people (Lend Lease 2014b).

rates in the unit costs between the two industry segments. By doing so, IE at least partially controlled for the variations in the complexity in, or other engineering differences between, the tasks.[110]

IE's main conclusion from this sequence of analyses is that there was convergence in costs, and that this could be attributed to improved productivity resulting from the operation of the ABCC and the weakening of union power. IE also tentatively concluded that the creation of the FWBC had reversed the beneficial effects of the ABCC.

There are several difficulties with these conclusions.

First, no judgment can be made about the effects of the FWBC from the data currently available. There is only one year of data, and the analysis does not recognise the point that, even during the ABCC period, relative costs sometimes rose.

Second, the empirical evidence supporting the contention is not clearcut.

- The Commission obtained data from all of the relevant Rawlinson cost handbooks from 1990 to 2014. There have been concerns over the comparability of some items over time, so the Commission used three sets of items, of which the 5 item group is likely to provide the most robust evidence and the 8 item group, the least (table I.4). The evidence supports IE's findings that since 2004 the cost gap between residential and non-residential buildings has fallen overall. This is true for all combined measures (figure I.10). However, 2004 was a peak year. From a long-run perspective, there has been no decline in the gap.
- Moreover, at the individual product and state level, there are large variations in the reductions in the cost differentials from 2004 to 2014. For all products, excepting the erection of plasterboard, the cost differentials have risen for some states and products over the period. This suggests that factors other than IR must also be at work.

110 In modelling terms, IE adopted a 'difference in difference' or fixed effect model, which has many advantages in separating the influence of fixed characteristics from the impacts of policy changes.

Table I.4 **The categories under the microscope**[a]

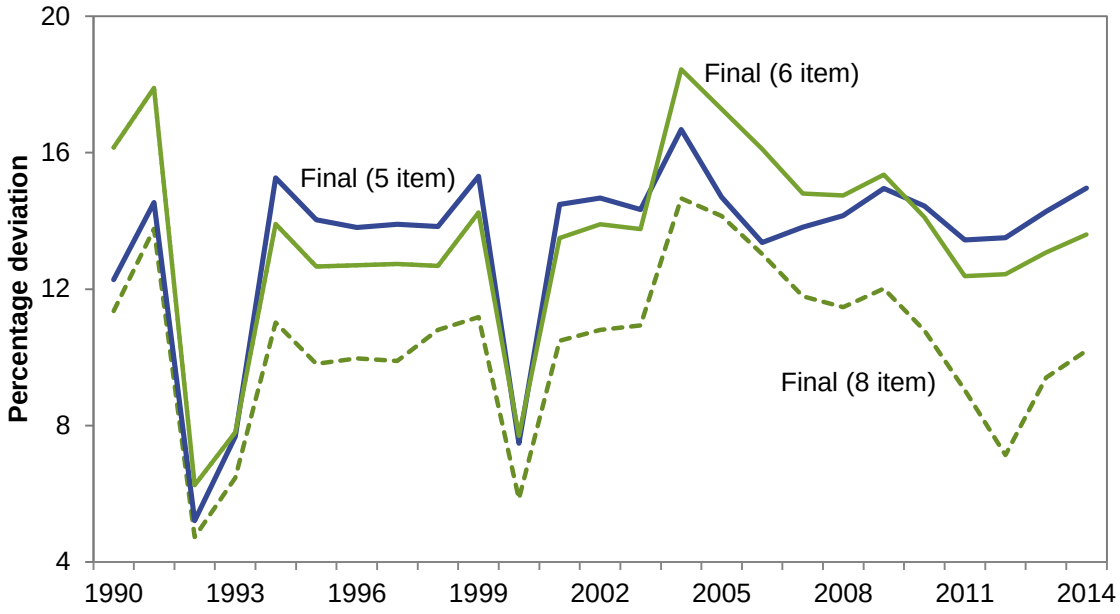
Non-residential	*8 items*	*6 items*	*5 items*
Concrete work; concrete; reinforced concrete 25 mpa; suspended slabs: N.E. 150 mm thick	yes	yes	yes
Concrete work; formwork; class 3 formwork; soffit of suspended slab: 100/200 mm thick	yes	yes	
Brickwork; clay brickwork; standard brick; common brickwork; base rate; wall or skin of hollow wall; 110 mm thick	yes		
Carpentry; wall framing; plates; 75 x 38 mm	yes	yes	yes
Windows and doors; hollow core; standard hollow core flush door size 2040 x 820 x 35 mm thick; faced both sides with - prime coated hardboard for paint finish	yes	yes	yes
Roofing and roof plumbing; steel roofing; corrugated; zincalume steel: 0.42 mm	yes		
Plasterboard; plasterboard, flushed finished; 10 mm thick to timber wall framing	yes	yes	yes
Painting; internal painting; woodwork; acrylic; prime, one sealer undercoat and two coats semi-gloss or gloss acrylic on: general surfaces	yes	yes	yes
Dwelling	8 items	6 items	5 items
Concrete work; reinforced concrete 20 mpa; suspended slabs	yes	yes	yes
Concrete work; formwork; soffit of suspended slab up to 250 mm thick	yes	yes	
Brickwork; standard clay common brickwork : reduced brickwork; 110 mm wall, leaf of wall	yes		
Carpentry; wall framing; 75 x 38 mm plate	yes	yes	yes
Windows and doors; doors; standard hollow core door, 2040x 820 x 35 mm thick (excluding edge strips, hardware and painting), faced both sides with - prime coated hardboard	yes	yes	yes
Roofing; steel; corrugated, zincalume steel: 0.42 mm	yes		
Plastering; plasterboard, flush finished: 1 x 10 mm thick to timber wall framing	yes	yes	yes
Painting; on general surfaces: woodwork - prime, one sealer undercoat and two coats gloss acrylic	yes	yes	yes

a The Commission has emulated the analysis of IE and Peetz in the selection of these items and obtained similar results to them. It should be noted that the thickness of the corrugated steel was 0.47 mm from 1990 to 1993 and 0.42 mm onwards. However, this does not appear to make a difference since this roofing is not in the 5- and 6-item measures (the more reliable measures), and they do not appear to differ much from the 8-item scales during this period.

Source: Various issues of the Rawlinsons *Australian Construction Handbook*.

Figure I.10 **The difference between cost indices between non-residential and residential buildings**

1990–2014 (percentage deviation)



Source: Various issues of the Rawlinsons *Australian Construction Handbook*.

Third, as in the prior analysis, the implicit assumption is that there were no shocks specific to either residential or non-residential building over the relevant period. The analysis leading to the conclusion that IR is the exclusive factor explaining the trend failed to consider a range of considerations:

- the method used by IE assumes that technological and managerial *change* is the same in dwellings and non-dwelling construction — an assumption that cannot be made lightly. For example, the adoption of improved management approaches to large building sites, the use of pre-fabricated technologies and changes in labour and capital input prices facing the two segments could affect unit costs in non-dwelling construction by more than dwellings construction. MBA has said that this is not the case (sub. DR211, p. 29), but the Commission's understanding from its stakeholder consultations is that new IT approaches have been increasingly applied to the construction of complex buildings. It is possible, however, that these do not show up in costing of the individual tasks underpinning the analysis of the Rawlinsons' data (although they may partly contribute to productivity improvement in the industry).
- aggregate productivity trends in construction do not appear to be rising throughout all of the years in the BIT/ABCC era
- the story at the jurisdictional level provides mixed evidence. The ABCC's focus was on Victorian building sites, where there is a higher degree of industrial

unrest and litigation before the courts than in other jurisdictions (chapter 13). It could therefore be expected that findings of reduced cost relativities would mainly relate to Victoria, and not to other states. The evidence provides some support for that contention. On the other hand, in Queensland, relative costs actually increased for the initial years of the ABCC, and then fell significantly from 2009. The Commission confirmed with Rawlinsons that there was no anomaly affecting the Queensland data. It would be misleading to assume that the Victorian evidence favours the IE conclusion, while ignoring the implications of the Queensland data (which suggest other factors have played a role).

Finally, there are thousands of cost items in the Rawlinsons cost handbook (most of them for the more complex buildings). The comparison across several common tasks in the two segments of the industry is useful, but it is hard to conclude that equal inefficiencies would apply to the many other tasks.

Accordingly, IE's conclusions based on the Rawlinson's data are not robust.

I.6 What does this mean for analysis of IR changes?

There are three distinct hypotheses about the impact of the more stringent IR arrangements that emerged with the creation of the BIT/ABCC:

- H1: they made no difference to productivity at all
- H2: they improved productivity, but not to the degree that they could be statistically discovered with any precision in aggregate data for the entire construction industry
- H3: they markedly improved aggregate productivity in the entire industry.

While there are devotees for all three hypotheses, the Commission's position is that H2 is the most reasonable. It is supported by:

- the findings of the Cole and Wilcox reviews about the processes on worksites that affect productivity, and how these can be undermined by industrial disharmony
- the likelihood that the ABCC reduced industrial disputes and, through deterrence, affected other problematic conduct
- case studies of outcomes for particular projects suggest that problematic IR arrangements influence productivity and that the creation of the ABCC partly addressed these. The survey evidence cited in chapter 13 found that while around half the industry participants did not believe that the ABCC had made a

difference to workplace productivity, around one quarter cited a moderate improvement and 15 per cent a significant one. Again this is consistent with H2, certainly contradicts H1, but is not supportive of H3. After all, the overwhelming majority did not say it had a major impact

- economic common sense that poor workplace relations are unlikely to be conducive to productivity. MBA quotes approvingly from previous Commission comments about the importance of institutional reform and the relevance of IR (MBA sub. DR211, p. 11, p. 34). These comments are entirely compatible with H2. One does not need to conclude that there is a large aggregate effect from one IR reform for one part of an industry to support the notion that IR arrangements are crucial
- analysis that shows that buildings have been the major source of problems and the major target for action by the ABCC and FWBC. The Commission has shown that even large impacts of IR reform on non-residential buildings will be hard to find in the aggregate date (chapter 13). IE's finding of a large impact of IR on engineering construction is an artefact of the technique by which it creates a shock for its computable general equilibrium model. It is not evidence in its own right
- the fact that not all the evidence points in one direction. The Commission has found evidence that Australian constructors are — for at least some tasks — amongst the global best performers (chapters 9 and 10). Moreover, according to some analysis, Australia was not a bad performer in the late 1990s either (Access Economics and World Competitive Practices Pty Ltd 1999).

MBA argued that commentators should consider the totality of the evidence on the effects of the BIT/ABCC on construction sector productivity (sub. DR211, p. 26). The Commission agrees, but considers that the totality of evidence favours H2, but not H3.

H3 requires something beyond H2. It cannot rely alone on individual case studies or on the (reasonable) proposition that the ABCC reduced industrial disputes. It must be supported by the reliable identification of robust and large parameters that causally link aggregate productivity gains to the creation of the BIT/ABCC. Neither MBA or IE have met this requirement.

MBA notes that:

> The Productivity Commission failed to make its own assessment as to whether a large institutional economic reform that changed the building and construction industry led to productivity improvements, and if yes, by how much? (sub. DR211, p. 29)

The Commission did in fact seek to do both. Its judgment is that there was an improvement, but that it could not be found in the aggregate data. That is neither surprising nor contrary to the need for further reform.

J Unsolicited proposals

As discussed in this report, private sector involvement in Australia's public infrastructure provision has been increasing. Typically, governments seek out private sector involvement through tendering opportunities for public-private partnerships (PPPs). However, some governments have opened up opportunities for the private sector to initiate contracts through the use of unsolicited proposal arrangements. These are the focus of this appendix.

Observed unsolicited proposals to Australian state governments appear to be increasing in popularity in recent years. For example, over the period from 2001 to 2007, 10 unsolicited proposals were submitted to the NSW Government (Hodges and Dellacha 2007, p. 18), while from January 2012 to 2013, 36 unsolicited proposals were reported (NSW Government 2013c).

This appendix provides some background on the unsolicited proposal model as well as a discussion of the potential benefits and challenges.

J.1 What are unsolicited proposals and how are they applied?

An 'unsolicited proposal' is a formal proposal made to government by a private party (otherwise referred to as a proponent) to undertake a PPP infrastructure project (World Bank 2012, p. 205). This project is not proposed in response to a request from government, but is instead initiated by the private party. In developing an unsolicited proposal, the proponent outlines basic project specifications before approaching government for approval and support. Typically this support is financial, though it may also include regulatory support or other forms of assistance (Victorian Government 2014a, p. 1; World Bank 2012, p. 205).

The Australian, state and territory governments generally negotiate with proponents exclusively, provided that the proposal meets the relevant criteria. Following negotiation, unsolicited proposals are delivered as PPPs and therefore encompass the advantages and disadvantages of this delivery model (see section J.3 for a discussion of the benefits and challenges specific to unsolicited proposals).

Jurisdictions have developed guidelines that outline the criteria for an unsolicited proposal to proceed to exclusive negotiation (box J.1). Common to all guidelines is a requirement for uniqueness or innovation. Uniqueness implies that no other party could reasonably deliver the project for the same value for money within an acceptable timeframe. This may be due to the proponent owning unique assets, such as property, or having access to unique financial arrangements. Alternatively, uniqueness may result from innovation over which the proponent has intellectual property rights.

Box J.1 **State policies on unsolicited proposals**

New South Wales

- Unsolicited Proposals: Guide for Submission and Assessment (2014b)

Victoria

- Unsolicited proposal guideline (2014)

Queensland

- National Public Private Partnership Guidelines: Annexure 1 – Queensland departures (2011)

South Australia

- Market Approaches Guideline (2012)

Northern Territory

- Unsolicited Proposals Policy (2013b)

The Australia Capital Territory

- The Partnerships Framework: Guidelines for Unsolicited Proposals (2014)

Tasmania and Western Australia have not published guidelines for processing unsolicited proposals.

While uniqueness and innovation are central to approval of an unsolicited proposal, a number of other factors are considered across the various stages of approval. In the initial assessment, governments require that unsolicited bids are feasible and align with the existing strategic infrastructure objectives. In the later stages governments focus on obtaining value for money. This involves consideration of factors such as whole-of–life costs and revenue, quality, risks borne by governments and the timeliness with which objectives are likely to be met. To facilitate this analysis, governments may build a costs comparator, seek independent assessment of the proposal, utilise benchmarking data or require an ‘open book’ approach to negotiations.

J.2 Who has made use of unsolicited proposals?

Information on the number unsolicited proposals made to governments is not readily available for all States and Territories. However, the NSW Government (2013c) reports that only a small portion of unsolicited proposals are deemed to meet its initial criteria. Indeed, from January 2012 to January 2013, 36 unsolicited proposals were submitted, with approximately 85 per cent of projects failing to proceed beyond the first stage.

Only two jurisdictions publicly report on unsolicited proposals. The NSW Government publishes a list of unsolicited proposals that have been approved or are currently under consideration (table J.1). The Victorian Government also provides some public information and has recently announced the first unsolicited proposal to be approved under its updated unsolicited proposal guidelines.

Table J.1 **Recent unsolicited proposals in New South Wales**

Proponent	*Description*
Brookfield Office Properties Australia Pty Ltd	Commercial and retail development on Carrington Street with improvements to the public access areas for Wynyard Station.
Transurban	The construction of a tunnel link between the F3 and M2 Motorways in Sydney.
The Crown Sydney Resort Project	The development of the Crown Sydney Hotel Resort in Barangaroo South and the commencement of VIP gaming from 2019.
University of Sydney Accommodation	The sale of the Queen Mary Building in Camperdown which is to be used for affordable student accommodation.

Sources: NSW Government (2014a); VIC Government (2014b).

J.3 The potential advantages and disadvantages of unsolicited proposals

Inquiry participants have outlined several potential benefits that can arise from jurisdictions encouraging unsolicited bids. Foremost, is the potential for unsolicited proposals to identify infrastructure needs, reduce administration costs and elicit innovative solutions (Chamber of Minerals and Energy of Western Australia, sub. 36; Sinclair Knight Merz, sub. 108; Transurban, sub. 61). However, they also present public decision makers with several challenges.

Gains from incentives for private sector project identification

A reliance on competitive tendering for infrastructure provides no incentive for private firms to identify infrastructure needs and solutions. The use of unsolicited

proposals can overcome this, helping governments identify net beneficial infrastructure investments. However, a potential trade–off from abandoning a competitive tender process is reduced value for money. Despite this, there are a number of options available for maintaining incentives for unsolicited proposals while also ensuring value for money.

States may opt to reimburse proponents for their proposals on the condition that the proposal is subsequently sent to tender. This has the advantage of encouraging innovative proposals and providing developers with the necessary resources to make sure that the project is developed to a high standard (Hodges and Dellacha 2007). On the other hand, this might also result in frivolous project proposals, with developers seeking profits from project concepts, without an intention to bid. If such an approach were used, strict criteria to assess 'conforming proposals' for reimbursement would be required — analogous to those required in return for contribution to bid costs (chapter 12).

Alternatively, governments could make use of 'adjusted bidding systems' that provide original proponents with an advantage in the bidding process. For example the ACT government uses a 'Six Ways' framework, which involves selecting from one of six bidding systems (see table J.2). These systems are also used in international jurisdictions, with the Bonus, Swiss Challenge and Final Offer systems most common.

Savings from reduced project identification costs

Allowing for unsolicited bids can potentially save on project identification costs (such as business case development and any other necessary preparatory work conducted before a project goes to tender). But there will be a bias in the projects identified through any unsolicited bid process that may undermine the efficient provision of infrastructure.

As private sector providers seek to maximise commercial return on their investment, they are only likely to identify those potential infrastructure investments where there is a strong community willingness to pay (for example, in user charges) for the subsequent services provided (such as new toll roads). However, in determining an infrastructure investment portfolio, governments should be driven by objectives that relate to the overall welfare of the community. In some instances, this disparity in objectives may result in unsolicited proposals that are not in the public interest and would pass on unnecessary costs to the taxpayer. These costs may take of form of direct financial assistance to the proponent, or indirect assistance, such as extending concession deeds.

In addition, given the separate objectives of private proponents and governments, where new infrastructure is built into an existing network, private sector proposals may lack integration with other parts of the state infrastructure and skew the decision–making process. Ultimately, while commercial viability is an important consideration, unsolicited proposals cannot necessarily be relied on to identify projects that would maximise economywide benefits.

These issues require governments to ensure that unsolicited proposals are evaluated in a transparent manner and against existing state infrastructure plans and strategies — a process which also involves some costs. In Australia, all jurisdiction guidelines require unsolicited proposals to align with existing infrastructure strategies at initial stages of assessment (see appendix F for a list of state infrastructure strategies). These stringent requirements relating to strategic alignment may explain the limited number of unsolicited proposals that are considered beyond the first stage of evaluation, approximately 15 per cent.

Table J.2 **Unsolicited proposal bidding systems**

Type	*Definition*	*Applicability*
Swiss challenge	An open bidding process where the provider of the unsolicited bid has the option to match the winning bid to win the tender	• Submission likely to be unique
Bid premium	The proponent receives a bonus in the form of a premium to the original technical or financial offer in an otherwise open bidding process.	• Unique submission • Acknowledges first mover advantage of proponent
Developer fee	The project or bid development costs of the original proponent are reimbursed by the winning bidder.	• Unique submission • Perceived potential for market alternative
Open book	A two stage open book process where the proponent receives from the Government a defined rate of return to develop bid criteria and material for the tender and is subsequently allowed to bid for the project.	• Submission likely to be unique • Perceived potential for market alternative
Development manager	The proponent develops the project and conducts the bidding process on behalf of the Government. The proponent cannot bid for the project but receives a development fee from the winning bidder.	• Submission likely unique • Niche model for proponents lacking full infrastructure life cycle delivery capability
Negotiate exclusivity	If the proponent's proposal progresses to a detailed proposal stage, Government enters into direct negotiations with the proponent, and they work cooperatively to develop a proposal.	• Unique submission • A market alternative does not exist

Sources: Hodges and Dellacha (2007); ACT Government (2014).

Savings in tendering costs

Unsolicited proposals could potentially reduce tendering costs for both the government and industry (where the unsolicited proposal is not followed by a tender). That said, there are some issues. Governments are still required to assess the proposal and in doing their due diligence would still face some of the same costs imposed by a traditional tender process. Further, as this process lacks competitive pressure, uncertainties exist over whether governments are procuring the best value-for-money partnership with the private sector.

There are also issues surrounding probity. Exclusive negotiations can create concerns around transparency. In this respect, the NSW Government's approach to publicly reporting proposals under consideration may address the issue. It could also potentially open up competition with alternative infrastructure asset partners being able to approach the government to build any asset under consideration.

More generally, governments still need to ensure that the resulting PPP is the best way to procure a particular asset. The consequences of poor PPP infrastructure delivery have been demonstrated in several Australian projects.

'Uniqueness' and potential limits to competitive tendering

Competitive tendering is not always feasible. This is often the case where an unsolicited proposal is submitted for the expansion of existing infrastructure and the provider of existing capacity has strong property rights, usually associated with land. Further, such circumstances may involve significant operational impacts which are much better managed by a party internalising processes rather than managing them by contract. Finally, it may be difficult to price access to the additional capacity separately from the existing capacity, especially if users consume services from the new and old assets jointly. An example is the recently announced upgrade to the CityLink toll road in Melbourne (see box J.2). In other cases, where intellectual property is crucial, the purchasing of intellectual property by governments to allow for tendering is also a possibility. This has also been implemented in Australia.

Box J.2 **The CityLink and Tullamarine road widening**

In March 2014, the Victorian Government announced an in–principle agreement with Transurban for an $850 million upgrade to the CityLink toll road in Melbourne. Construction is expected to begin in early 2015 and finish in 2017, adding extra lanes in each direction as well as lane use management, ramp metering, variable message signs and CCTV cameras. The Victorian Government expects these upgrades to increase capacity by 30 per cent and reduce travel times between Melbourne Airport and the West Gate Freeway by 16 minutes during peak periods.

This project was initiated by the owners of the existing CityLink toll road, Transurban, through an unsolicited proposal to the Victorian Government. It is one of two projects processed according to the Victorian Government's recently developed *Unsolicited Proposal Guideline* (2014).

The Victorian Government is currently in discussions with the Australian Government surrounding additional upgrades to the Tullamarine Freeway, a continuation of the CityLink Road. This would also add an extra lane in each direction, costing approximately $250 million.

Sources: Transurban (2014); Napthine (2014).

Gains from innovation

Another claimed benefit to arise from unsolicited proposals relates to the gains from innovation in the design of the infrastructure assets. Unsolicited proposals allow the infrastructure owner (the resulting PPP created special purpose vehicle) to engage a constructor earlier. This, it has been argued, provides greater incentives for the constructor to be innovative as they are certain to be rewarded for their novel ideas, unlike what may potentially occur in a tender process under traditional contracting.

However, such benefits are disputed. As discussed in chapter 12, early involvement of a constructor in lieu of a competitive process has some costs. Further, if adopted, the Commission's recommended changes to procurement practices should encourage a greater degree of innovation in the design of infrastructure assets when using traditional contracting arrangements. This would suggest that there are unlikely to be any *additional* gains from innovation from this procurement method vis–à–vis traditional procurement. It should also be noted that a PPP process would provide the same opportunities for early constructor involvement and the adoption of private sector procurement approaches.

That said, if due to an absence of restrictions that arise from probity rules, the private sector approach to procurement encourages greater levels of innovation relative to public sector tendering, there could be some gains from unsolicited bids.

However, a first best response would be to review the probity arrangements rather than rely on unsolicited bids. Above all, however, governments should adopt appropriate processes of the type advocated elsewhere in this report when they consider the merits of unsolicited proposals to ensure they are consistent with the long–term interests of the community.

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