Infrastructure Australia

Evidence Based Comparative Analysis of Major Infrastructure Construction Costs in Australia and Internationally

Final Report, April 2011

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1. Summary

This study represents a high level analysis of the evidence on Australian and international infrastructure construction costs. More detailed analysis of data sources may yield slightly different results and conclusions to those reported here.

The data-based evidence of the trends in and drivers of movements in Australian and international infrastructure construction costs indicates that increases in infrastructure construction costs have not consistently exceeded increases in the general rate of inflation over the long run. There have been some exceptional episodes where infrastructure construction cost increases have outstripped inflation increases (i.e., the 2004 – 2008 episode) as well as episodes when the evidence shows the reverse occurred (i.e., the 2009 and 2010 epsiode) – that is, inflation rose by more than infrastructure construction costs.

The analysis suggests that Australian experience with increases in infrastructure construction costs is broadly in line with trends observed in the comparator countries of US, UK, France and Canada.

Trends in world oil prices and fuel prices are seemingly the main cost drivers which regularly have explained trends in Australian infrastructure construction costs over a sufficiently long and representative period of time. Movements in input material costs and labour wage costs appear to have played a modest role in driving movements in Australian infrastructure construction costs. The strong growth in the amount of infrastructure construction work done in Australia during the early and mid 2000s appears to have contributed to the 2004 – 2008 period of above-CPI increases in infrastructure construction costs.

With world oil prices seemingly being a significant driver of infrastructure construction costs in the past, the medium and longer term projections for substantial and sustained increases in world oil price increases imply real (above-CPI rate) increases in infrastructure construction.

From a policy perspective, this scenario invites a response from governments. While it is true that governments can do little about rising oil prices, the prospect of oil price-driven increases in iinfrastructure construction costs does highlight a need for governments to apply even greater scrutiny of infrastructure projects (i.e., project proposals seeking government funding). One important element here is the application of higher standards of project evaluation to ensure that planned infrastructure projects genuinely deliver value for money. The point is that governments cannot afford to spend scarce capital on ever more expensive projects. This analysis highlights the need for governments to be careful about the choice and scope of projects to be developed.

2. Introduction

GHD's transport economics and policy group, GHD Meyrick, has been commissioned by Infrastructure Australia (IA) to undertake an: *Evidence based comparative analysis of major construction costs in Australia and internationally*. The work has been commissioned under the Infrastructure Panel of Economists & Other Experts (SON 13004).

IA's interest in this issue arose from its assessment of infrastructure project proposals in 2008-09 and 2009-10. A number of project proponents argued that the 'outturn cost' of their proposals, i.e. the expected capital construction cost in nominal terms, was anticipated to increase at a rate somewhat higher than the rate of general inflation (often at 6-7% per annum).

The role of the analysis is to critically evaluate the available data-based evidence about the rate of increase in infrastructure construction costs in Australia to see if it is higher than the general level of inflation, and if so, whether a similar trend has occurred in comparable countries. The purpose is to provide an understanding of the key drivers of infrastructure construction costs in a way that informs specific policy solutions for improving the efficiency of the Australian infrastructure construction sector.

2.1 Approach

From the outset, IA and GHD Meyrick were aware that the coverage of the analysis – both sectors and countries – would be highly dependent on the availability of suitable data.

This has proven a realistic concern, with many statistical agencies not reporting infrastructure construction cost data in sufficient detail for desired analysis. In view of the data limitations, the aim has been to capture data information from comparable countries (especially the United Kingdom, United States of America and Canada, but with some interest in large continental European countries such as France, Spain and Germany) on a best-endeavours basis. The sector coverage applicable to this data information is outlined in Table 1:

Table 1: Infrastructure construction sector coverage

Transport infrastructure sub sectors	Non transport infrastructure sub sectors
1. Road	5. Electricity
2. Rail	6. Gas
3. Ports	7. Water
4. Airports	8. Telecommunications

2.2 Report structure

This document is structured as follows:

- Section 3 describes, compares and interprets the key data available for infrastructure construction costs and inflation trends in Australia;
- Section 4 describes, compares and interprets the key data available for infrastructure construction costs and inflation trends in the selected sample of comparator countries. It then assesses the extent to which infrastructure construction cost trends in comparator countries have been similar to infrastructure construction cost trends in Australia;

- Section 5 assesses the evidence for a range of underlying cost drivers that explain trends in headline (or aggregate) infrastructure construction cost in Australia;
- Section 6 presents the indicative outlook for infrastructure construction cost growth in the medium to longer term. This is based on forecasts for the specific drivers of infrastructure construction costs and macroeconomic variables (which have a broader influence on infrastructure construction costs); and
- Section 7 concludes by considering the policy implications stemmimg from the evidence on and indicative outlook for infrastructure construction cost increases moving forward.

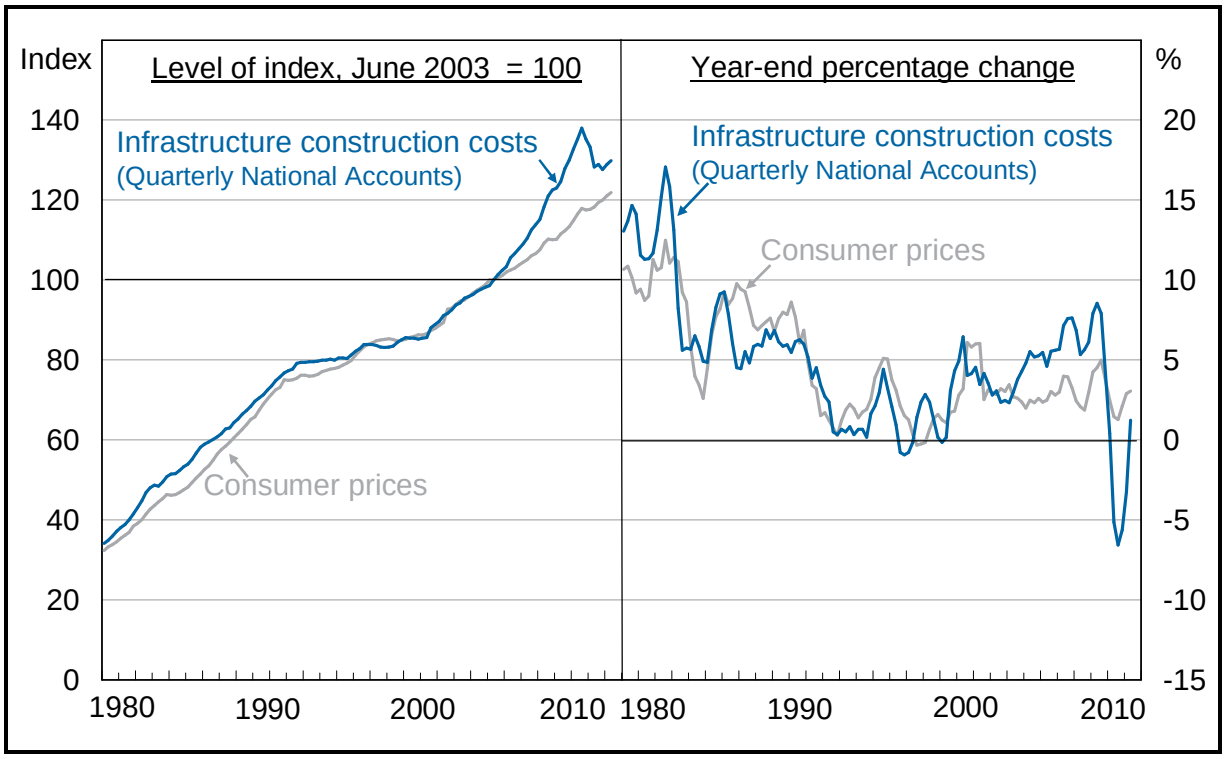
3. Australian infrastructure construction costs

This section reports on infrastructure construction costs in Australia. This involves explaining the different data sources available, applicability of these data sources to this study, identifying and interpreting trends in infrastruction construction costs vis-à-vis inflation.

3.1 Infrastructure construction costs – headline

The Australian Bureau of Statistics (ABS) is the primary source for Australian infrastructure construction cost and inflation data. The series in Figure 1 have been selected to best describe the relevant infrastructure construction cost changes in the Australian economy over recent years. These, and other series, are described in Section 3.2. The data suggest that infrastructure construction costs tracked consumer prices closely from 1992 to 2003, but grew significantly faster from 2004 to 2008. After falling back significantly in 2009, recent data points suggest that infrastructure construction costs have grown at similar rates to consumer prices during 2010.

Figure 1: Australian cost and price indexes and growth



Sources: ABS CPI (6401.0, Table 5 'CPI: Groups, Index Numbers by Capital City'), ABS Australian National Accounts: National Income, Expenditure and Product (5206.0, Table 5 'Expenditure on Gross Domestic Product (GDP), Implicit price deflators')'[1]

[1] ABS 6401.0 (Table 5) available at: http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/71A9FFD0379EA6A0CA25782200170BF5/$File/640105.xls. ABS 5206.0 (Table 5) available at: http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4113653B118F9227CA25784600125837/$File/5206005_expenditure_implicit_price_deflators.xls.

3.2 Available data sources

This section briefly describes the available ABS data series that can describe consumer prices, headline infrastructure sector construction costs and infrastructure construction costs by sub-sector.

- **Consumer Price Index** (CPI), *Catalogue number 6401.0* – the 'Consumer Price Index, Australia'[2] data series measures quarterly changes in the price of a 'basket' of goods and services which account for a high proportion of expenditure by a representative sample population group. This is the most reliable data source used to measure the extent of consumer price inflation or 'general' cost pressure in the Australian economy. The CPI is available from 1948 to June 2010.
- Changes in the CPI are used as the 'comparator' for establishing whether infrastructure construction costs have grown at above and/or below-CPI over time (as shown in Figure 1).

- **Quarterly National Accounts**, *Catalogue number 5206.0* – the 'Australian National Accounts: National Income, Expenditure and Product'[3] data series measure the components of national economic activity at a quarterly frequency. The Quarterly National Accounts are available from 1959 to June 2010. However, previous experience with the series suggests that data prior to the mid 1970s is less reliable.
- The Quarterly National Accounts contain 'Implicit Price Deflators' that measure changes in unit costs over time. Price deflators are obtained by dividing the current price value of an economic activity by the constant price or 'chain volume'[4] equivalent (i.e., the physical quantity or volume) of that economic activity. There are different price deflators for different economic activities (i.e., deflators for household consumption, residential construction, equipment and machinery investment, exports and imports).
- The price deflator that is of most relevance to this study is the one for private gross fixed capital investment in non-residential engineering construction. Non-residential engineering construction is defined as total investment spending on roads, bridges, railways, ports, airports, dams, electricity power stations and telecommunication infrastructure. As such, the price deflator for engineering construction measures changes in the headline (or aggregate) cost of all infrastructure construction in the economy. It is the most holistic, reliable and timely data series for analysing cost trends in the infrastructure construction sector.
- The Quarterly National Accounts (and the Annual National Accounts, which are outlined in detail below) distinguish between private investment in non-residential building construction and non-residential engineering construction. These two categories make up private non-residential construction. Non-residential building construction covers office blocks, retail shopping centres, factories, warehouses etc. Analysis of these construction categories is outside the scope of sectors outlined in in Table 1.
- The Quarterly National Accounts do not contain price deflator data for public sector non-residential engineering construction. Instead, the accounts contain a price deflator for public non-residential building construction. This measures the cost of constructing hospitals, schools, community centres and other public infrastructure facilities. However, these construction categories are outside the scope of sectors outlined in Table 1. Given this, the private sector price deflator for non-residential engineering construction is the key data series utilised for comparison with the CPI.
- **Annual National Accounts**, *Catalogue number 5204.0* – the 'Australian System of National Accounts'[5] data series measure the components of national economic activity at an annual frequency. The Annual National Accounts are available from 1959 to June 2009. As with the Quarterly National Accounts, data prior to the mid 1970s is considered less reliable. The Annual National Accounts provide annual current price values and volumes for various

[2] ABS 6401.0 available at:
http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0
[3] ABS 5206.0 available at:
http://www.abs.gov.au/ausstats/abs@.nsf/mf/5206.0/
[4] 'Chain volume' is a technical term used by the ABS to describe changes in quantity (or volume) of a good or service between time periods by keeping prices constant.
http://www.abs.gov.au/ausstats/abs@.nsf/0/95ce2d6796bd15aeca256db800754639/$FILE/ATT4T7WF/Demystifying%20Chain%20Volume%20Measures_1.pdf
[5] ABS 5204.0 available at:
http://www.abs.gov.au/AusStats/abs%40.nsf/mf/5204.0

economic activities. This allows price deflators to be readily calculated on an annual basis. Unlike the Quarterly National Accounts, the Annual National Accounts contain data on some of the infrastructure construction sub-sectors of interest. This means, that for this study, there is an apparent trade-off between the Quarterly and Annual National Accounts data in that:

- the Annual National Accounts enables a headline price deflator to be calculated for total (private and public sector) non-residential construction, as well as price deflators for non-residential construction in the transport, electricity, gas and water, telecommunications sectors. However, no price deflators can be calculated for total (private and public sector) non-residential engineering construction works undertaken in these sectors. This is because headline and sectoral value and volume data is not available for non-residential engineering construction. While price deflators for non-residential construction are not the ideal measure of costs required for this study (i.e., price deflators for non-residential construction will capture a combination of cost movements for buildings offices, shopping centres, factories etc. and cost movements for building the sorts of assets that this study is primarily concerned with – that is, roads, railways, telecommunication lines, water and gas pipelines etc.), they will be useful in providing indicative insights into what is likely to be happening with costs of non-residential engineering construction activities that are interest to IA. This is because non-residential engineering construction is a sub-set of non-residential construction. As such, it would be reasonable to expect cost trends for non-residential engineering construction to be somewhat similar to those for non-residential construction; *but*
- the Annual National Accounts data is of lower frequency and longer time lag (i.e., latest Annual National Accounts data point is June 2009 whereas the Quarterly National Accounts are more up to date – it is available up to June 2010).

- **Engineering Construction Activity**, *Catalogue number 8762.0* – the 'Engineering Construction Activity Survey'[6] data series measure quarterly current price value and volume of total (public and public sector[7]) non-residential engineering construction work done (and work remaining on hand). Data is available from 1986 to March 2010. This is a primary ABS data source in that it relies on surveyed information obtained from representative set of businesses operating in the construction and engineering services sector. The data is subsequently aggregated to form the non-residential engineering construction series in the Quarterly National Accounts.
- As with the Quarterly and Annual National Accounts, the Engineering Construction Activity Survey allows a price deflator for headline infrastructure construction costs to be calculated. This is done by taking the current price value of work done and dividing it by the volume of work done in a given period. This, in turn, enables comparisons of headline (overall) infrastructure construction costs to be made across three different data sources – that is, the Engineering Construction Survey, Quarterly and Annual National Accounts data series.
- The Engineering Construction Activity Survey contains some limited annual time-series data for the current price value of construction work done in the infrastructure sub-sectors of interest. This includes roads, highways and subdivisions, bridges, railways, harbours, water storage and supply, sewerage and drainage, electricity generation, transmission and distribution, pipelines and telecommunications. Data is available from 2006 to 2009 for these annual series.

- **Producer Price Index (PPI)**, *Catalogue number 6427.0* – the Producer Price Indexes, Australia'[8] data series captures changes in the prices of certain goods sold by a sector of the economy. The PPI's Table 15 covers the output of the construction industry. This includes the following sub-classes; 'buildings', 'houses', 'other-residential', 'non-residential building' and 'roads and bridges'. The last of these series, 'roads and bridges', is the only relevant series for the purpose of this study. The PPI data series is new, starting in 1997.

[6] ABS 8762.0 available at:
http://www.abs.gov.au/ausstats/abs@.nsf/mf/8762.0

[7] It is worth noting that the Engineering Construction Activity Survey distinguishes between construction work undertaken by the private sector (whether on behalf of public sector or private sector clients) and construction work undertaken by the public sector for its own purposes. This analysis captures the cost changes that are associated with the total amount of construction work undertaken (i.e., private sector work undertaken for both sectors plus public sector work undertaken for its own purposes).

[8] ABS 6427.0 available at:
http://www.abs.gov.au/ausstats/abs@.nsf/mf/6427.0

It is important to note that consideration was given to the use of non-ABS data sources. These include 'Construction Outlook' (published by the Australian Constructors Association), 'Australian Construction Cost Trends' (published by Macromonitor) and other reports (published by consultancy groups like Access Economics). However, these sources were either not readily available due to budget constraints (i.e., Macromonitor) or did not contain the required unit cost data for infrastructure construction. For example, the Australian Constructors Association's Construction Outlook report contains data for the current price value of infrastructure construction work done. It does not contain data for the volume of infrastructure construction work done. This means that it is not possible to calculate a unit cost (i.e., a price deflator) of infrastructure construction work done. This study is primarily concerned with analysing trends in the unit cost of infrastructure construction work done.

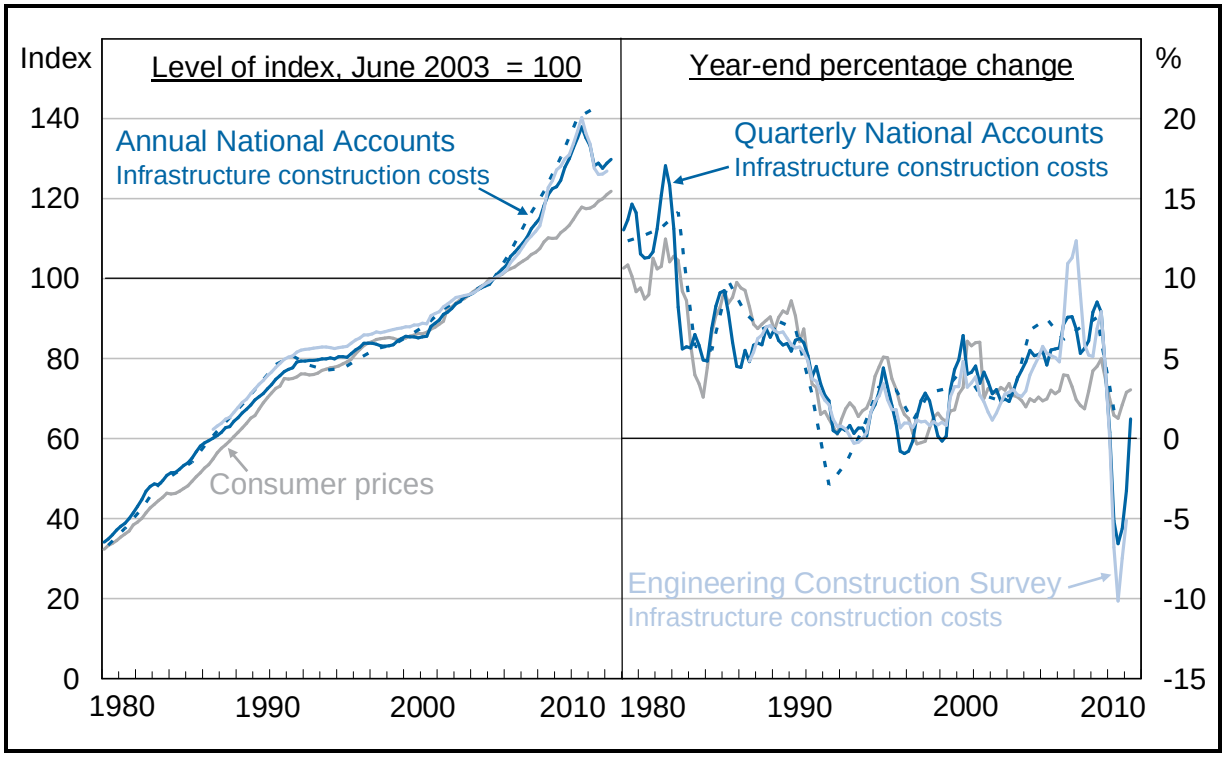
Figure 1 graphs movements in the Quarterly National Accounts price deflator for private new engineering construction against the CPI. This is our preferred headline infrastructure construction costs series for comparison with the CPI over time. At face value, this series is considered superior to the alternative series because it provides a;

- long data series, back at least to the mid 1970s;
- quarterly frequency in line with the CPI's frequency; and
- short lag time, with the latest observations available after three months (in particular it picks up changes in the last six to nine months that would otherwise be missed if the Annual National Accounts were used).

Against these advantages, the Quarterly National Accounts series suffer from a lack of specific infrastructure construction sub-sector data. The Quarterly National Accounts do not have a breakdown for the transport, telecommunications and electricity, gas and water sectors.

Pragmatically, though, the difference between the three potential series for headline infrastructure construction costs is not large over the period 1980 – 2010 (Figure 2). All three series (i.e., the Quarterly and Annual National Accounts and Engineering Construction Activity Survey) capture the period of higher-than-consumer-price-inflation period between 2004 and 2008, though only the quarterly series (Quarterly National Accounts and Engineering Construction Activity Survey) are able to capture the sharp decline in construction costs observed over 2009. Furthermore, other than a more extreme spike in the Engineering Construction Activity Survey cost series in 2006-07, the two quarterly series track each other very closely over the entire period they are available in parallel.

Figure 2: Australian cost and price indexes and growth – series comparison



Sources: ABS CPI (6401.0, Table 5 'CPI: Groups, Index Numbers by Capital City'), ABS Australian National Accounts: National Income, Expenditure and Product (June 2010, 5206.0, Table 5 'Expenditure on Gross Domestic Product (GDP), Implicit price deflators), ABS System of National Accounts 2009-10 (5204.0, Table 64 'Gross Fixed Capital Formation, by Industry by type of asset'), ABS Engineering Construction Activity, Australia (8762.0, Table 1 'Value of Work Done, by Sector, Chain Volume Measures, Australia and Table 5 'Activity, States and Territories, Original')[9]

3.3 Infrastructure construction costs – by sector

Evidence has been sought on the construction cost trends for specific types of transport and utilities infrastructure. The available ABS data series provides insights into non-residential engineering construction cost trends in the relevant infrastructure sub-sectors. While comprehensive data for non-residential engineering construction are not available for individual sub sectors, the nature of the sector means that much of the non-residential construction work done at the sector level is likely to be engineering construction.

- For example, engineering construction work done on roads, rail, ports and airport projects is likely to make up a high proportion of total construction work done in the transport sector. Similarly, engineering construction work done on electricity generation, transmission, and distribution (i.e., pylon erection and wiring), water storage and supply, sewrage and drainage, water and gas pipelines and telecommunications towers is likely to make up a high proportion of total construction work done in the electricity, water, gas and telecommunications sector (i.e., the utilities sector).
- An analysis was undertaken to establish the coverage differences (in current price value terms) between the non-residential construction sector series in the Annual National Accounts and the sub-sector engineering construction series in the Engineering Construction Activity Survey. This was done for the limited period for which annual data is available from the Engineering Construction Activity Survey.

[9] ABS 6401.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/71A9FFD0379EA6A0CA25782200170BF5/$File/640105.xls.
ABS 5206.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4113653B118F9227CA25784600125837/$File/5206005_expenditure_implicit_price_deflators.xls.
ABS 5204.0 (Table 64) available at:
http://www.ausstats.abs.gov.au/ausstats/ABS@Archive.nsf/0/19B8CE78B5333427CA2577CA0013CCF2/$File/5204064_gfcf_by_industry_asset.xls
ABS 8762.0 (Table 1 and 5) available at:
http://www.ausstats.abs.gov.au/ausstats/ABS@Archive.nsf/0/26A07A6E9FB71A3FCA25781C00228255/$File/8762001.xls
http://www.ausstats.abs.gov.au/ausstats/ABS@Archive.nsf/0/D6D92850485E710CCA25781C0022865F/$File/8762005.xls

- The value of engineering construction work done in the transport sub-sectors (as outlined in the Engineering Construction Survey) makes up 70% of the value of total construction work done in the transport sector (as outlined in the Annual National Accounts). This implies 30% of construction work done in the transport sector is attributable to warehouses, distribution centres and offices.
- The value of engineering construction work done in the electricity, gas and water sub-sectors (as outlined in the Engineering Construction Survey) makes up 96% of the value of total construction work done in the electricity, gas and water sector (as outlined in the Annual National Accounts).
- The value of engineering construction work done in the telecommunications sub-sectors (as outlined in the Engineering Construction Survey) makes up 82% of the value of total construction work done in the telecommunications sector (as outlined in the Annual National Accounts) [10].

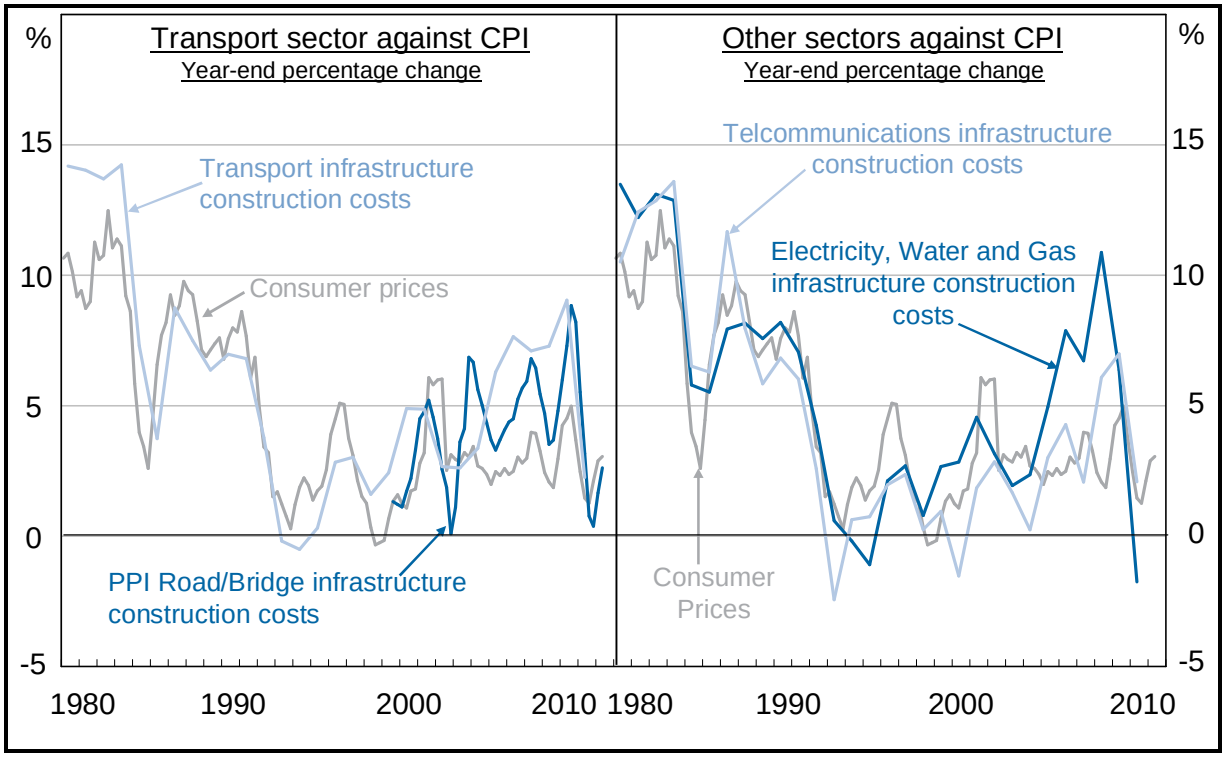
- The extent to which engineering construction drives overall construction activity in the relevant sectors gives comfort that the Annual National Accounts and Engineering Construction Activity Survey data are very similar. The amount of construction activity attributable to buildings (like offices, warehouses etc) is modest. This implies that the unit cost (price deflator) data at the sector level in the Annual National Accounts provides meaningful information about trends occurring at the sub-sector level.

Section 3.2 described the available data on sub-sector infrastructure construction costs; in summary:

- the Annual National Accounts provide the best coverage of relevant sub sectors, and
- the PPI has an amalgamated series for road and bridge costs.

Figure 3 graphs these series against CPI to illustrate that transport sector construction costs have fairly closely tracked the overall level of price inflation from the early 1980s until around 2003 (left panel). Between 2004 and 2008 though, CPI growth stayed relatively contained below 5 percent, while the two transport construction cost inflation series accelerated to around 7 percent. Since 2009, the series have moved in tandem – initially falling sharply in the wake of the financial crisis, and more recently picking up at similar rates.

Figure 3: Australian cost and price indexes and growth – sub-sector comparison



[10] There is insufficient time series data to determine how these percentages have changed over time.

Sources: ABS CPI (6401.0, Table 5 'CPI: Groups, Index Numbers by Capital City'), ABS System of National Accounts 2009-10 (5204.0, Table 64 'Gross Fixed Capital Formation, by Industry by type of asset'), ABS Producer Price Indexes, Australia (6427.0, Table 15 'Selected output of division E construction, subdivision and class index numbers')[11]

The right panel of Figure 3 displays growth rates of the other utilities construction cost series. The electricity, water and gas services series follows a very similar trajectory to the transport construction cost series, though with an even greater divergence with the CPI over the period 2004 – 2008. The Information media and telecommunications construction cost series displays some idiosyncratic movements relative to other utilities construction cost series. For instance, construction cost growth only exceeded consumer price inflation for 2008 and 2009, with costs in other years increasing by less than inflation since 1998.

[11] ABS 6401.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/71A9FFD0379EA6A0CA25782200170BF5/$File/640105.xls.
ABS 5204.0 (Table 64) available at:
http://www.ausstats.abs.gov.au/ausstats/ABS@Archive.nsf/0/19B8CE78B5333427CA2577CA0013CCF2/$File/5204064_gfcf_by_industry_asset.xls
ABS 6427.0 (Table 15) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4F3E7059569F232ACA25781F0011BF09/$File/6427010.xls

4. International infrastructure construction costs

This section describes, compares and interprets the key data available for infrastructure construction costs and inflation trends in the selected sample of comparator countries. It then assesses the extent to which infrastructure construction cost trends in comparator countries have been similar to infrastructure construction cost trends in Australia.

The countries with the most relevant construction cost data are the UK, US, Canada and France. Within these countries though, availability of data sets varies in terms of measures and industry coverage. A collation of data has been conducted on a best-endeavours basis, where the results can be compared on a relatively consistent basis.

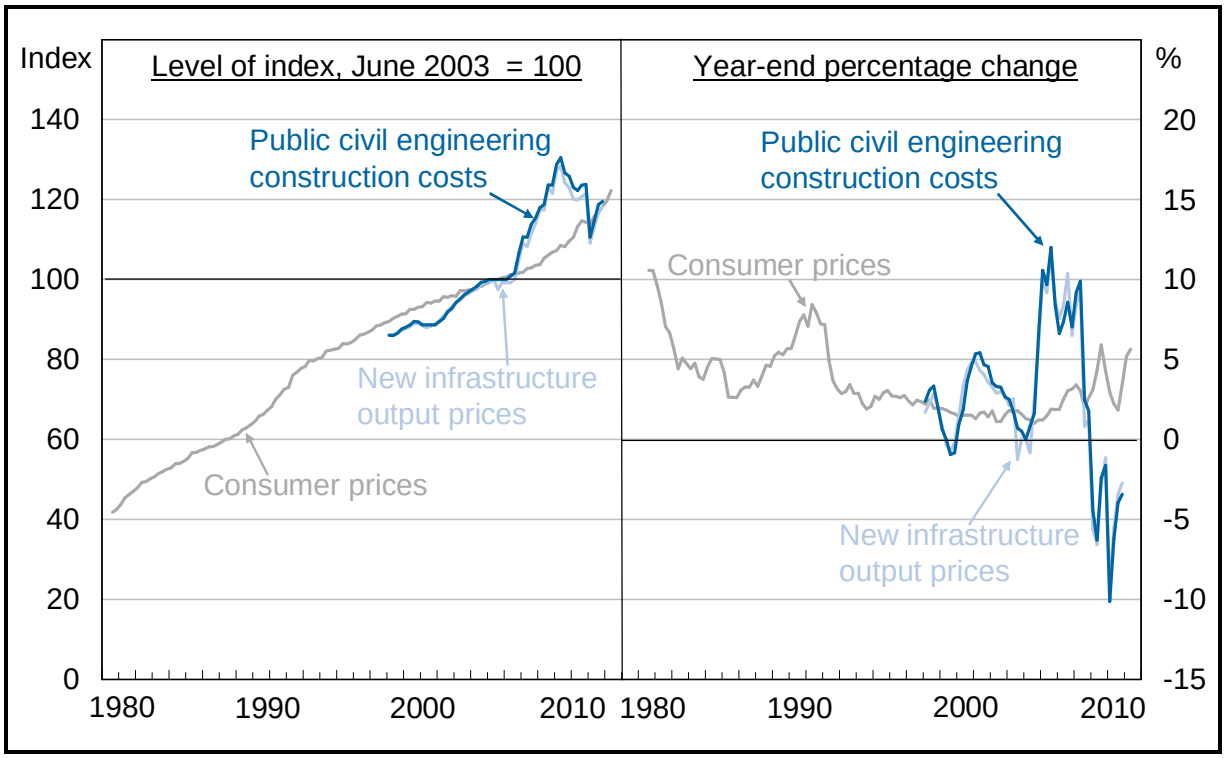
Data searches were also undertaken for the other large continental European countries of Germany and Spain. However, these searches yielded little meaningful data. Given this, the view taken was that there would be more value in concentrating on those international comparator countries where relevant data was available.

4.1 United Kingdom

The UK was chosen as a suitable comparator country for the Australian construction cost experience.

Figure 4 compares construction cost growth in the UK with UK consumer price inflation. Both construction cost series (once rebased) broadly track the CPI from series commencement in 1997 – albeit with greater volatility – then experience much faster growth from end-2004 until mid-2007, before plunging over the duration of the UK recession (beginning end-2007). Construction costs continue to fall in the UK – in nominal and inflation-adjusted terms.

Figure 4: UK cost and price indexes



Sources: ABS CPI (6401.0, Table 11 and Table 12 'CPI: International Comparisons, All Groups Excluding Housing and Financial and insurance services, Index Numbers and Percentage Changes'), UK Office of National Statistics (ONS)

Construction Statistics Annual 2010 (Table 4.9 'Output price indices for new construction' and 4.10 'Public works output price indices')[12]

The available UK data series both originate from the Office of National Statistics (ONS):

- CPI – is supplied to the ABS from the ONS and is on the most comparable basis possible with the Australian series. ABS catelogue number 6401.0, Tables 11 and 12 International Comparisons;
- Public Civil Engineering Works Costs – available in the *Construction Statistics Annual 2010*, which covers a range of price and output measures in the UK construction industry. The exact series is one of the 'Public works output price indices' (Table 4.10); for our purposes we have selected the 'civil engineering projects' sub-series (as opposed to 'building'). The indexes measure price levels of payments by public sector construction clients based on values of tender prices and the values of new orders. This captures construction over the transport and utilities sectors of interest in this study and is further broken down into a road and non-road split. These series highlight that non-road construction costs increased somewhat more dramatically than roads construction costs over the 2004 – 2007 period;
- New Infrastructure Output Prices – this series is also contained in the *Construction Statistics Annual 2010* and covers all new infrastructure construction rather than just construction by the public sector. Table 4.9 in this publication covers 'Output price indices for new construction', of which we have selected the 'infrastructure' sub-series (rather than 'public housing', 'private housing', 'total public works', 'private industrial' or 'private commercial' construction).

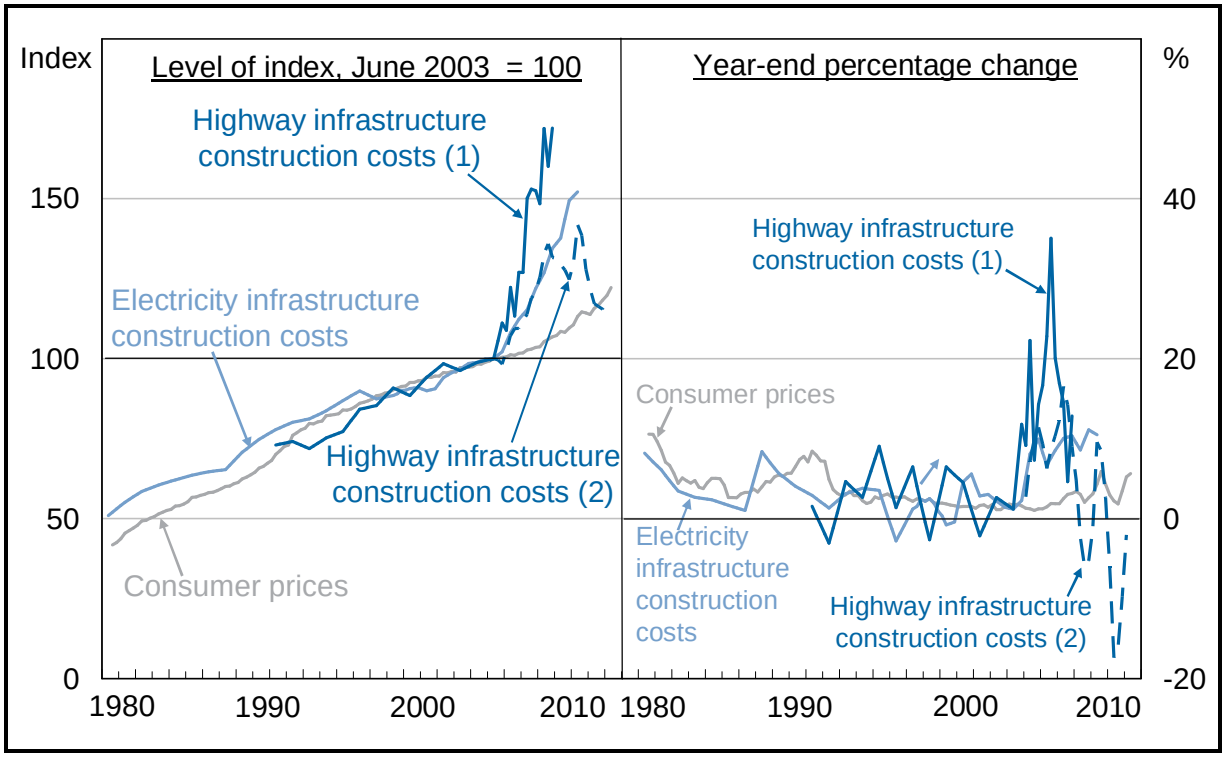
4.2 United States

In spite of the myriad statistical agencies in the US, very limited information is freely available about infrastructure construction costs. Nevertheless, the available series capturing electricity and highways construction costs have been compiled and presented in
Figure 5.

This evidence suggests that, as with the UK and Australia, the US also experienced similar construction cost growth and consumer price inflation over the 1980s and 1990s, with a significant run-up in inflation-adjusted construction costs over the period 2004 – 2008. In more recent periods, the available evidence suggests that highway construction costs fell in real and nominal terms.

[12] ABS 6401.0 (Table 11 and Table 12) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/5CE49DA93B8BEF20CA257822001712CB/$File/640108.xls
UK Construction Statistics Annual 2010 (Table 4.9 and 4.10) available at:
http://www.statistics.gov.uk/downloads/theme_commerce/CSA-2010/chapter4.xls

Figure 5: US cost and price indexes



Sources: ABS CPI (6401.0, Table 11 and Table 12 'CPI: International Comparisons, All Groups Excluding Housing and Financial and insurance services, Index Numbers and Percentage Changes'), US Department of Transportation Federal Highway Administration (2010) 'Composite Bid Price Index', US Department of Transportation Federal Highway Administration (2010) Construction Cost Trends for Highways (Table PT-1), Washington State Department of Transportation (2010) seven states Highway construction cost indexes, Parsons Brinkerhoff (2010) Highway construction cost index, Whitman, Requard and Associates (2008) Handy-Whitman Indexes of Public Utility Construction Costs[13]

The data series compiled for the US are from a wide range of sources, with significant analyst judgement required to construct appropriate measures:

- CPI – as with the UK, this series is drawn from the ABS International Comparisons;
- Electricity Construction Costs – this is drawn from a sample of the proprietary Handy-Whitman Indexes of Public Utility Construction Costs. This publication shows the level of costs for different types of utility construction. Separate sets of indexes are published for the electric, gas and water industries. Each set of indices is maintained for general items of construction, such as reinforced concrete, and specific items of material or equipment, such as pipe or turbo-generators. All indices begin in 1912. There are no USA-Total series for each item. Rather, the indices arereported under 6 geographic areas in the US separately, which we have combined with a simple average. Unfortunately, the series coverage and time series is limited by the document recovered being only a sample of the available series: we only have electricity industry construction cost, and these costs are available until 2008. The full set of up to date series are available for around US$1000 for a one-year subscription.
- Road Construction Cost (1) – this series is a composite of the time series that are available at least between 1990 and 2006:

[13] ABS 6401.0 (Table 11 and Table 12) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/5CE49DA93B8BEF20CA257822001712CB/$File/640108.xls
US Federal Highways Highway's composite index available at:
http://www.fhwa.dot.gov/programadmin/pt2006q4.cfm
US Federal Highways Highway's highway construction cost trends series available at:
http://www.fhwa.dot.gov/ohim/nhcci/index.cfm
Washington State Department of Transportation's seven states highway construction cost indexes available at:
http://www.wsdot.wa.gov/biz/construction/constructioncosts2.html
Parsons Brinkerhoff's highway construction cost index available at:
http://www.pbworld.com/news_events/publications/efr/pdf/volume_4_issue_1.pdf
Whitman, Requard and Associates' indexes of public utility construction costs available at:
http://www.business-magazines.com/product.php?prd=135331

- The Federal Highways Administration's (FWHA) 'Composite bid price index', produced from 1972 until 2006, when it has was discontinued. The index is composed of six input items whose prices are surveyed from state road agencies: roadway excavation; portland cement concrete pavement and bituminous concrete pavement; and reinforcing steel, structural steel, and structural concrete, to indicate the price trend for structures; and
- The Washington State Department of Transportation collates a range of state-based data series on highway construction costs, including the Federal Highways Agency and: California, Colorado, Florida, Ohio, Oregon, South Dakota and Utah. Indexes track bid prices from construction contracts provides key data to monitor highway material cost trends and cover similar input prices to the FHWA's composite index. The series are available annually between 1990 and 2010.

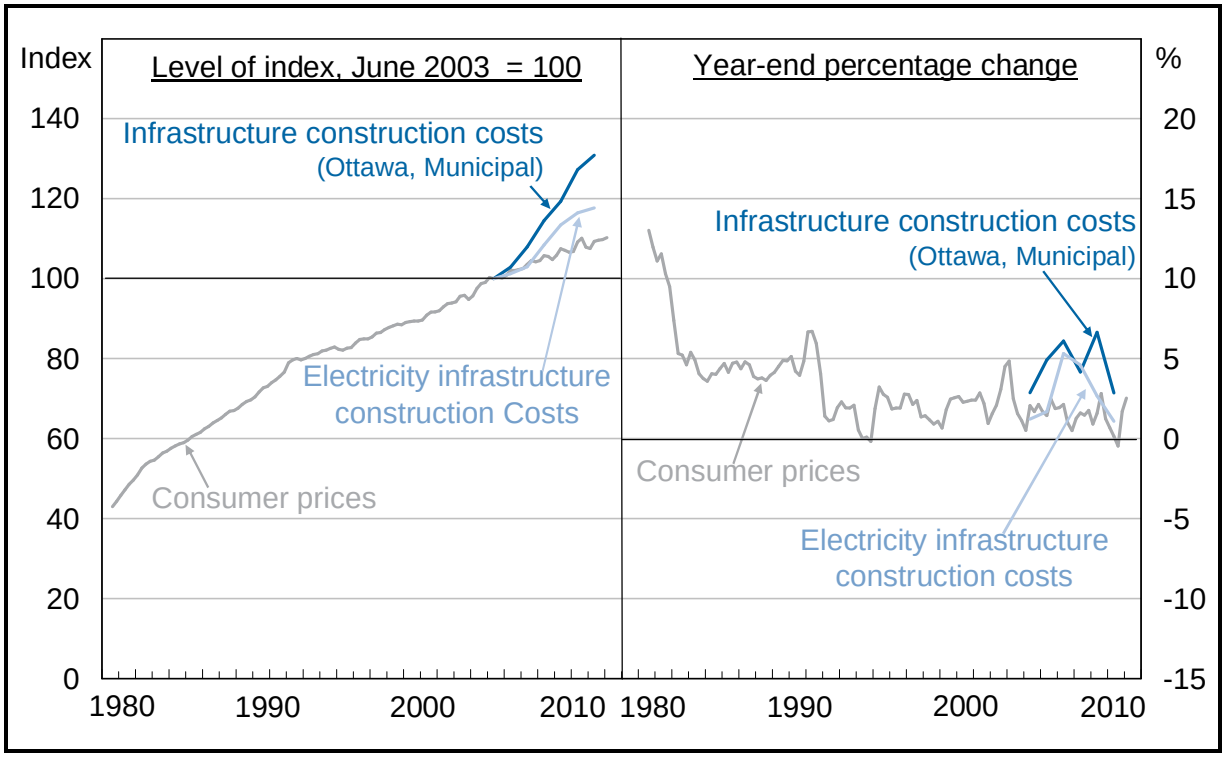
- Road Construction Cost (2) – this series is a composite of the time series that are available at least between 2003 and 2010:
  - The National Highway Construction Cost Index (NHCCI) compiled by the FHWA is a measure of the average change over time in the prices paid by State transportation departments for roadway construction materials and services. This series has been constructed between 2003 to present (latest June 2010) and the FHWA considers it to be a far more satisfactory series than the Bid-Price Index (BPI) series that was discontinued in 2006. The BPI series relied upon state governments accurately filing construction cost forms with the FHWA and consequently had data timeliness and quality issues;
  - The PB highway construction cost index is from Parsons Brinkerhoff's "Economic Forecasting Review", and is a proprietary series "derived from cost components that were identified through research and interviews with contractors, engineers, cost estimators, economists, and transportation agency officials" in a range of locations in the US (PB, June 2010, p. 20).

4.3 Canada

The statistics that are freely available from Canada's statistical agency (Statistics Canada) are not well suited to provide a long-term picture of trends in infrastructure construction costs. In terms of industry-specific construction cost series, the focus is very much on dwelling construction. The only available series of relevance for our study is for the electricity sector. A more general series is available for a short period for overall infrastructure construction costs in the Ottawa area.

On the basis of these short time series, it appears that between 2003 and 2009, infrastructure costs increased more rapidly than the general level of consumer prices (Figure 6). However, outside these years there are no indications of the pace of construction cost growth.

Figure 6: Canada cost and price indexes



Note: Series indexes rebased to reflect the index value of the CPI in June 2003

Sources: ABS CPI (6401.0, Table 11 and Table 12 'CPI: International Comparisons, All Groups Excluding Housing and Financial and insurance services, Index Numbers and Percentage Changes'), Statistics Canada, 'Capital Expenditure Price Statistics' (62-007-X) Cost of Municipal Infrastructure Construction in Ottawa (p. 17) and Table 9 'Electric utility construction price indexes'[14]

The available data series for Canada are:

- CPI – as with the UK and US, this series is drawn from the ABS International Comparisons;
- Electricity infrastructure construction costs – this series, from the Statistics Canada publication "Capital Expenditure Price Indexes" (document 62-007-X), is based on the Electric Utility Construction data (Table 9). The series is freely available between 2003 and 2009, with earlier data available in the full data series, which is available for purchase from Statistics Canada.

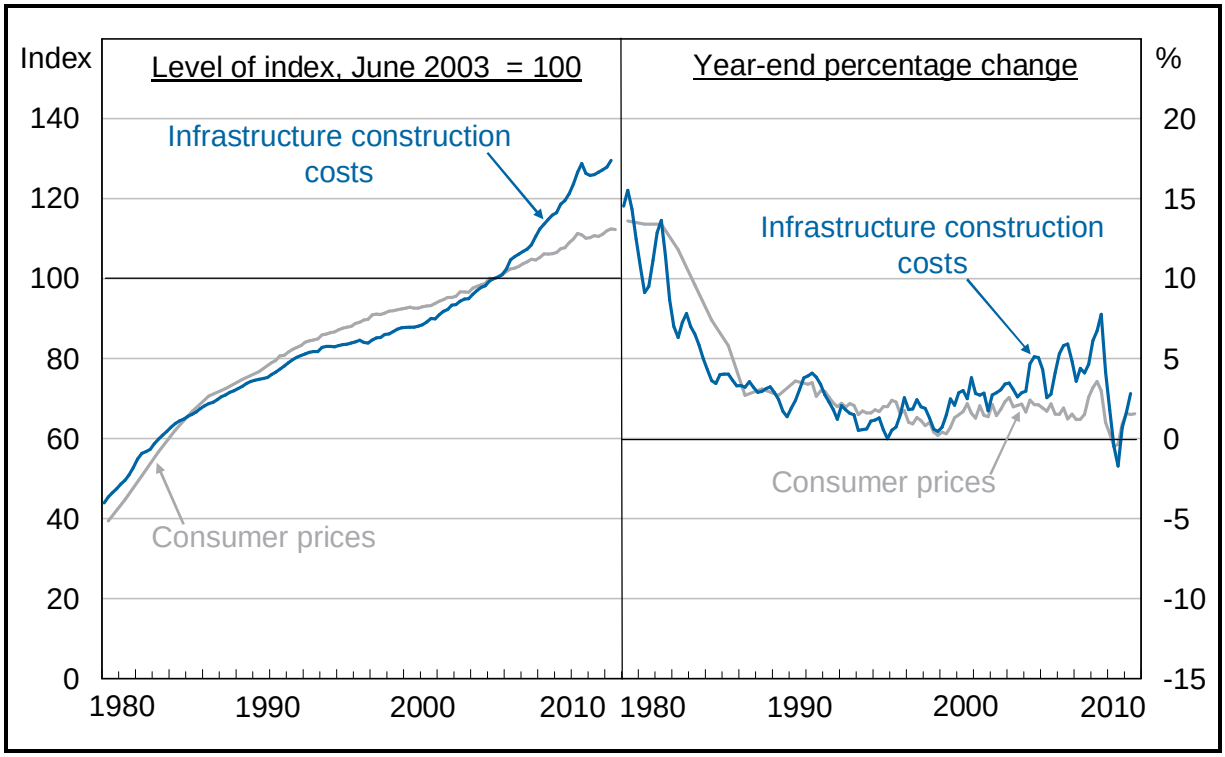
Infrastructure construction costs – this series measures annual changes in the cost of municipal infrastructure construction funded by development charges and was developed by Statistics Canada on behalf of the City of Ottawa. Little other information on the series is provided by Statistics Canada in the "Capital Expenditure Price Indexes" document (62-007-X).

4.4 France

The French statistical agency (Institut National de la Statistique et des Études Économiques (INSEE)) publishes a CPI series and national accounts, which allow a comparison of consumer price inflation and construction cost increases over a long time period. French infrastructure construction costs have consistently outpaced CPI since 1997, though the gap between the two series was most pronounced over 2004 – 2008 (Figure 7). Both CPI and infrastructure construction cost growth fell sharply over the course of 2009, but have rebounded over 2010.

[14] ABS 6401.0 (Table 11 and Table 12) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/5CE49DA93B8BEF20CA257822001712CB/$File/640108.xls
Statistics Canada 62-007-X (p. 17 and Table 9) available at:
http://www.statcan.gc.ca/cgi-bin/af-fdr.cgi?teng=62-007-x2010003-eng.pdf&tfra=62-007-x2010003-fra.pdf&l=eng&loc=../62-007-x2010003-eng.pdf

Figure 7: France cost and price indexes



Sources: Institut National de la Statistique et des Études Économiques (INSEE) CPI (Indice des prix à la consummation, series 000639196 (monthly back to 1990) and annual average inflation rate (annual back to 1950 to create series 1980 – 1990), quarterly national accounts (Comptes nationaux trimestriels)[15]

The compilation of the series for France involved two main sources:

- CPI – this series is called "Indice des prix à la consummation" (series 000639196) and is available monthly back to 1990 (we take quarterly index values). Prior to 1990 only the annual average inflation rate is available (back to 1950). We used this average percentage change series to backcast the index values over the period 1980 – 1990.
- Infrastructure construction costs – this series is constructed in the same manner as the Australian quarterly national accounts (in French, "Comptes nationaux trimestriels"), with price deflators obtained by dividing the current price value by its "real" counterpart (i.e. the physical quantity or volume of the good or service) for the non-dwelling construction series.

4.5 Cross-country comparison

Figure 8 provides some context to the analysis of construction cost inflation by showing gross fixed capital formation as a share of national income (GDP). Essentially, this measure gives an indication of the level of investment in the economy. While the available series cover both dwelling and infrastructure investment (and only covers 2000 – 2008) they give some indication of the trends in each country:

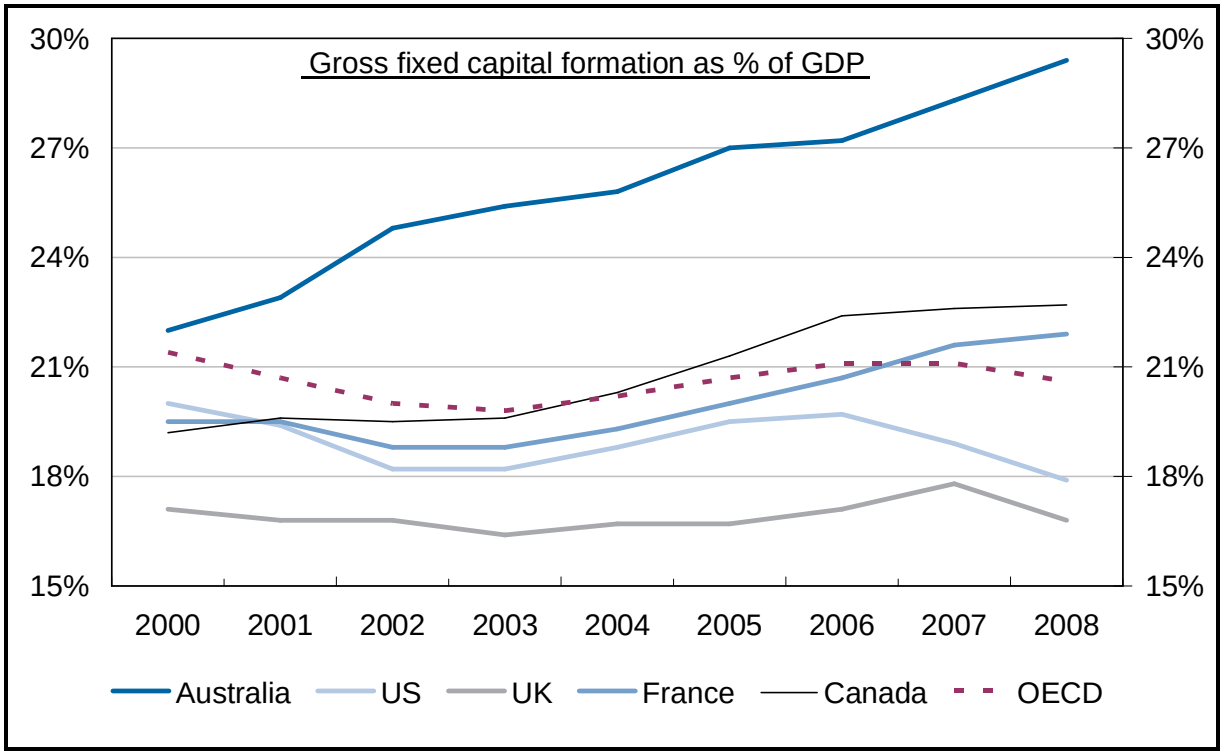
- **Australia** experienced high and prolonged investment growth over the mining boom;
- **France** and **Canada** experienced relatively stable investment growth over the period;
- **UK**'s investment share was stable before falling in 2008 in line with the fall-out of the GFC;
- **US** investment accounted for a relatively stable share of GDP until 2007, when it experienced a significant investment drop-off related to overinvestment in housing that precipitated the GFC.

[15] France CPI available at:
http://www.indices.insee.fr/?action=BS_RECHGUIDEE_VALIDATION&BS_IDBANK=0639196&I2.x=39&I2.y=12
France quaterly National Accounts available at:
http://www.insee.fr/fr/themes/theme.asp?theme=16&sous_theme=8#rub4

An argument presented in some quarters is that growth in demand for infrastructure from newly industrialising countries (not just the 'BRIC' countries of Brazil, Russia, India and China (BRIC), but elsewhere also) is driving up global demand, and therefore causing construction sector inflation. For this reason, there may be is value in analysing a broader set of countries than the five outlined above (Australia, France, Canada, UK and US). Data for the OECD set of countries was extracted from the 2010 OECD Factbook.

- Figure 8 displays gross fixed capital formation as a percentage of GDP for the OECD. It shows the OECD average has oscillated around the 20% mark for the past decade. This suggests there has been little pent-up construction sector inflation across the OECD countries as a whole.

Figure 8: Gross fixed investment in Australia and comparator countries – recent historical trends



Sources: OECD Factbook 2010 'Economic, Environmental and Social Statistics', Production and income - Income, savings and investments - Investment rates[16]

Given the diversity of construction cost series coverage available, it is clear that any cross-country comparison is going to be indicative rather than definitive. We have selected the most comparable series possible among those presented in preceding sections in order to conduct such a comparison.

Further, to improve comparability (and simplify presentation) national contruction growth series have been deflated by consumer prices to establish their levels of "real" (i.e. inflation-adjusted) growth. This is undertaken using the Fisher equation:

$$real = \left[\frac{(1+nom)}{(1+cpi)} - 1 \right] * 100 \qquad (1)$$

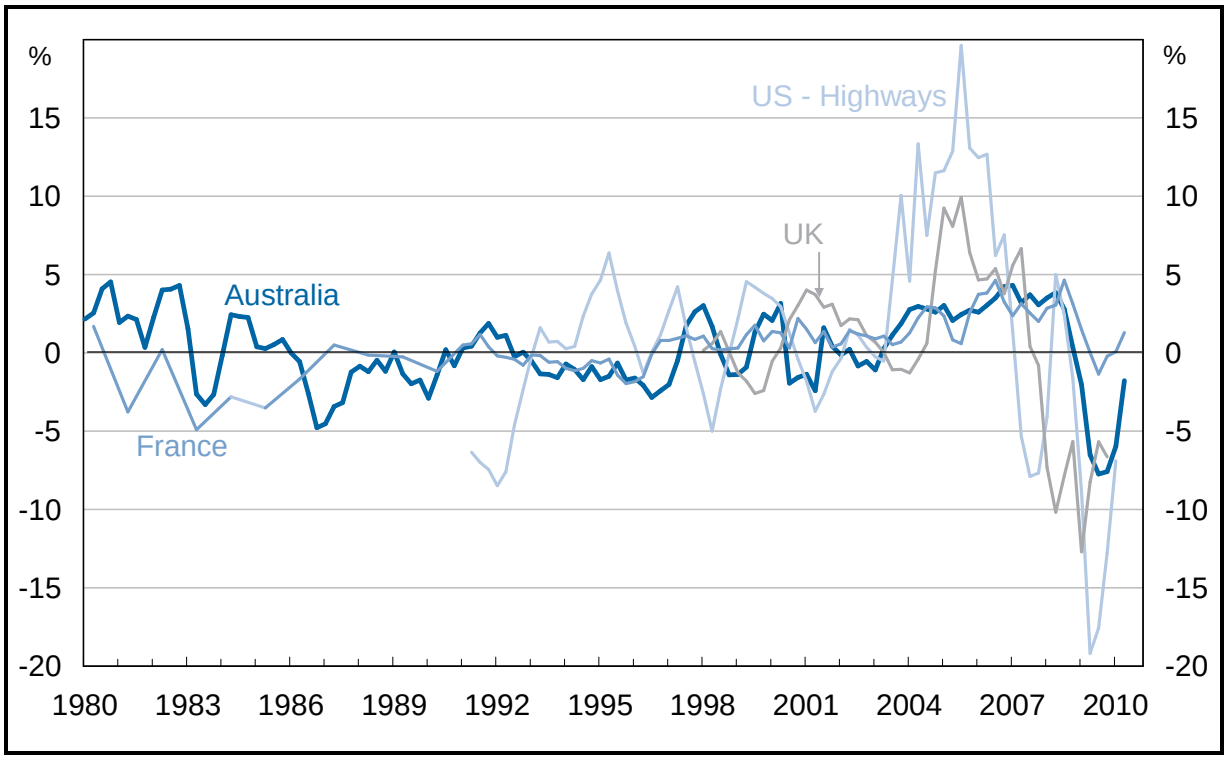
where *real* is the real construction growth rate, *nom* is the nominal construction growth rate, and *cpi* is the growth rate of consumer price inflation.

[16] OECD Factbook available at: http://www.oecd-ilibrary.org/docserver/download/fulltext/302010061x1t016.xls?expires=1301438958&id=0000&accname=guest&checksum=D6D6148935D6A7A7BF87BC0C95F5E16D

The results of the indicative cross-country comparison for real construction costs are shown in Figure 9. This comparison highlights a number of key points:

- Series tend to oscillate around zero real growth prior to 2003, which is consistent with simple (and rapid) "reversion to the mean" behaviour, whereby construction costs grew at broadly similar rates to CPI, but with some short-term deviations; and
- The patterns of the national series are strikingly similar after 2003, even if magnitudes and exact timings are different. Specifically, construction costs rose at a rate persistently above general inflation between 2004 and 2008, but fell over 2007 (US), 2008 (UK, Australia and France) and have begun to turn around over 2009-10.

Figure 9: Inflation-adjusted infrastructure construction costs by country – year-ended percentage change



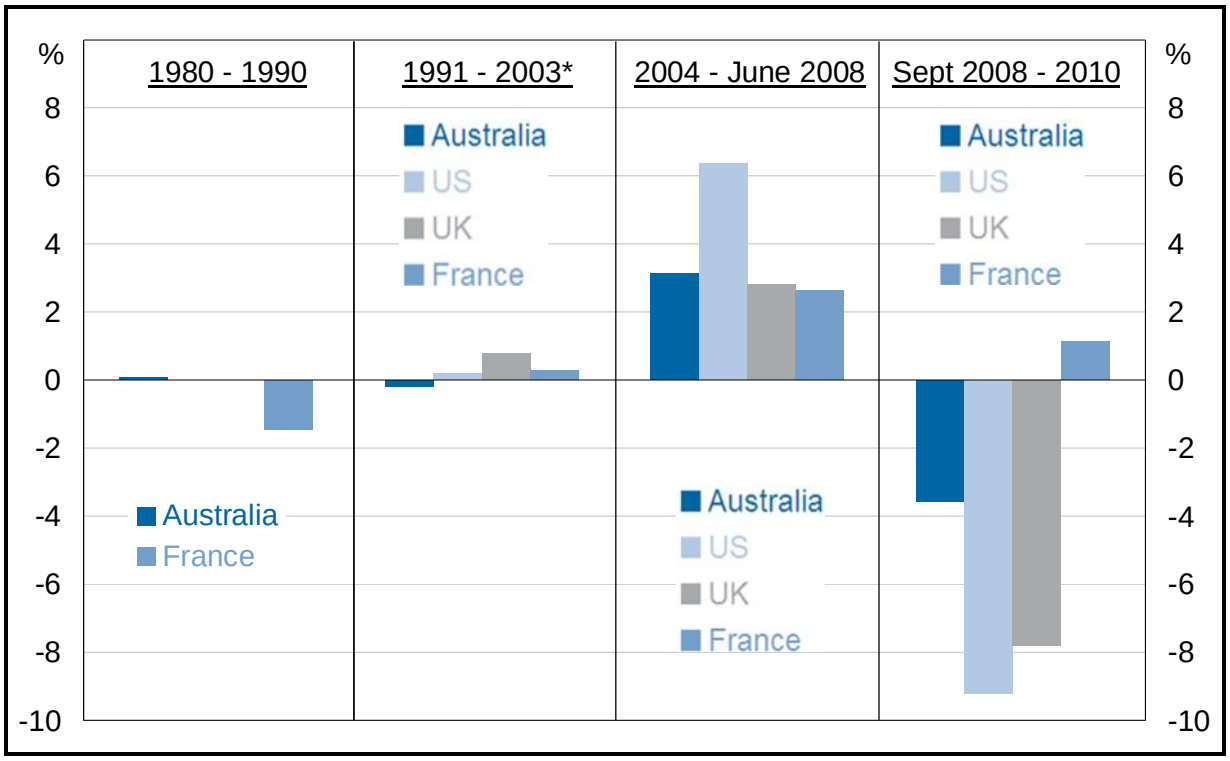
Series used: Australia – Quarterly National Accounts, non-dwelling engineering construction cost deflator; US – annual average combined highway construction cost series; UK – public civil engineering works costs; France - Quarterly National Accounts, construction cost deflator; Canada – excluded due to short time series

Sources: As per sources and website addresses shown in preceding graphs. All construction costs deflated by country CPI

These key messages are reinforced by simplifying the data from Figure 9 into four key time periods over which we can average these year-ended growth numbers (Figure 10):

- **1980s** – where only Australian and French series are available, both show similar, low real construction cost growth;
- **1990s – 2003** – all national series show very little real construction cost growth (Australia's was very slightly negative);
- **2004 – mid 2008** – all countries experience sustained real growth in construction costs, averaging around 3 percent for Australia, UK, and France, and a staggering 6 percent for US highway construction;
- **September 2008 – 2010** – with the exception of France, other countries experienced significant average construction cost *deflation*.

Figure 10: Inflation-adjusted infrastructure construction costs by country – average year-ended percentage change over each period



* UK is 1998 - 2003 only for the graphed time period 1991 – 2003

Series used: Australia – Quarterly National Accounts, non-dwelling engineering construction cost deflator; US – combination of highway construction cost series; UK – public civil engineering works costs; France - Quarterly National Accounts, construction cost deflator; Canada – excluded due to short time series

Sources: As per sources and website addresses shown in preceding graphs. All construction costs deflated by country CPI

4.6 Overall assessment of evidence

The above evidence assists in answering two of the key research questions of this study:

- Yes – Australia did experience construction cost growth significantly in excess of consumer price growth over 2004 – 2008; and
- Yes – Other countries experienced a similar run-up over the same period.

However, several other relevant points have been raised from this analysis:

- No – the real cost growth inflation has not continued since the onset of the GFC; and
- Yes – the recent period of real construction cost inflation and deflation appears to be somewhat unusual by historical standards, both in terms of the duration and extent to which consumer price growth and construction cost growth are out of alignment.

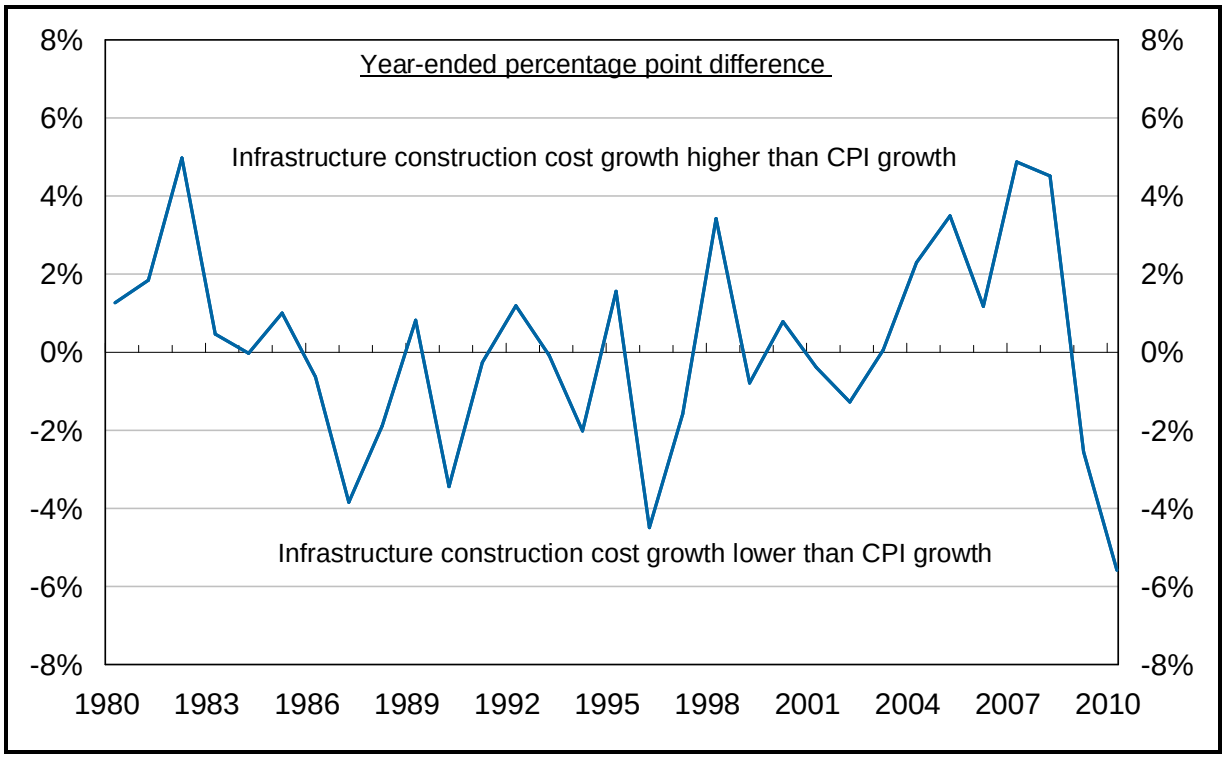
Taken together, these points suggest that the 2004 – 2008 experience internationally is not likely to be reproduced into the future. Instead, what is most likely is that over the medium term, consumer price growth and construction cost growth will revert to more normal levels of volatility, and will tend to move in tandem. The more recent fall in real construction costs may be part of this return to more normal situation, whereby the sharp fall represents a reversion following the abnormally sustained growth which preceded it.

4.6.1 Short term phenomenon or longer term trend?

Figure 11 highlights the above point about increases in Australian infrastructure costs returning to normal levels. Figure 11 shows the annual percentage difference between increases in Australian infrastructure construction costs and increases in Australian CPI over a 30-year period.

- There are numerous episodes through history where growth in the CPI has outstripped growth in infrastructure construction costs. Similarly, there are a number of ocaasions where growth in infrastructure construction costs has outstripped growth in the CPI.
- The key point is growth in Australian infrastructure construction costs exhibits classic mean-reverting behaviour relative to the CPI. For example, the significant real increases in infrastructure construction costs during 2007 and 2008 have been unwound by similar real reductions in infrastructure construction costs during 2009 and 2010. Over a 30-year period, the average annual percentage difference between the growth in infrastructure construction costs and the growth in CPI is 0.2 percentage points over the long run. That is, the difference is effectively zero.
- The upshot is real increases in infrastructure construction costs between 2004 and 2008 appear to have been a short term phenomenon, which has since been largely corrected. There does not appear to be any data-based evidence to suggest that a new long term trend is emerging where increases in infrastructure construction costs are set to consistently be higher than increases in the CPI.

Figure 11: Differential between Australian infrastructure construction costs and consumer prices



Sources: ABS CPI (6401.0, Table 5 'CPI: Groups, Index Numbers by Capital City'), ABS Australian National Accounts: National Income, Expenditure and Product (5206.0, Table 5 'Expenditure on Gross Domestic Product (GDP), Implicit price deflators') [17]

The following chapter will explore some of the national and international forces that help to explain trends in infrastructure construction costs over various timeframes, including the period of above-CPI increases in construction costs experienced in Australia and internationally between 2004 and 2008.

[17] ABS 6401.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/71A9FFD0379EA6A0CA25782200170BF5/$File/640105.xls
ABS 5206.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4113653B118F9227CA25784600125837/$File/5206005_expenditure_implicit_price_deflators.xls

5. Cost Drivers

This section outlines the available evidence on the underlying drivers that have fundamentally shaped the trends in infrastructure construction costs. Obtaining an understanding of what the key individual cost drivers are and the indicative extent to which these individual drivers are likely to contribute to overall infrastructure construction costs is important because it will provide guidance on whether government policy measures may or may not be appropriate.

- For example, if strong wages growth (due to persistent skill shortages) in the construction sector was an important explanator of consistent above-CPI growth in overall infrastructure construction costs then government could inject more funding into apprenticeship and training programs to create a larger pool of skilled engineers and tradespeople on which the infrastructure construction sector could draw on into the future. Over the medium to longer term, this policy action could help moderate cost increases in the infrastructure construction sector.

- On the other hand, if cost drivers like fuel, material inputs and capital equipment/machinery costs were significant explanators of consistent above-CPI growth in overall infrastructure construction costs then there may little role for government policy. It might largely be a matter of government 'keeping a watchful eye' on these cost drivers. This reflects the fact that the underlying costs of fuel, materials inputs and equipment/machinery are determined in global commodity and technology markets.

Data on individual cost drivers for the Australian infrastructure construction sector was readily available. However, similar data was not readily available for the infrastructure construction sector of comparator countries. Given this, the analysis of cost drivers in this section exclusively focusses on the Australian context.

Australian time series data was collected for four groups of cost drivers. The data series used and rationale for inclusion of the group in this study is as follows:

- Oil-based costs: The data series are world crude oil prices, Australian refined fuel and asphalt prices. The rationale is that fuel powers the heavy machinery, equipment and special transport vehicles that are used in the process of building infrastructure. For example, the total operating costs of utilising earthmoving equipment (to create the corridors on which road, highways or rail tracks can be layed out) and cranes (to erect pylons for electricity powerlines) contain a fuel cost component. In addition, fuel costs affect the total cost of producing certain materials (like concrete, cement and steel) subsequently used as inputs for the construction of infrastructure. Fuel prices are primarily determined by trends in world crude oil prices. Asphalt is included here as it is an oil-based input material used for rolling out roads and highway surfaces.
- Input materials costs: The data series are concrete, cement and steel prices. The rationale is materials like concrete, cement and steel are universal inputs into all types of infrastructure construction activity. As such, the prices construction companies pay for these materials will affect the overall cost of infrastructure construction.
- Labour costs: The data series is construction sector wages. The rationale is labourers, tradepersons and management resources are required to execute infrastructure construction projects. As such, movements in the wages bill will partly drive movements in overall infrastructure construction costs[18].
- Machinery and equipment costs: The data series are prices of imported machinery and industrial equipment and spare parts for transport equipment. The rationale is the costs of purchasing or leasing machinery, equipment and spare parts is part of the normal costs of undertaking infrastructure construction. This means movements in machinery, equipment and spare parts costs will partly drive movements in overall infrastructure construction costs.

[18] A search was undertaken for labour intensity data in the infrastruction construction sector, i.e., labour costs proportion of capital investment in the sector. However, no such data could be found.

The trend movements in each above group of cost drivers are analysed against the movements in infrastructure construction costs over time.

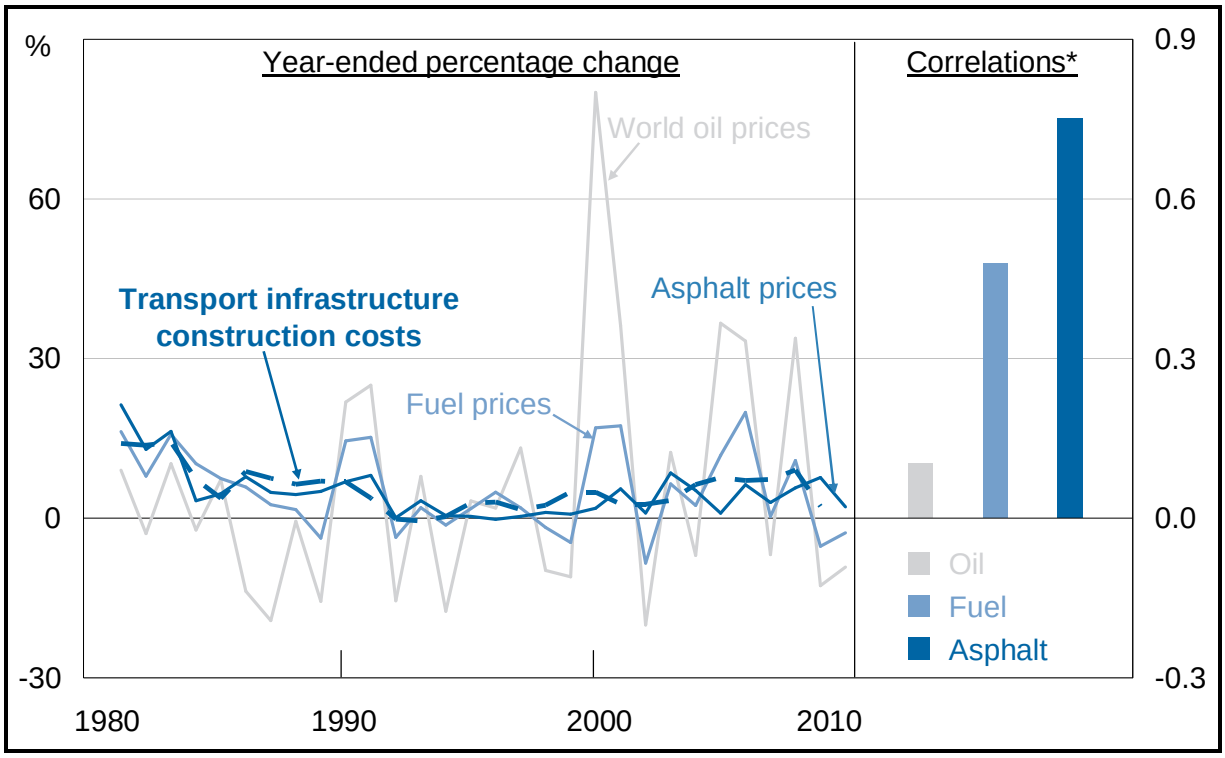
- The approach to relating movements in nominated cost drivers to movements in Australian infrastructure construction costs relies on visual inspection of growth rates patterns (i.e., looking for similarities/differences between a cost driver and overall infrastructure construction costs at certain points and episodes in time) and calculated correation coefficients. The latter are statistics that summarise the nature and indicative magnitude of a relationship between a cost driver and overall infrastructure construction costs.
- It is important to appreciate that the analytical approach here is an interpretive, rather than a formal econometric one. The emphasis is on interpreting the relative contribution and importance of each set of cost drivers in explaining movements in infrastructure construction costs over time. This is done via the use of simple correlation coefficients. Detailed econometric modelling involving causality and parameter testing is beyond the scope and budget of this study.

5.1 Oil-based costs

The left hand panel of Figure 12 displays annual percentage changes in Australian transport infrastructure construction costs and the three oil-based cost drivers and for 1981 – 2010.

Based on the left hand panel alone, it is difficult to determine if movements in the oil-based cost drivers have influenced movements in transport sector infrastructure costs. This is primarily due to the high magnitude and volatility of movements in world crude oil prices. The average standard deviation of annual movements in the world crude oil price was 22% for 1981 - 2010. Given this, correlation coefficients were calculated to capture the indicative nature and extent of the relationship between transport sector infrastructure costs and each of the oil-based cost drivers.

Figure 12: Oil-based cost drivers and transport infrastructure construction costs – comparison of growth rates and correlations



* Degree of co-movement between percentage changes in Australian transport infrastructure construction costs and percentage changes in each of the oil-based cost drivers {world oil prices (expressed in $A), Australian fuel prices, Australian asphalt prices} over the period 1980 - 2010.

Sources: Federal Reserve Bank of St Louis ('Spot oil price, West Texas Intermediate'), Reserve Bank of Australia Statistics (Exchange Rate Data, (Table F11 'Exchange Rates', $US/$A exchange rate), ABS CPI (6401.0, Table 13 'CPI: Group, Sub-group and Expenditure Class, Index Numbers by Capital City', automotive fuel index), ABS Producer Price Indexes, Australia (6427.0, Table 31 'Asphalt supplied and placed, index numbers'), ABS System of National Accounts 2009-10 (5204.0, Table 64 'Gross Fixed Capital Formation, by Industry by type of asset')[19]

The right hand panel of Figure 12 shows the calculated correlation coefficients between Australian transport infrastructure construction costs and world crude oil, fuel and asphalt prices, respectively. The intuition behind a correlation coefficient is as follows:

- The value of a correlation coefficient will range between -1 and 1.
- A correlation coefficient between 0 and 1 indicates a positive relationship exists between movements in variable X (where X is a cost driver) and variable Y (where Y is infrastructure construction costs). Increases in X will cause or explain increases in Y, and vice-versa. The stronger the positive relationship between X and Y, the closer the coefficient will be to 1.
- A correlation between 0 and -1 indicates a negative relationship exists between movements in variable X and Y. Increases in X will cause decreases in Y, respectively. The stronger the negative relationship between X and Y, the closer the coefficient will be to -1.

The key points are:

- All the correlations are positive. This is an intuitive result as increases in world oil prices, domestic fuel and asphalt prices would be expected to translate into increases in transport infrastructure construction costs, and vice-versa.
- World oil prices will fundamentally determine the overall direction of transport infrastructure construction costs, but movements in world oil prices are unlikely to inform precise movements in infrastructure construction costs. World oil prices are somewhat 'distant' or removed from what is actually happening to 'on-the-ground' infrastructure construction costs. This is due to movements in world oil prices being partly affected by non-economic factors (ie, speculation about wars in Iraq and Afghanistan, political tensions between US and Iran governments on nuclear weapons development programs, general instability in the Middle East region, terrorist threats). This explains the low correlation (of 0.10) between world oil prices and Australian transport infrastructure construction costs.
- The genuine economic demand and supply component of movements in world oil price that translates to movements in domestic fuel prices. The correlation between the price of fuel and transport infrastructure construction costs is 0.48. This is a reasonable size correlation which is attributable to the operating costs of heavy machinery and transport equipment (that is used in the roll out of new roads and highways) being influenced by fuel costs. Note fuel prices also feed into asphalt prices via their impact on the cost of manufacturing asphalt.
- The high correlation of 0.75 between movements in transport infrastructure construction costs and movements in asphalt prices reflects the fact that asphalt is a direct and significant input in road and highway construction.
- The size of the correlations between each oil-based cost driver and transport infrastructure construction costs is intuitive. The closer the cost driver is to the underlying variable that is being explained (Australian transport infrastructure construction costs) the higher is the correlation.

Apart from being significant to infrastructure construction projects within the transport sector, oil-based cost drivers may help explain the cost trends in infrastructure construction more generally.

[19] Federal Reserve Bank of St Louis data available at:
http://research.stlouisfed.org/fred2/series/OILPRICE/downloaddata?cid=98
Reserve Bank of Australia (Table F11) available at:
http://www.rba.gov.au/statistics/tables/xls/f11hist-1969-2009.xls
http://www.rba.gov.au/statistics/tables/xls/f11hist.xls?accessed=3003-09:57:00
ABS 6401.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/BDAD1186A43A677DCA25782200171409/$File/640109.xls
ABS 6427.0 (Table 31) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/731C5ED08DE09FACCA25781F0011C4A1/$File/6427018.xls
ABS 5204.0 (Table 64) available @;
http://www.ausstats.abs.gov.au/ausstats/ABS@Archive.nsf/0/19B8CE78B5333427CA2577CA0013CCF2/$File/5204064_gfcf_by_industry_asset.xls

Correlations were calculated between the movements in overall Australian infrastructure construction costs and world oil prices and fuel prices, respectively. (Asphalt prices were omitted here since asphalt does not form part of the cost base in non-transport sector infrastructure construction).

Table 2 displays correlations between overall Australian infrastructure construction costs and world oil prices and Australian retail fuel prices, respectively. The correlations are very similar to those calculated above for Australian transport infrastructure costs (Figure 12). This suggests world oil prices and Australian fuel costs are a driving factor for Australian infrastructure construction costs generally.

Table 2: Correlations between overall Australian infrastructure construction costs and oil based cost drivers

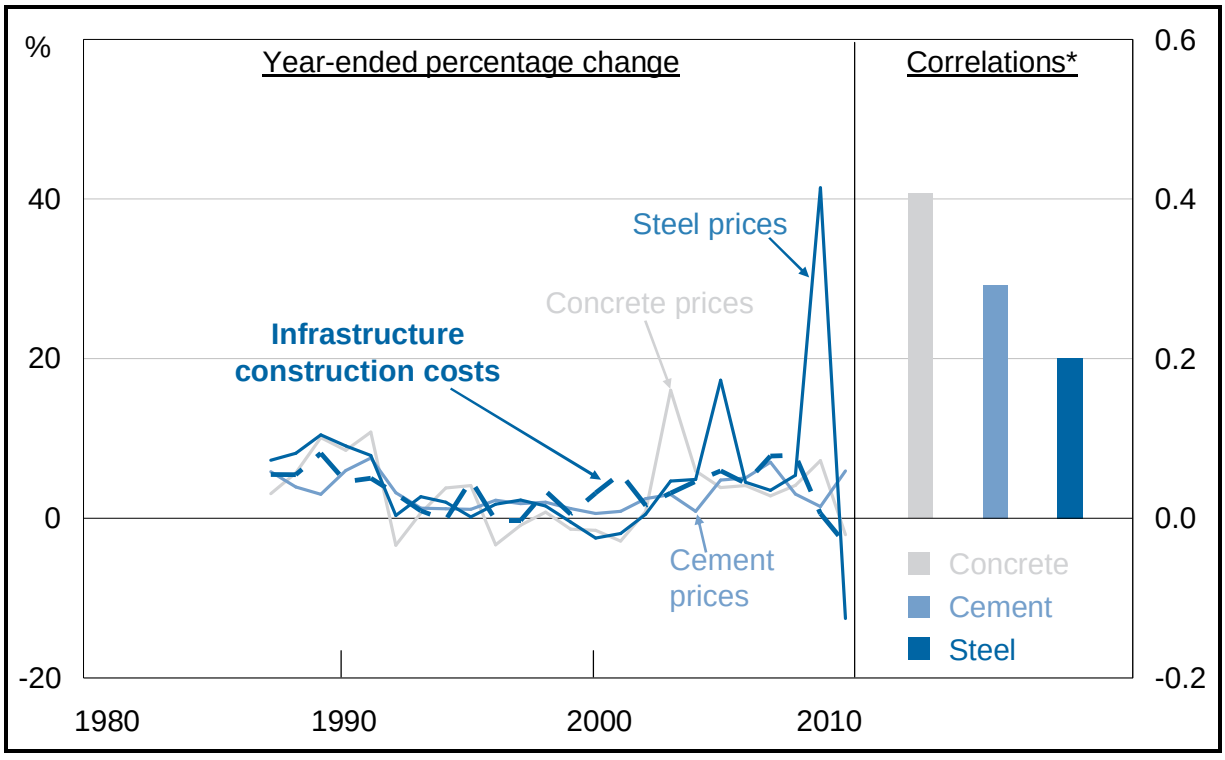
Correlation between overall Australian infrastructure construction costs and	Correlations*
- World oil prices	0.10
- Australian retail fuel prices	0.47

* Degree of co-movement between percentage changes in overall Australian transport infrastructure construction costs and percentage changes in world oil prices (expressed in $A) and Australian fuel prices, over the period 1981 - 2010.

5.2 Input materials costs

The left hand panel of Figure 13 displays annual percentage for overall Australian infrastructure construction costs, cement, concrete and steel prices from 1987 to 2010.

Figure 13: Input materials cost drivers and infrastructure construction costs – comparison of growth rates and correlations



* Degree of co-movement between percentage changes in Australian infrastructure construction costs and percentage changes in each of the input materials cost drivers (Australian concrete prices, Australian cement prices and Australian steel prices) over the period 1987 – 2010.

Sources: ABS PPI (6427.0, Tables 16 and 17 'Materials used in house building, index numbers and percentage changes by state capital city', concrete, steel and steel price indexes), ABS Australian National Accounts: National Income, Expenditure and Product (5206.0, Table 5 'Expenditure on Gross Domestic Product (GDP), Implicit price deflators') [20]

As with the oil-based cost drivers, visual inspection of the percentage changes (in Figure 13) alone makes it is difficult to gleen if there is an indicative relationship between the trends in the costs of input materials and infrastructure construction costs. Given this, instructive guidance comes from the right hand panel of Figure 13. This shows the calculated correlation coefficients between Australian infrastructure construction costs and concrete, cement and steel prices, respectively.

The key points are:

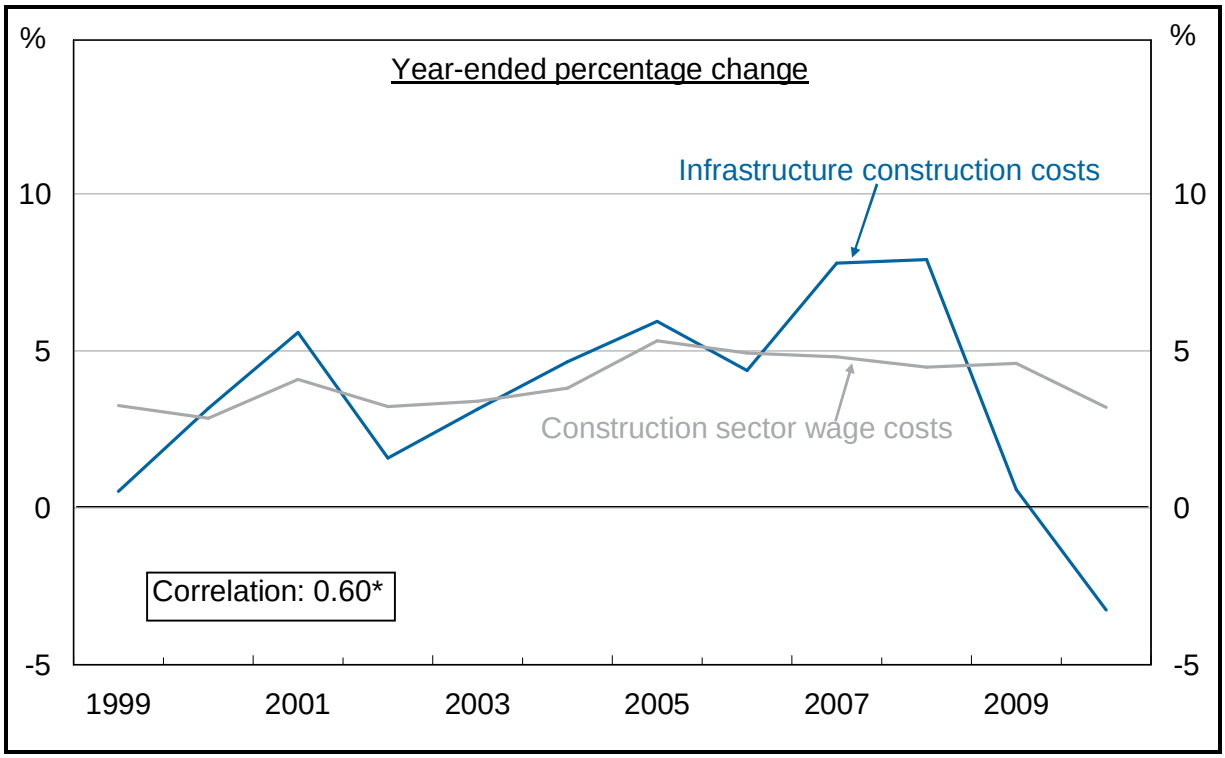
- All the correlations are positive. This is an intuitive result since increases in concrete, cement and steel prices would be anticipated to feed through to increases in infrastructure construction costs, and vice-versa.
- The size of the correlations range between 0.20 (steel) and 0.41 (concrete). This suggests changes in concrete, cement and steel costs consistently play a role in determining overall Australian infrastructure construction costs – but these input material costs are likely to play a smaller role than fuel costs in driving infrastructure construction costs.

5.3 Labour costs

Figure 14 displays annual percentage changes in overall Australian infrastructure construction costs and Australian construction sector wage costs. It shows that growth of construction sector wages and overall infrastructure construction costs exhibit the same broad trend from 1999 to 2010. However, the step up in the growth of infrastructure construction costs in 2007 and 2008 is not explained by an increase in the growth in construction sector wages. Also, the flattening out and decline of infrastructure construction costs in 2009 and 2010, respectively, was not attributable to a stabilisation or fall in construction sector wage rates in these years, respectively.

[20] ABS 6427.0 (Table 16 and Table 17) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4A80B20F5EAA88C5CA25781F0011BF94/$File/6427011.xls
ABS 5206.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4113653B118F9227CA25784600125837/$File/5206005_expenditure_implicit_price_deflators.xls

Figure 14: Australian construction sector wage costs and infrastructure construction costs – comparison of growth rates and correlations



* Degree of co-movement between percentage changes in Australian infrastructure construction costs and percentage changes in Australian construction sector wage costs driver over the period 1999 – 2010.

Sources: ABS Labour Price Index (6345.0, Tables 5A 'Total Hourly Rates of Pay Excluding Bonuses: Sector by Industry, Original (Financial Year Index Numbers for year ended June quarter)'), ABS Australian National Accounts: National Income, Expenditure and Product (5206.0, Table 5 'Expenditure on Gross Domestic Product (GDP), Implicit price deflators')[21]

At 0.60, the correlation between growth in construction sector wages and overall infrastructure construction costs is relatively high. This suggests movements in wages costs play a reasonably important role in explaining movements in overall infrastructure construction costs. However, unlike the oil-based and input material cost drivers, construction sector wage data is only available for the past 11 years. The limited time series implies there is some uncertainty regarding the robustness and precision of the calculated correlation between construction sector wages costs and overall infrastructure construction costs. This is no such uncertainty for the calculated correlations between the oil-based and input materials cost drivers and overall infrastructure construction costs, respectively. These correlations are estimated back to the 1980s, which ensures the correlations capture a number of construction cycles (ie, upturns and downturns in activity). The upshot for the correlation between construction sector wages costs and overall infrastructure construction costs is that the headline estimate of 0.60 needs to be discounted to some degree.

After allowing for data limitations and the observation that construction sector wages costs do not appear to have contributed to the most recent set of movements in overall infrastructure construction costs, increases in wages costs are likely to be a moderate driver of increases in overall infrastructure construction costs. Since it is not possible to be precise here, the contribution of wages costs (in an ongoing year-to-year sense) to overall infrastruction construction costs is likely to be in the same ball-park as that of input material costs.

[21] ABS 6345.0 (Table 5A) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/BDD7A907AB15C609CA25783F000F00BD/$File/634505a.xls
ABS 5206.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4113653B118F9227CA25784600125837/$File/5206005_expenditure_implicit_price_deflators.xls

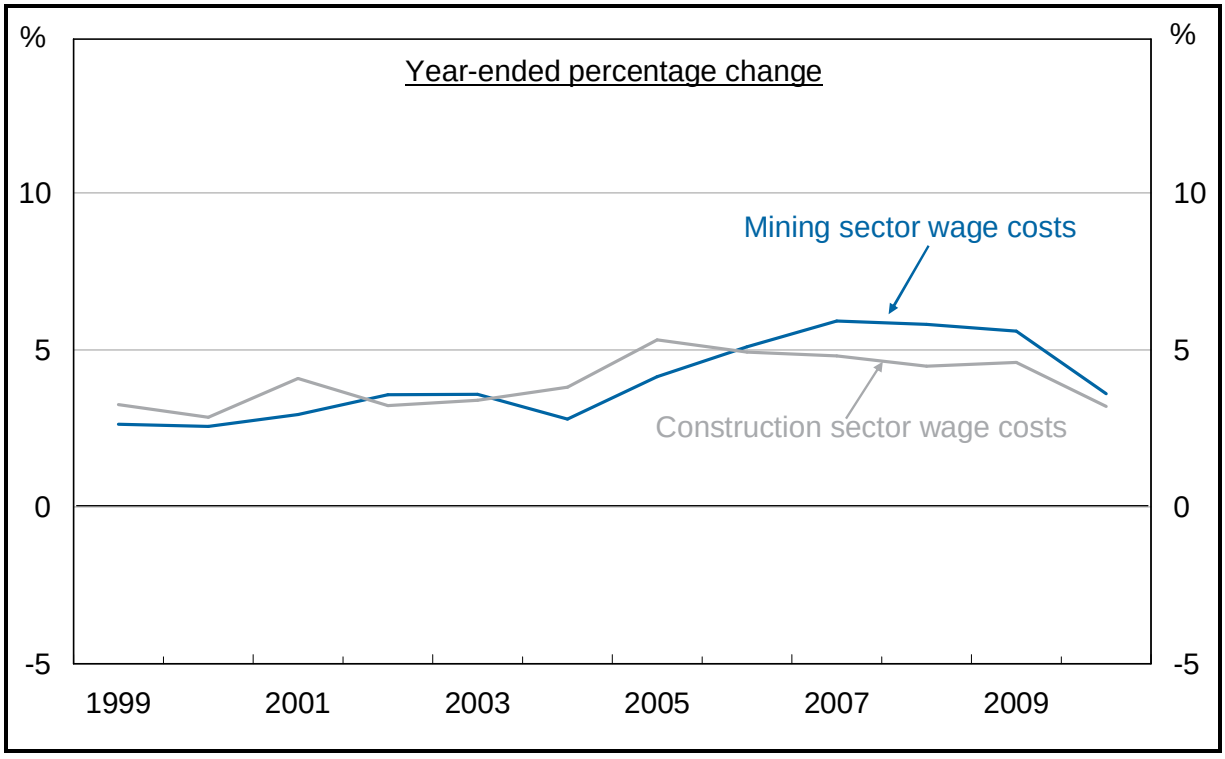
5.3.1 Influence of mining sector boom

An anecdote consistently put forward by the construction contracting firms over the past 5-6 years relates to the impact of the Australian minerals boom on construction sector wages and overall infrastructure construction costs. The basic argument is as follows:

- The substantial expansion in mining sector output over the past 5-6 years has underpinned strong growth in mining sector wage rates. This has attracted traditional construction sector workers to leave the construction sector to take up higher paying mining jobs. Given labour skill shortages, employers in the construction have had to offer higher wage rates in order to hold onto existing employees. This increase in construction sector wage rates has contributed to increases in the overall growth of infrastructure construction costs.

To verify whether this argument is supported by the available data, Figure 15 displays annual percentage changes in Australian construction and mining sector wage costs from 1999 to 2010. Growth in construction and mining sector wages accelerated in 2005. Growth in mining sector wages continued to strengthen in 2006 before peaking at 6% p.a. in 2007 and 2008, respectively. However, the construction sector did not experience a pick up in the rate of wages growth during these years. Rather, construction sector wage growth consistently hovered at around 4¾% p.a. from 2006 to 2008.

Figure 15: Construction and mining sector wage costs



Sources: ABS Labour Price Index (6345.0, Tables 5A 'Total Hourly Rates of Pay Excluding Bonuses: Sector by Industry, Original (Financial Year Index Numbers for year ended June quarter)')[22]

This suggests the pent up demand pressure created by the mining boom does not appear to have translated into higher wages growth in the construction sector. The upshot is the spike in overall Australian infrastructure construction costs during 2007 and 2008 is likely to have been caused by factors other than construction sector wages. This is consistent with the earlier analysis in this section, which points to world oil prices and fuel prices as being the primary explanators of the recent spike in overall infrastructure construction costs. It is worth noting that there is a striking difference between the available statistical evidence and the available anecdotal evidence on the issue. There are regular anectodes of young workers being enticed by the extremely high salaries on offer to go and work in

[22] ABS 6345.0 (Table 5A) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/BDD7A907AB15C609CA25783F000F00BD/$File/634505a.xls

the mining firms in the north-west of Western Australia (the Pilbara region) and Queensland. The difference between the statistical evidence and anectodes suggests there may be scope to explore this issue in more detail.

Similarly, the actual decline in world oil prices and fuel prices (rather than the slight softening in the growth of construction sector wages costs) is likely to have largely caused the fall in overall infrastructure construction costs in 2009 and 2010. A contributing additional factor here is more competitive pricing of infrastructure construction projects during 2009 and 2010. Companies which struggled to win jobs during the Global Financial Crises (GFC) would have cut prices to win contracts.

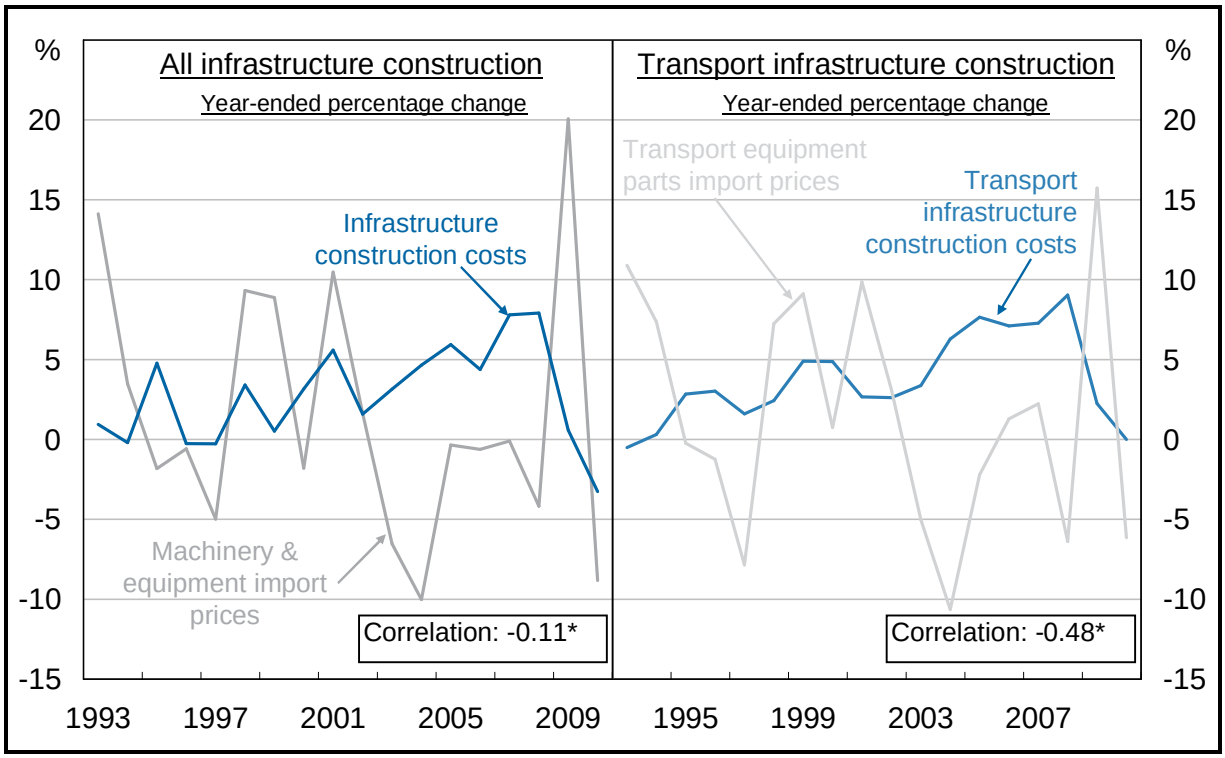
5.4 Machinery and equipment costs

The left hand panel of Figure 16 displays annual percentage changes in overall Australian infrastructure construction costs and the prices of imported machinery and industrial equipment. The right hand panel of Figure 16 displays annual percentage changes in Australian transport infrastructure construction costs and the prices of imported spare parts for transport equipment. The rationale for using import prices is most of machinery, equipment and spare parts used in the infrastructure process is sourced from overseas.

Figure 16 shows there is little similarity in the movement pattern of imported machinery and industrial equipment prices and overall infrastructure construction costs over the past 17 years. The price of imported machinery and industrial equipment actually fell (by an average of 3% p.a.) between 2004 and 2008. This is in contrast to the solid increases in overall infrastructure constructions costs during this period (an average increase of 6% p.a.). Looking back further in history, the pattern of movements in the two series throughout the 1990s is marginally better than during the 2000s, though there are still examples of counter-intuitive behaviour. While the two series record declines in 2010, this is likely to be coincidental. The presence of a negative correlation coefficient reinforces the view that the prices of imported machinery and industrial equipment do not appear to have played a role in driving the movements in infrastructure construction costs over the past 17 years. A positive correlation was expected here (ie, increases in import prices would normally pass through into higher construction costs), but the available data provides a small negative correlation.

A similar finding to the above is apparent between movements in the prices of imported spare parts (for transport equipment) and transport infrastructure construction costs. The pattern in the growth rates and the negative correlation imply that the prices of imported spare parts do not appear to have played a role in driving the movements in transport infrastructure construction costs over the past 17 years.

Figure 16: Imported machinery/equipment, parts prices and infrastructure construction costs – comparison of growth rates and correlations



* Correlation in left-hand panel reflects the degree of co-movement between percentage changes in Australian infrastructure construction costs and percentage changes in the nominated cost driver ($A price of machinery and industrial equipment imported into Australia) over the period 1993 - 2010. Correlation in right-hand panel reflects the degree of co-movement between percentage changes in Australian transport infrastructure construction costs and percentage changes in the nominated cost driver ($A price of spare parts imported into Australia for use in heavy transport equipment) over the period 1993 – 2010.

Sources: ABS International Trade Price Indexes (6457.0, Tables 4, 5 and 6 'Import Price Index by Balance of Payments Broad Economic Categories, Index Numbers', indexes for machinery and industrial equipment and parts for heavy transport equipment), ABS Australian National Accounts: National Income, Expenditure and Product (5206.0, Table 5 'Expenditure on Gross Domestic Product (GDP), Implicit price deflators') [23]

5.5 Other cost drivers

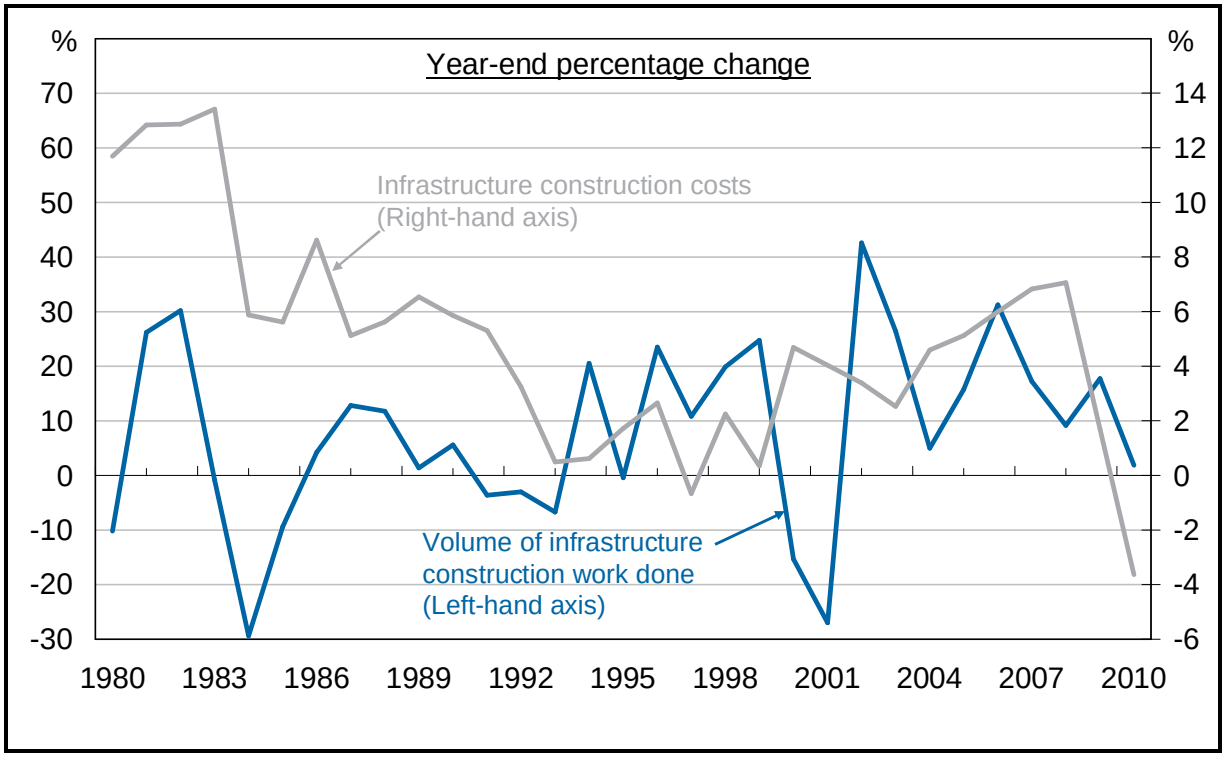
Apart from the nominated cost drivers outlined above, there is value in judging whether the volume of infrastructure construction work itself may have contributed to infrastructure construction cost increases over time.

Figure 17 displays percentage changes in infrastructure construction costs against percentage changes in the volume of infrastructure construction work done over the period 1980 – 2010. One plausible argument is that periods of consistently high year-in year-out growth in the volume of infrastructure construction may initially precede and subsequently overlap with periods of above-CPI increases in infrastructure construction costs. Taking the 2002-07 period, which is a period of 6 years (inclusive) the volume of infrastructure construction work done increased at an average annual rate of 23%. In 5 of these 6 years the volume of infrastructure construction work done rose by more than 15% per year. It appears likely that the consistently high volume growth (from 2002-07) has fed into above-CPI construction cost increases with a lag. This is evidenced by the notable step up in infrastructure construction cost increases in 2004 (i.e., infrastructure construction costs increases went from 2½% in 2003 to 4½% in 2004), with annual infrastructure cost increases hovering at 6% per year from 2005 to 2008 (inclusive).

[23] ABS 6457.0 (Table 4, 5 and 6) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/471EECCE6B08E1E0CA25781E0013C641/$File/645703.xls
ABS 5206.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4113653B118F9227CA25784600125837/$File/5206005_expenditure_implicit_price_deflators.xls

- The difficulty in establishing the strength of the purported relationship between the volume of work done and construction costs over a number of cycles is that there have not been any other similar periods over the past 30 years where the volume of construction activity has consecutively increased at more than 15% per year over a sustained 4, 5 or 6 year period. Therefore, caution needs to be exercised to ensure the role of the volume of activity (in contributing to the rate of growth in infrastructure construction costs) is not overstated. Having said this, it appears that the volume of construction work done has played at least some role in explaining the above-CPI increases in construction costs witnessed during the 2004-08 period.

Figure 17: Cost and volume of infrastructure construction activity



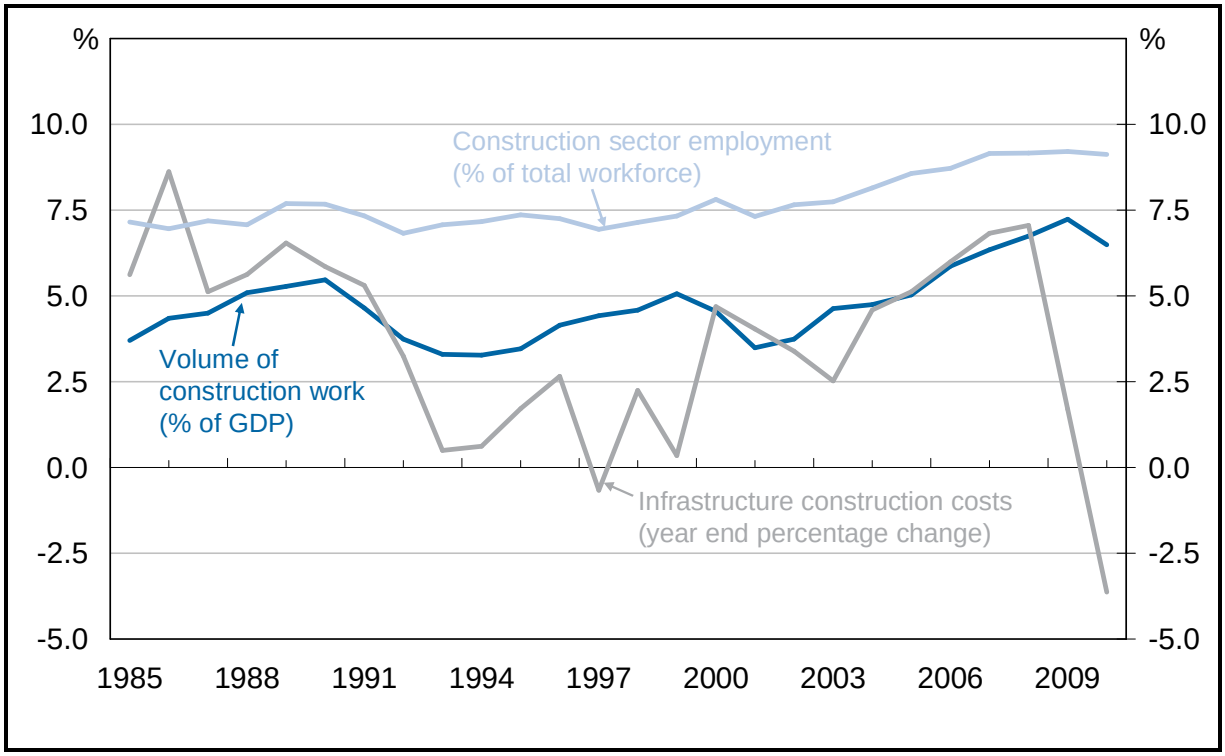
Sources: ABS Australian National Accounts: National Income, Expenditure and Product (June 2010, 5206.0, Table 5 'Expenditure on Gross Domestic Product (GDP), Implicit price deflators', Table 2 'Expenditure on Gross Domestic Product (GDP), Chain volume measures')[24]

An alternative way of analysing whether the volume of infrastructure construction activity has contributed to above-CPI construction cost increases is to place the construction sector within a broader macroeconomic setting. Figure 18 displays movements in infrastructure construction costs against the volume of construction sector work done (as a proportion of Australian GDP) and construction sector employment (as a proportion of the total Australian workforce). The volume of construction sector work done here is measured as non-residential engineering construction plus non-residential building construction.

- Figure 18 shows that following a lengthy period where the construction sector share of the total workforce remained relatively constant the share stepped up during the mid and later part of the 2000s. At the same time the contribution of the construction sector to total economic activity (as captured by the volume of construction work done as a percentage of GDP) surpassed levels reached in previous cyclical peaks (i.e., 1990 and the late 1990s). Taken together, these trends suggest the volume of construction work done played a part in driving the above-CPI increases in construction costs witnessed during the 2004-08 period.

[24] ABS 5206.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4113653B118F9227CA25784600125837/$File/5206005_expenditure_implicit_price_deflators.xls.
ABS 5206.0 (Table 2) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/960AC0A12FBCC39FCA257846001254FB/$File/5206002_expenditure_volume_measures.xls

Figure 18: Construction costs, employment and sector contribution to Australian economy



Sources: ABS Australian National Accounts: National Income, Expenditure and Product (5206.0, Table 5 'Expenditure on Gross Domestic Product (GDP), Implicit price deflators', Table 2 'Expenditure on Gross Domestic Product (GDP), Chain volume measures'), ABS Labour Force Australia Detailed Quarterly (June 2010, 6291.0, Table 4 'Employed persons by Industry – Trend, Seasonally adjusted, Original') [25]

5.6 Non quantified cost drivers

Due to a lack of available data, there are some potential cost drivers that could not be quantified in this study. These include:

- Regulatory
- Construction alliance structures
- Environmental/climatic

The regulatory cost driver was discussed with in-house GHD engineering specialists who regularly undertake design work for construction contracting firms in Australia. The key anecdote to consistently come out of these discussions was the cost impact of increasingly stringent safety and design standards and building specifications.

The past decade had seen extra labour resources (ie, extra WorkCover inspectors) contribute to higher overall infrastructure construction costs. Related to this, regulatory authorities mandated that additional steel reinforcing be used to build a given structure. These higher unit requirements were thought to be pushing up the overall cost of constructing infrastructure across Australia.

[25] ABS 5206.0 (Table 5) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4113653B118F9227CA25784600125837/$File/5206005_expenditure_implicit_price_deflators.xls.
ABS 5206.0 (Table 2) available at:
http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/960AC0A12FBCC39FCA257846001254FB/$File/5206002_expenditure_volume_measures.xls
ABS 6291.0 (Table 4) available at:
http://www.ausstats.abs.gov.au/ausstats/ABS@Archive.nsf/0/BBEAD477B69BA12FCA257855000EBE5C/$File/6291004.xls

5.7 Overall assessment of historical evidence

The above analysis suggests trends in Australian infrastructure construction costs are likely to be significantly and consistently driven by movements in fuel prices (which are in turn determined by movement in world oil prices). Following fuel prices, movements in the costs of input materials and labour used in the infrastructure construction process appear to play a modest role in explaining trends in Australian infrastructure construction costs. However, the costs of imported machinery, equipment and spare parts do not seem to exert an influence on Australian infrastructure construction costs.

In addition to the above mentioned drivers, the volume of infrastructure construction work done appears to have contributed to the above-CPI increases in infrastructure construction costs during the mid and latter part of the 2000s.

6. Forecasts

This section presents the indicative outlook for infrastructure construction cost growth in the medium to longer term. This is based on forecasts for the specific drivers of infrastructure construction costs and macroeconomic variables (which have a broader influence on infrastructure construction costs)

Due to budget constraints, specific annual growth forecasts for infrastructure construction costs are not readily available for Australia or comparator countries. Given this, growth forecasts were sourced for specific cost drivers of infrastructure construction costs as well as general economic and construction investment activity. These forecasts were in turn used to build up an indicative picture of the general direction and magnitude of forecast growth in infrastructure construction cost trends over the medium term. Growth forecasts were collected for the following:

- World oil prices
- Wages
- GDP
- Gross fixed capital formation
- CPI

The majority of the forecasts for the above indicators were collected from the International Monetary Fund's (IMF) latest 'World Economic Outlook' report.

In order to put the forecasts into perspective, it is necessary to compare a selected forecast period with a selected historical period. Where possible, average historical growth rates are calculated for the six-year period (2002-07) preceding the onset of the Global Financial Crisis (GFC) in 2008. Similarly, average forecast growth rates are calculated for the six-year period (2010-15) following the emergence of the global economy from the GFC. By removing the GFC years of 2008 and 2009, it is possible to compare a prospective 'growth' period in the future with a 'growth' period over recent history. This allows the forecasts to be compared with a historical period in which strong increases in infrastructure construction costs were recorded.

6.1 Oil prices

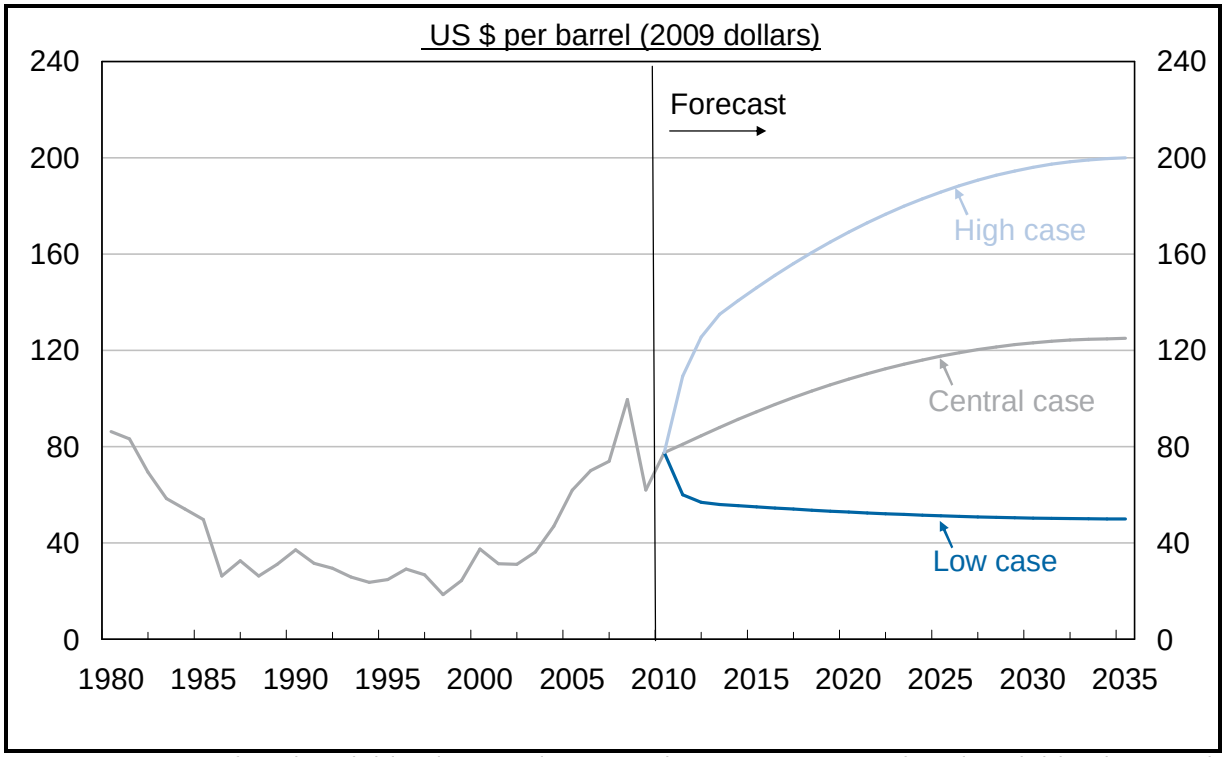
Section 4 suggests world crude oil prices appear to have been the primary driver of movements in infrastructure construction costs in Australia, particularly over recent years. For this reason, forecast growth in world oil prices will provide indicative guidance on where infrastructure construction costs may go in the future.

Proponents of the 'peak oil' thesis suggest there are strong grounds to believe that oil prices will increase significantly in the future as global demand exceeds available supply. Indeed, organisations such as the US Energy Information Administration (that have been viewed by some as taking a relatively optimistic view of oil supply and demand) are now also projecting scenarios that would entail significant real increases in oil prices.

- Figure 19 provides an example of these projections from the US Energy Information Administration's 2011 Energy Outlook. Under the 'central case' (or most likely) scenario, oil prices are projected to increase by around 22% between 2010 and 2015 (from US $77.50 per barrel in 2010 to $94.53 per barrel in 2015. This is a real increase of 22% since prices are expressed in 2009 dollar terms. Under the 'high case' scenario, oil prices would rise by 88% by 2015. In other words, there would almost be a doubling in real oil prices in the medium term.

In themselves, the oil price forecasts here imply higher-than-CPI increases in Australian infrastructure construction costs over the medium term.

Figure 19: World oil price forecast scenarios: comparison with historical trends



Sources: US Energy Information Administration 'Annual Energy Review 2009', US Energy Information Administration 'Annual Energy Outlook 2011'[26]

6.2 Wages costs

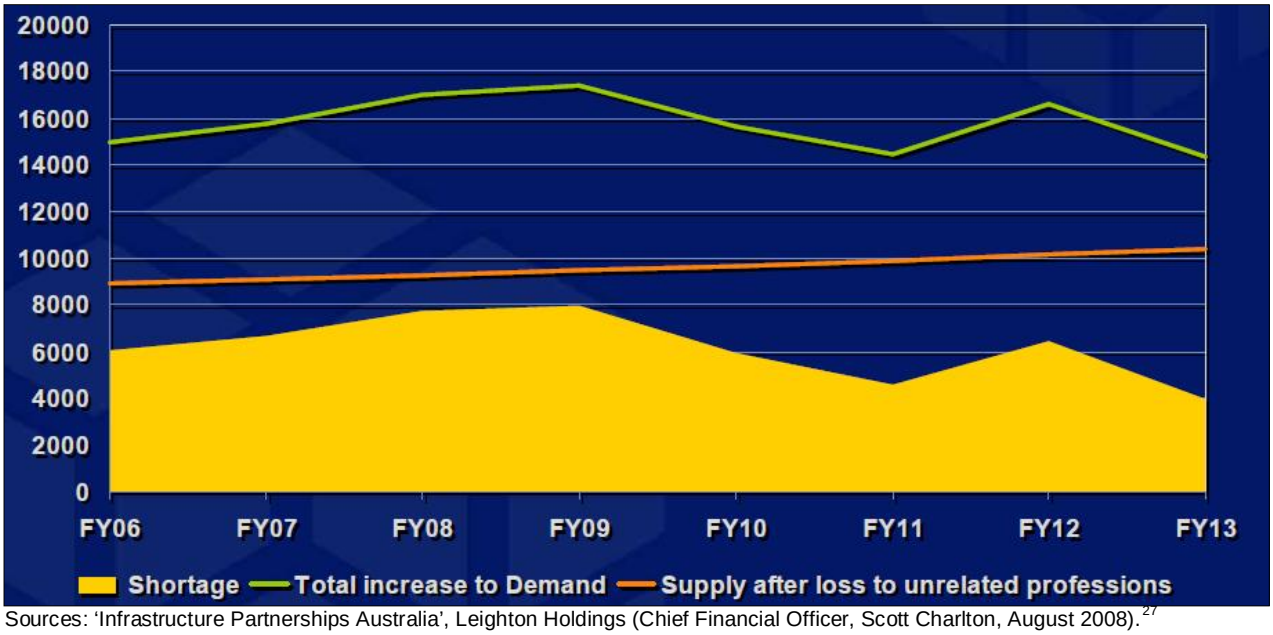
In addition to world oil prices, Section 4 outlined that construction sector labour costs is a driver of infrastructure construction costs. Given this, forecast growth in construction sector wages growth will provide indicative guidance on where infrastructure construction costs may go in the future.

IMF forecasts are not available for construction sector wages growth. An alternative source is a 2006 audit report published by the Australian Federal Department of Education, Science and Training. This report contains forecasts for the number of skilled workers required (i.e., demand) and available (i.e., supply) to undertake science, engineering and technology-related tasks.

Figure 20 displays the forecast demand and supply balance for engineering tradespersons in the Australian construction sector. While the coverage here is broader than the infrastructure construction sector {i.e., Figure 20 includes engineers employed in the residential and non-residential building (ie, office, retail and industrial complexes) construction sectors}, it is still likely to be of some value for inferring broad trends in wages growth across the Australian infrastructure construction sector.

[26] US Energy Information Administration data available at: http://www.eia.gov/forecasts/aeo/early_prices.cfm

Figure 20: Demand and supply of engineering tradespersons employed in Australian construction sector



Sources: 'Infrastructure Partnerships Australia', Leighton Holdings (Chief Financial Officer, Scott Charlton, August 2008).[27]

As at 2006, Figure 20 shows that forecast growth in the demand for engineers was consistently expected to outstrip forecast growth in the supply of engineers between 2006 and now (2010). The consequent shortage in the number of engineers was forecast to be between 6,000 and 8,000 per year between 2006 and 2010. The size of the forecast shortage is expected to decline over the (true) forecast period between 2010 and 2013. During these years, the shortage is expected to hover between 4,000 and 6,000 per year.

Using Figure 20 as a broad guide to forecast wage growth in the infrastructure construction sector, it would imply softer wage growth compared to what was recorded in the sector during the second half of the 2000s. In other words, the moderation in the excess demand for engineering staff (via the reduction in shortfall) would lead to an easing in wages growth. This in turn points to lower forecast growth in overall infrastructure construction costs relative to the second half of the 2000s.

On the other hand, the construction industry remains concerned about skills shortages. Research undertaken by SkillsDMC (the national industry skills council for the resources and infrastructure sector) and the Civil Contractors Federation found that, during late 2009 (when labour demand was relatively subdued due to the GFC) construction industry employers were having difficulty in recruiting suitable workers. The report went on to find:

> *'As the economy recovers, led by industries such as mining and continuing strong infrastructure spending, these recruitment difficulties can be expected to become more widespread and inhibit economic and job growth'*[28].

Similarly, the report of the Australia Government's National Resources Sector Employment Taskforce found that:

> *'the resources sector could be 36,000 tradespeople short by 2015. If these workers are recruited from other sectors there will be skills shortages in those industries'*[29].

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[27] Available at:
http://www.leighton.com.au/verve/_resources/SC_IPA_Presentation_1Aug08.pdf.
Underlying data from Department of Education, Science and Training report Audit of Science Engineering and Technology Skills' (July 2006). Available at:
http://www.dest.gov.au/NR/rdonlyres/AFD7055F-ED87-47CB-82DD-3BED108CBB7C/13065/SETSAsummaryreport.pdf

[28] Civil Contractors Federation and SkillsDMC '*Civil Construction Occupations Overview Report*', March 2010, pg.6.
Report available at:
http://www.skillsdmc.com/en/Industry%20Projects/ANZSCO%20CCF.aspx

[29] National Resources Sector Employment Taskforce '*Resourcing The Future*', July 2010, pg. 3.
Report available at:
http://www.deewr.gov.au/Skills/Programs/National/nrset/Documents/FinalReport.pdf

The Australian Government is funding work by the Australian National Engineering Taskforce, a collaboration of five organisations from the engineering profession, to address a skills shortage in the profession. The Taskforce's October 2010 report, '*Scoping our Future',* consolidated a body of work to highlight prospective shortages in the supply of engineers. Of particular relevance to this study is that work also sought to link existing skills shortages to project scoping inadequacies that previous studies for the Australian Contractors' Association had suggested were a significant issue in Australia's infrastructure sector[30].

The above views point to possible labour supply-related pressures on the cost of developing infrastructure projects over the next few years.

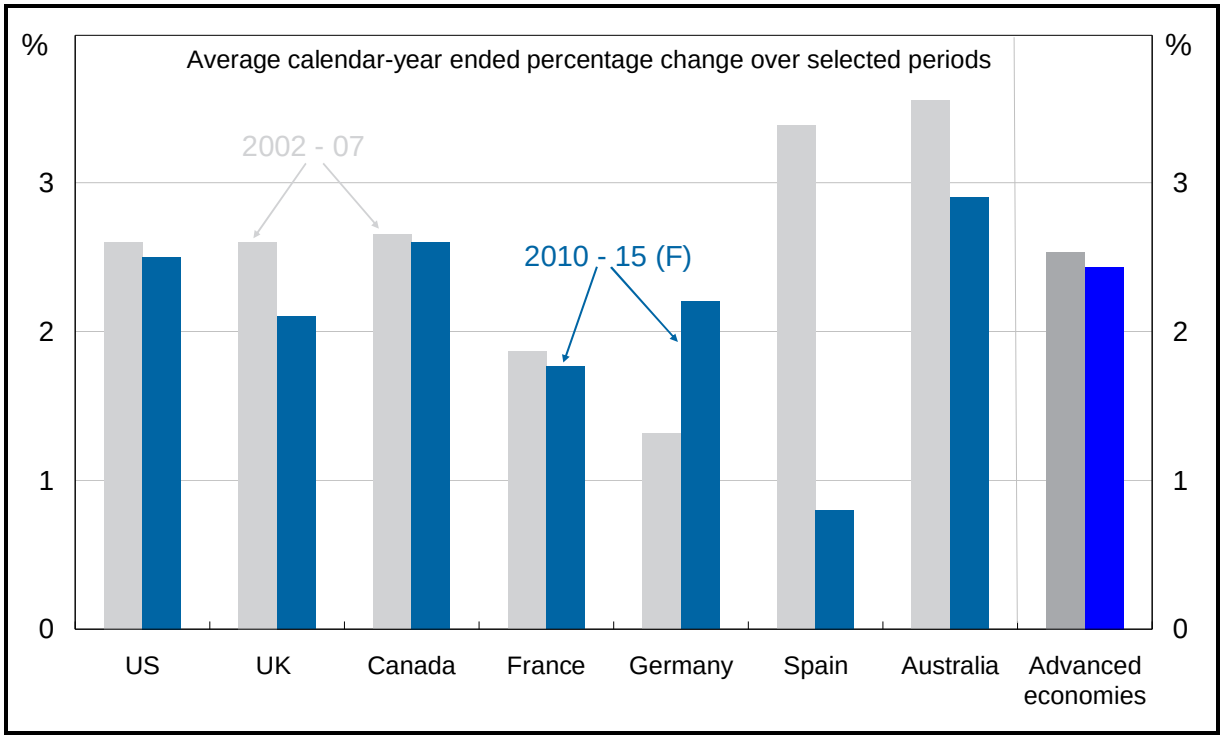
6.3 GDP

Forecast growth in overall economic activity (as captured by growth in GDP) may provide high-level guidance on the forecast strength of work done in the infrastructure construction sector. Given the range of infrastructure construction sub-sectors analysed in this study, growth in overall economic activity is likely to be suggestive of growth in infrastructure construction activity.

Figure 21 displays historical and forecast growth in real GDP for the periods 2002-07 and 2010-15, respectively. Growth rates are shown for Australia and comparator countries.

The key observation is that, with a few exceptions (Germany and Spain), the IMF is projecting average annual GDP growth over the six years to 2015 to be marginally lower compared to the six years to 2007. Average annual Australian GDP growth is tipped to decline from 3.6% (between 2002 and 2007) to 2.9% between 2010 and 2015.

Figure 21: GDP growth forecasts for Australia and comparator countries: comparison with recent historical trends



Sources: International Monetary Fund (IMF), October 2010, World Economic Outlook 'Recovery, Risk and Rebalancing', (Table A2 'Advanced Economies, Real GDP and Total Domestic Demand')[31]

[30] The 2006 report for the Australian Contractors' Association, 'Scope for Improvement', found that scoping inadequacies accounted for a quarter of projects valued over $1 billion being more than $200 million or up to 20% over budget.

[31] IMF data available at:
http://www.imf.org/external/pubs/ft/weo/2010/02/index.htm

After taking into the account the summarised nature of GDP, the forecasts imply ongoing solid levels of infrastructure construction activity in Australia.

6.4 Gross fixed capital formation

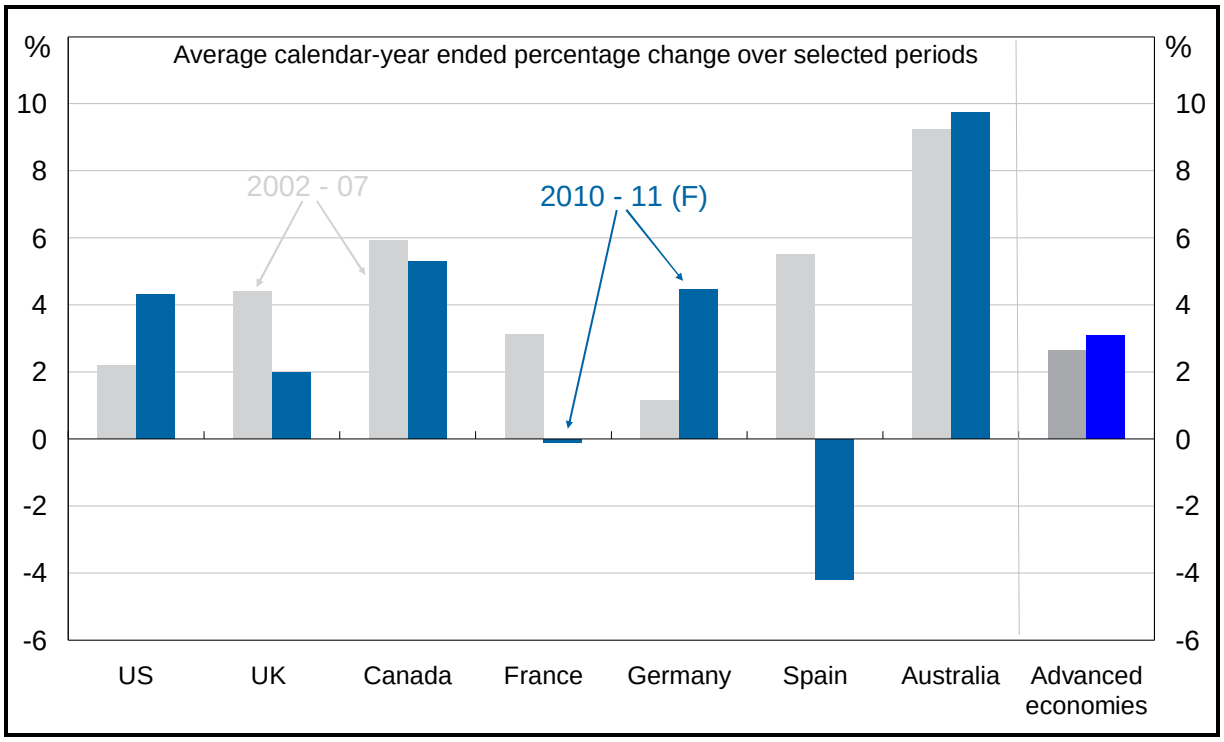
Another economic indicator that is more directly relevant (than GDP) to the infrastructure construction sector is gross fixed capital formation. It measures total private and public sector investment in residential, non-residential buildings and infrastructure construction. While forecasts for investment in infrastructure construction are not readily available, forecasts for gross fixed capital formation are likely to convey a broad sense of how much infrastructure construction activity may occur in the future.

Figure 22 displays historical and forecast growth in real gross fixed capital formation for the periods 2002-07 and 2010-11, respectively. Growth rates are shown for Australia and comparator countries. Forecast growth rates are only available for 2010 and 2011.

For the 2002-07 period, Australia recorded notably higher growth in gross fixed capital expenditure relative to the comparator countries. Australian gross investment increased at an average annual rate of 9% per year. This compares with an average annual rate of 4% per year across the comparator countries.

Australia is projected to continue to experience strong growth of nearly 10% in gross fixed capital expenditure in 2010 and 2011. In contrast, investment expansion is predicted to be variable acoss the comparator countries. Some comparator countries are expected to record increases in investment growth (i.e., USA, Germany) while other comparator countries are anticipated to incur declines in investment growth (ie, UK, France and Spain). Together, the set of comparator countries are forecast to experience investment growth of 2% in 2010 and 2011.

Figure 22: Gross fixed capital formation growth forecasts for Australia and comparator countries: comparison with recent historical trends



Sources: International Monetary Fund (IMF), October 2010, World Economic Outlook 'Recovery, Risk and Rebalancing' (Table A3 'Advanced Economies, Components of Real GDP'), ABS Australian National Accounts: National Income, Expenditure and Product (5206.0, Table 2 'Expenditure on Gross Domestic Product (GDP), Chain volume measures), Australia Government, Budget, Budget Strategy and Outlook, Budget Paper Number 1, 2010-11 (Table 1 'Major Economic Parameters')[32]

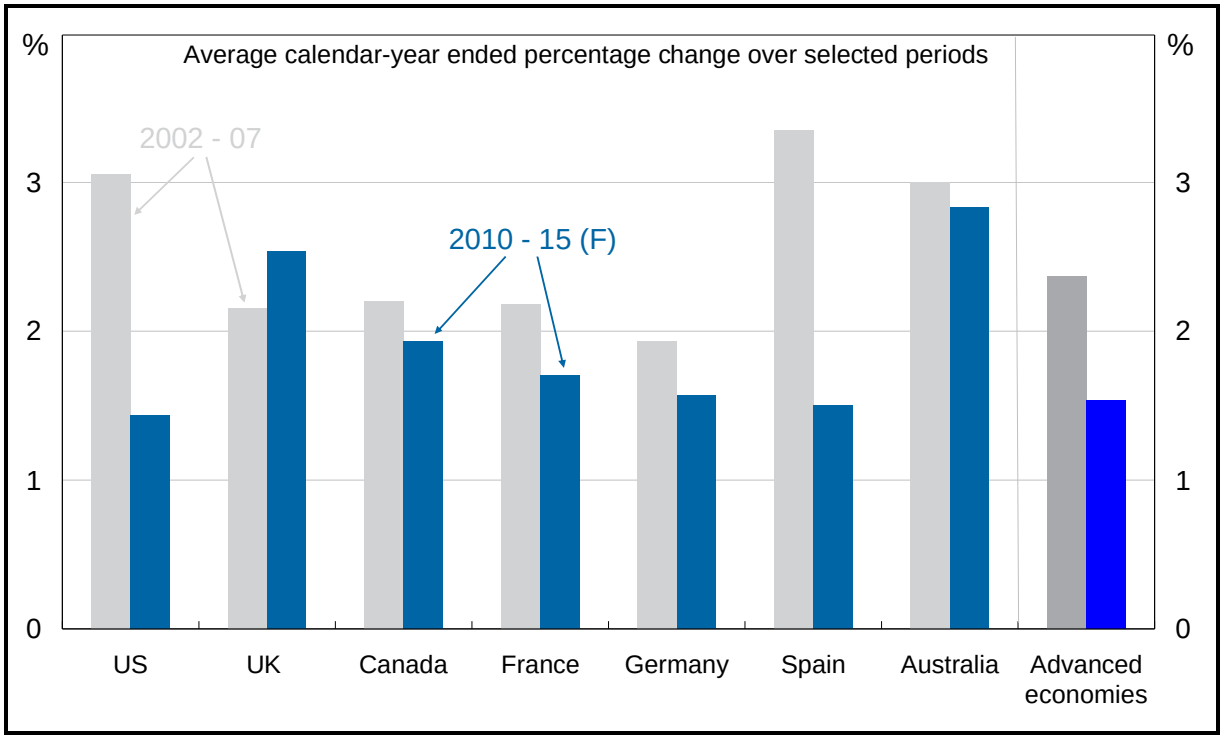
[32] IMF data available at:
http://www.imf.org/external/pubs/ft/weo/2010/02/index.htm
ABS 5206.0 (Table 5) available at:

6.5 Consumer prices

Unlike the above indicators, CPI forecasts do not provide general guidance on the future rate of growth in either the level of infrastructure construction activity or infrastructure construction costs. Rather, analysing available CPI growth forecasts may be useful since the CPI is the key 'comparator' against which trends in infrastructure construction costs are assessed in this study (see Section 3 and Section 4).

Figure 23 displays historical and forecast growth in the CPI for the periods 2002-07 and 2010-15, respectively. Growth rates are shown for Australia and comparator countries. Figure 23 shows that for most countries (including Australia) the CPI is forecast to grow at slightly lower rate compared to that experienced during the 2002-07 period.

Figure 23: CPI growth forecasts for Australia and comparator countries: comparison with recent historical trends



Sources: International Monetary Fund (IMF), October 2010, World Economic Outlook 'Recovery, Risk and Rebalancing' (Table A6 'Advanced Economies, Consumer Prices') [33]

6.6 Overall assessment of forecasts

The available forecasts for general economic activity (i.e., growth in real GDP and gross fixed capital formation) suggest that construction sector activity in Australia is likely to remain high in the medium term. This suggests there will be pressure for infrastructure construction costs in Australia to grow at least as much as inflation in the medium term.

http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/4113653B118F9227CA25784600125837/$File/5206005_expenditure_implicit_price_deflators.xls
Austarlian Government Budget available at:
http://www.aph.gov.au/budget/2010-11/content/bp1/download/bp1.pdf
[33] IMF data available at:
http://www.imf.org/external/pubs/ft/weo/2010/02/index.htm

More pertinently, the available forecasts for the key driver of Australian infrastructure construction costs - world oil prices - imply that growth in Australian infrastructure construction costs are likely to outpace growth in inflation in the medium term.

7. Conclusions and policy implications

It is important to appreciate that this study is a high level analysis of the evidence on Australian and international infrastructure construction costs. More detailed analysis of data sources may yield slightly different results and conclusions to those reported here.

The data-based evidence of the trends in and drivers of movements in Australian and international infrastructure construction costs indicates that increases in infrastructure construction costs have not consistently exceeded increases in the general rate of inflation over the long run. There have been some exceptional episodes where infrastructure construction cost increases have outstripped inflation increases (i.e., the 2004 – 2008 episode) as well as episodes when the reverse has occurred (i.e., the 2009 and 2010 epsiode) – that is, inflation has risen by more than nfrastructure construction costs.

The analysis suggests that Australian experience with increases in infrastructure construction costs is broadly in line with trends observed in the comparator countries of US, UK, France and Canada.

Trends in world oil prices and fuel prices are seemingly the main cost drivers which regularly have explained trends in Australian infrastructure construction costs over a sufficiently long and representative period of time (i.e., a number of upturns and downturns in the construction sector and macroeconomic cycle). ovements in input material costs (such as steel, cement and concrete prices) and labour wage costs appear to have played a modest role in driving movements in Australian infrastructure construction costs. The strong growth in the amount of infrastructure construction work done in Australia during the early and mid 2000s appears to have contributed to the 2004 – 2008 period of above-CPI increases in infrastructure construction costs.

With world oil prices seemingly being a significant driver of infrastructure construction costs in the past, the medium and longer term projections (from traditionally conservative bodies like the International Energy Administration) for substantial and sustained increases in world oil price increases imply real (above-CPI rate) increases in infrastructure construction moving forward.

From a policy perspective, this scenario invites a response from governments. While it is true that governments can do little about rising oil prices, the prospect of oil price-driven increases in iinfrastructure construction costs does highlight a need for governments to apply even greater scrutiny of infrastructure projects (i.e., project proposals seeking government funding). One important element here is the application of higher standards of project evaluation to ensure that planned infrastructure projects genuinely deliver value for money. The point is that governments cannot afford to spend scarce capital on ever more expensive projects. This analysis highlights the need for governments to be careful about the choice and scope of projects to be developed.

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1 (Draft: 08/11/10)	M. Gorgievski/ D. Veryard	M. Gorgievski	N. Smith
2 (Final: 05/04/11)	M. Gorgievski/ D. Veryard	N. Smith	N. Smith

Data Appendix

Data series for **Figure 1: Australian cost and price indexes and growth**

Date	Consumer prices Index	Infrastructure construction costs index (ABS Quarterly National Accounts) Index	Consumer prices Normalised index (Jun-2003 = 100)	Infrastructure construction costs index (ABS Quarterly National Accounts) Normalised index (Jun-2003 = 100)	Consumer prices Year end % change	Infrastructure construction costs index (ABS Quarterly National Accounts) Year end % change
Jun-1979	42.40	23.40	30.01	30.71		
Sep-1979	43.40	23.90	30.71	31.36		
Dec-1979	44.70	24.80	31.63	32.55		
Mar-1980	45.70	26.00	32.34	34.12		
Jun-1980	47.00	26.60	33.26	34.91	10.8%	13.7%
Sep-1980	47.80	27.40	33.83	35.96	10.1%	14.6%
Dec-1980	48.80	28.30	34.54	37.14	9.2%	14.1%
Mar-1981	50.00	29.00	35.39	38.06	9.4%	11.5%
Jun-1981	51.10	29.60	36.16	38.85	8.7%	11.3%
Sep-1981	52.10	30.50	36.87	40.03	9.0%	11.3%
Dec-1981	54.30	31.60	38.43	41.47	11.3%	11.7%
Mar-1982	55.30	32.80	39.14	43.04	10.6%	13.1%
Jun-1982	56.60	34.10	40.06	44.75	10.8%	15.2%
Sep-1982	58.60	35.70	41.47	46.85	12.5%	17.0%
Dec-1982	60.30	36.60	42.68	48.03	11.0%	15.8%
Mar-1983	61.60	37.10	43.60	48.69	11.4%	13.1%
Jun-1983	62.90	36.90	44.52	48.43	11.1%	8.2%
Sep-1983	64.00	37.70	45.29	49.48	9.2%	5.6%
Dec-1983	65.50	38.70	46.36	50.79	8.6%	5.7%
Mar-1984	65.20	39.20	46.14	51.44	5.8%	5.7%
Jun-1984	65.40	39.30	46.28	51.57	4.0%	6.5%
Sep-1984	66.20	39.90	46.85	52.36	3.4%	5.8%
Dec-1984	67.20	40.60	47.56	53.28	2.6%	4.9%
Mar-1985	68.10	41.10	48.20	53.94	4.4%	4.8%
Jun-1985	69.70	42.00	49.33	55.12	6.6%	6.9%
Sep-1985	71.30	43.20	50.46	56.69	7.7%	8.3%
Dec-1985	72.70	44.30	51.45	58.14	8.2%	9.1%
Mar-1986	74.40	44.90	52.65	58.92	9.3%	9.2%
Jun-1986	75.60	45.30	53.50	59.45	8.5%	7.9%
Sep-1986	77.60	45.80	54.92	60.10	8.8%	6.0%
Dec-1986	79.80	46.30	56.48	60.76	9.8%	4.5%
Mar-1987	81.40	46.90	57.61	61.55	9.4%	4.5%
Jun-1987	82.60	47.80	58.46	62.73	9.3%	5.5%
Sep-1987	84.00	48.00	59.45	62.99	8.2%	4.8%
Dec-1987	85.50	49.00	60.51	64.30	7.1%	5.8%
Mar-1988	87.00	49.70	61.57	65.22	6.9%	6.0%
Jun-1988	88.50	50.60	62.63	66.40	7.1%	5.9%
Sep-1988	90.20	51.30	63.84	67.32	7.4%	6.9%
Dec-1988	92.00	52.10	65.11	68.37	7.6%	6.3%
Mar-1989	92.90	53.10	65.75	69.69	6.8%	6.8%
Jun-1989	95.20	53.70	67.37	70.47	7.6%	6.1%
Sep-1989	97.40	54.30	68.93	71.26	8.0%	5.8%
Dec-1989	99.20	55.20	70.21	72.44	7.8%	6.0%
Mar-1990	100.90	56.00	71.41	73.49	8.6%	5.5%
Jun-1990	102.50	57.00	72.54	74.80	7.7%	6.1%
Sep-1990	103.30	57.70	73.11	75.72	6.1%	6.3%
Dec-1990	106.00	58.50	75.02	76.77	6.9%	6.0%
Mar-1991	105.80	58.90	74.88	77.30	4.9%	5.2%
Jun-1991	106.00	59.20	75.02	77.69	3.4%	3.9%
Sep-1991	106.60	60.30	75.44	79.13	3.2%	4.5%
Dec-1991	107.60	60.50	76.15	79.40	1.5%	3.4%
Mar-1992	107.60	60.50	76.15	79.40	1.7%	2.7%
Jun-1992	107.30	60.60	75.94	79.53	1.2%	2.4%
Sep-1992	107.40	60.60	76.01	79.53	0.8%	0.5%
Dec-1992	107.90	60.70	76.36	79.66	0.3%	0.3%
Mar-1993	108.90	60.90	77.07	79.92	1.2%	0.7%
Jun-1993	109.30	60.90	77.35	79.92	1.9%	0.5%
Sep-1993	109.80	61.10	77.71	80.18	2.2%	0.8%
Dec-1993	110.00	60.90	77.85	79.92	1.9%	0.3%

Date	Consumer prices	Infrastructure construction costs index (ABS Quarterly National Accounts)	Consumer prices	Infrastructure construction costs index (ABS Quarterly National Accounts)	Consumer prices	Infrastructure construction costs index (ABS Quarterly National Accounts)
	Index	Index	Normalised index (Jun-2003 = 100)	Normalised index (Jun-2003 = 100)	Year end % change	Year end % change
Mar-1994	110.40	61.30	78.13	80.45	1.4%	0.7%
Jun-1994	111.20	61.30	78.70	80.45	1.7%	0.7%
Sep-1994	111.90	61.20	79.19	80.31	1.9%	0.2%
Dec-1994	112.80	61.90	79.83	81.23	2.5%	1.6%
Mar-1995	114.70	62.60	81.17	82.15	3.9%	2.1%
Jun-1995	116.20	63.10	82.24	82.81	4.5%	2.9%
Sep-1995	117.60	63.90	83.23	83.86	5.1%	4.4%
Dec-1995	118.50	63.90	83.86	83.86	5.1%	3.2%
Mar-1996	119.00	63.90	84.22	83.86	3.7%	2.1%
Jun-1996	119.80	63.70	84.78	83.60	3.1%	1.0%
Sep-1996	120.10	63.40	85.00	83.20	2.1%	-0.8%
Dec-1996	120.30	63.30	85.14	83.07	1.5%	-0.9%
Mar-1997	120.50	63.40	85.28	83.20	1.3%	-0.8%
Jun-1997	120.20	63.60	85.07	83.46	0.3%	-0.2%
Sep-1997	119.70	64.30	84.71	84.38	-0.3%	1.4%
Dec-1997	120.00	64.80	84.93	85.04	-0.2%	2.4%
Mar-1998	120.30	65.20	85.14	85.56	-0.2%	2.8%
Jun-1998	121.00	65.10	85.63	85.43	0.7%	2.4%
Sep-1998	121.30	65.10	85.85	85.43	1.3%	1.2%
Dec-1998	121.90	64.90	86.27	85.17	1.6%	0.2%
Mar-1999	121.80	65.10	86.20	85.43	1.2%	-0.2%
Jun-1999	122.30	65.20	86.55	85.56	1.1%	0.2%
Sep-1999	123.40	67.10	87.33	88.06	1.7%	3.1%
Dec-1999	124.10	67.70	87.83	88.85	1.8%	4.3%
Mar-2000	125.20	68.30	88.61	89.63	2.8%	4.9%
Jun-2000	126.20	69.40	89.31	91.08	3.2%	6.4%
Sep-2000	130.90	69.80	92.64	91.60	6.1%	4.0%
Dec-2000	131.30	70.50	92.92	92.52	5.8%	4.1%
Mar-2001	132.70	71.40	93.91	93.70	6.0%	4.5%
Jun-2001	133.80	71.80	94.69	94.23	6.0%	3.5%
Sep-2001	134.20	72.70	94.98	95.41	2.5%	4.2%
Dec-2001	135.40	73.00	95.82	95.80	3.1%	3.5%
Mar-2002	136.60	73.40	96.67	96.33	2.9%	2.8%
Jun-2002	137.60	74.00	97.38	97.11	2.8%	3.1%
Sep-2002	138.50	74.40	98.02	97.64	3.2%	2.3%
Dec-2002	139.50	74.80	98.73	98.16	3.0%	2.5%
Mar-2003	141.30	75.10	100.00	98.56	3.4%	2.3%
Jun-2003	141.30	76.20	**100.00**	**100.00**	2.7%	3.0%
Sep-2003	142.10	77.20	100.57	101.31	2.6%	3.8%
Dec-2003	142.80	78.00	101.06	102.36	2.4%	4.3%
Mar-2004	144.10	78.70	101.98	103.28	2.0%	4.8%
Jun-2004	144.80	80.40	102.48	105.51	2.5%	5.5%
Sep-2004	145.40	81.20	102.90	106.56	2.3%	5.2%
Dec-2004	146.50	82.10	103.68	107.74	2.6%	5.3%
Mar-2005	147.50	83.00	104.39	108.92	2.4%	5.5%
Jun-2005	148.40	84.10	105.02	110.37	2.5%	4.6%
Sep-2005	149.80	85.70	106.02	112.47	3.0%	5.5%
Dec-2005	150.60	86.70	106.58	113.78	2.8%	5.6%
Mar-2006	151.90	87.70	107.50	115.09	3.0%	5.7%
Jun-2006	154.30	90.10	109.20	118.24	4.0%	7.1%
Sep-2006	155.70	92.20	110.19	121.00	3.9%	7.6%
Dec-2006	155.50	93.30	110.05	122.44	3.3%	7.6%
Mar-2007	155.60	93.70	110.12	122.97	2.4%	6.8%
Jun-2007	157.50	94.90	111.46	124.54	2.1%	5.3%
Sep-2007	158.60	97.40	112.24	127.82	1.9%	5.6%
Dec-2007	160.10	99.00	113.31	129.92	3.0%	6.1%
Mar-2008	162.20	101.10	114.79	132.68	4.2%	7.9%
Jun-2008	164.60	103.00	116.49	135.17	4.5%	8.5%
Sep-2008	166.50	105.10	117.83	137.93	5.0%	7.9%
Dec-2008	166.00	103.00	117.48	135.17	3.7%	4.0%
Mar-2009	166.20	101.50	117.62	133.20	2.5%	0.4%
Jun-2009	167.00	97.70	118.19	128.22	1.5%	-5.1%
Sep-2009	168.60	98.20	119.32	128.87	1.3%	-6.6%
Dec-2009	169.50	97.20	119.96	127.56	2.1%	-5.6%
Mar-2010	171.00	98.20	121.02	128.87	2.9%	-3.3%
Jun-2010	172.10	98.90	121.80	129.79	3.1%	1.2%

Data for **Figure 2: Australian cost and price indexes and growth – detailed series comparison**

Date	Consumer prices Index	Infrastructure construction costs index (ABS Quarterly National Accounts) Index	Infrastructure construction costs index (ABS Annual National Accounts) Index	Infrastructure construction costs index (ABS Engineering Construction Survey) Index	Consumer prices Normalised index (Jun-2003 = 100)	Infrastructure construction costs index (ABS Quarterly National Accounts) Normalised index (Jun-2003 = 100)
Jun-1979	42.40	23.40	0.21		30.01	30.71
Sep-1979	43.40	23.90			30.71	31.36
Dec-1979	44.70	24.80			31.63	32.55
Mar-1980	45.70	26.00			32.34	34.12
Jun-1980	47.00	26.60	0.24		33.26	34.91
Sep-1980	47.80	27.40			33.83	35.96
Dec-1980	48.80	28.30			34.54	37.14
Mar-1981	50.00	29.00			35.39	38.06
Jun-1981	51.10	29.60	0.27		36.16	38.85
Sep-1981	52.10	30.50			36.87	40.03
Dec-1981	54.30	31.60			38.43	41.47
Mar-1982	55.30	32.80			39.14	43.04
Jun-1982	56.60	34.10	0.30		40.06	44.75
Sep-1982	58.60	35.70			41.47	46.85
Dec-1982	60.30	36.60			42.68	48.03
Mar-1983	61.60	37.10			43.60	48.69
Jun-1983	62.90	36.90	0.35		44.52	48.43
Sep-1983	64.00	37.70			45.29	49.48
Dec-1983	65.50	38.70			46.36	50.79
Mar-1984	65.20	39.20			46.14	51.44
Jun-1984	65.40	39.30	0.37		46.28	51.57
Sep-1984	66.20	39.90			46.85	52.36
Dec-1984	67.20	40.60			47.56	53.28
Mar-1985	68.10	41.10			48.20	53.94
Jun-1985	69.70	42.00	0.39		49.33	55.12
Sep-1985	71.30	43.20			50.46	56.69
Dec-1985	72.70	44.30			51.45	58.14
Mar-1986	74.40	44.90			52.65	58.92
Jun-1986	75.60	45.30	0.42		53.50	59.45
Sep-1986	77.60	45.80		0.47	54.92	60.10
Dec-1986	79.80	46.30		0.47	56.48	60.76
Mar-1987	81.40	46.90		0.48	57.61	61.55
Jun-1987	82.60	47.80	0.46	0.49	58.46	62.73
Sep-1987	84.00	48.00		0.49	59.45	62.99
Dec-1987	85.50	49.00		0.50	60.51	64.30
Mar-1988	87.00	49.70		0.51	61.57	65.22
Jun-1988	88.50	50.60	0.49	0.52	62.63	66.40
Sep-1988	90.20	51.30		0.53	63.84	67.32
Dec-1988	92.00	52.10		0.54	65.11	68.37
Mar-1989	92.90	53.10		0.54	65.75	69.69
Jun-1989	95.20	53.70	0.52	0.55	67.37	70.47
Sep-1989	97.40	54.30		0.56	68.93	71.26
Dec-1989	99.20	55.20		0.57	70.21	72.44
Mar-1990	100.90	56.00		0.58	71.41	73.49
Jun-1990	102.50	57.00	0.56	0.58	72.54	74.80
Sep-1990	103.30	57.70		0.59	73.11	75.72
Dec-1990	106.00	58.50		0.60	75.02	76.77
Mar-1991	105.80	58.90		0.60	74.88	77.30
Jun-1991	106.00	59.20	0.58	0.61	75.02	77.69
Sep-1991	106.60	60.30		0.61	75.44	79.13
Dec-1991	107.60	60.50		0.62	76.15	79.40
Mar-1992	107.60	60.50		0.62	76.15	79.40
Jun-1992	107.30	60.60	0.56	0.62	75.94	79.53
Sep-1992	107.40	60.60		0.62	76.01	79.53
Dec-1992	107.90	60.70		0.62	76.36	79.66
Mar-1993	108.90	60.90		0.62	77.07	79.92
Jun-1993	109.30	60.90	0.55	0.62	77.35	79.92
Sep-1993	109.80	61.10		0.62	77.71	80.18
Dec-1993	110.00	60.90		0.62	77.85	79.92

Date	Consumer prices Index	Infrastructure construction costs index (ABS Quarterly National Accounts) Index	Infrastructure construction costs index (ABS Annual National Accounts) Index	Infrastructure construction costs index (ABS Engineering Construction Survey) Index	Consumer prices Normalised index (Jun-2003 = 100)	Infrastructure construction costs index (ABS Quarterly National Accounts) Normalised index (Jun-2003 = 100)
Mar-1994	110.40	61.30		0.62	78.13	80.45
Jun-1994	111.20	61.30	0.55	0.62	78.70	80.45
Sep-1994	111.90	61.20		0.62	79.19	80.31
Dec-1994	112.80	61.90		0.63	79.83	81.23
Mar-1995	114.70	62.60		0.64	81.17	82.15
Jun-1995	116.20	63.10	0.57	0.64	82.24	82.81
Sep-1995	117.60	63.90		0.65	83.23	83.86
Dec-1995	118.50	63.90		0.65	83.86	83.86
Mar-1996	119.00	63.90		0.65	84.22	83.86
Jun-1996	119.80	63.70	0.59	0.65	84.78	83.60
Sep-1996	120.10	63.40		0.65	85.00	83.20
Dec-1996	120.30	63.30		0.65	85.14	83.07
Mar-1997	120.50	63.40		0.65	85.28	83.20
Jun-1997	120.20	63.60	0.60	0.66	85.07	83.46
Sep-1997	119.70	64.30		0.66	84.71	84.38
Dec-1997	120.00	64.80		0.66	84.93	85.04
Mar-1998	120.30	65.20		0.66	85.14	85.56
Jun-1998	121.00	65.10	0.61	0.66	85.63	85.43
Sep-1998	121.30	65.10		0.66	85.85	85.43
Dec-1998	121.90	64.90		0.66	86.27	85.17
Mar-1999	121.80	65.10		0.67	86.20	85.43
Jun-1999	122.30	65.20	0.63	0.67	86.55	85.56
Sep-1999	123.40	67.10		0.68	87.33	88.06
Dec-1999	124.10	67.70		0.69	87.83	88.85
Mar-2000	125.20	68.30		0.69	88.61	89.63
Jun-2000	126.20	69.40	0.66	0.70	89.31	91.08
Sep-2000	130.90	69.80		0.70	92.64	91.60
Dec-2000	131.30	70.50		0.71	92.92	92.52
Mar-2001	132.70	71.40		0.72	93.91	93.70
Jun-2001	133.80	71.80	0.68	0.72	94.69	94.23
Sep-2001	134.20	72.70		0.72	94.98	95.41
Dec-2001	135.40	73.00		0.72	95.82	95.80
Mar-2002	136.60	73.40		0.72	96.67	96.33
Jun-2002	137.60	74.00	0.69	0.73	97.38	97.11
Sep-2002	138.50	74.40		0.74	98.02	97.64
Dec-2002	139.50	74.80		0.74	98.73	98.16
Mar-2003	141.30	75.10		0.75	100.00	98.56
Jun-2003	141.30	76.20	0.71	0.75	**100.00**	**100.00**
Sep-2003	142.10	77.20		0.76	100.57	101.31
Dec-2003	142.80	78.00		0.76	101.06	102.36
Mar-2004	144.10	78.70		0.77	101.98	103.28
Jun-2004	144.80	80.40	0.76	0.78	102.48	105.51
Sep-2004	145.40	81.20		0.79	102.90	106.56
Dec-2004	146.50	82.10		0.80	103.68	107.74
Mar-2005	147.50	83.00		0.81	104.39	108.92
Jun-2005	148.40	84.10	0.82	0.82	105.02	110.37
Sep-2005	149.80	85.70		0.83	106.02	112.47
Dec-2005	150.60	86.70		0.84	106.58	113.78
Mar-2006	151.90	87.70		0.85	107.50	115.09
Jun-2006	154.30	90.10	0.87	0.88	109.20	118.24
Sep-2006	155.70	92.20		0.92	110.19	121.00
Dec-2006	155.50	93.30		0.94	110.05	122.44
Mar-2007	155.60	93.70		0.96	110.12	122.97
Jun-2007	157.50	94.90	0.93	0.96	111.46	124.54
Sep-2007	158.60	97.40		0.98	112.24	127.82
Dec-2007	160.10	99.00		0.98	113.31	129.92
Mar-2008	162.20	101.10		1.01	114.79	132.68
Jun-2008	164.60	103.00	1.00	1.03	116.49	135.17
Sep-2008	166.50	105.10		1.05	117.83	137.93
Dec-2008	166.00	103.00		1.02	117.48	135.17
Mar-2009	166.20	101.50		1.00	117.62	133.20
Jun-2009	167.00	97.70	1.02	0.96	118.19	128.22
Sep-2009	168.60	98.20		0.95	119.32	128.87
Dec-2009	169.50	97.20		0.95	119.96	127.56
Mar-2010	171.00	98.20		0.95	121.02	128.87
Jun-2010	172.10	98.90			121.80	129.79

Date	Infrastructure construction costs index (ABS Annual National Accounts) Normalised index (Jun-2003 = 100)	Infrastructure construction costs index (ABS Engineering Construction Survey) Normalised index (Jun-2003 = 100)	Consumer prices Year end % change	Infrastructure construction costs index (ABS Quarterly National Accounts) Year end % change	Infrastructure construction costs index (ABS Annual National Accounts) Year end % change	Infrastructure construction costs index (ABS Engineering Construction Survey) Year end % change
Jun-1979	29.64					
Sep-1979						
Dec-1979						
Mar-1980						
Jun-1980	33.30		10.8%	13.7%	12.3%	
Sep-1980			10.1%	14.6%		
Dec-1980			9.2%	14.1%		
Mar-1981			9.4%	11.5%		
Jun-1981	37.54		8.7%	11.3%	12.7%	
Sep-1981			9.0%	11.3%		
Dec-1981			11.3%	11.7%		
Mar-1982			10.6%	13.1%		
Jun-1982	42.48		10.8%	15.2%	13.2%	
Sep-1982			12.5%	17.0%		
Dec-1982			11.0%	15.8%		
Mar-1983			11.4%	13.1%		
Jun-1983	48.50		11.1%	8.2%	14.2%	
Sep-1983			9.2%	5.6%		
Dec-1983			8.6%	5.7%		
Mar-1984			5.8%	5.7%		
Jun-1984	51.29		4.0%	6.5%	5.8%	
Sep-1984			3.4%	5.8%		
Dec-1984			2.6%	4.9%		
Mar-1985			4.4%	4.8%		
Jun-1985	54.12		6.6%	6.9%	5.5%	
Sep-1985			7.7%	8.3%		
Dec-1985			8.2%	9.1%		
Mar-1986			9.3%	9.2%		
Jun-1986	59.46		8.5%	7.9%	9.9%	
Sep-1986		62.32	8.8%	6.0%		
Dec-1986		63.15	9.8%	4.5%		
Mar-1987		63.81	9.4%	4.5%		
Jun-1987	64.13	64.86	9.3%	5.5%	7.9%	
Sep-1987		65.33	8.2%	4.8%		4.8%
Dec-1987		66.56	7.1%	5.8%		5.4%
Mar-1988		67.80	6.9%	6.0%		6.3%
Jun-1988	68.51	69.05	7.1%	5.9%	6.8%	6.5%
Sep-1988		69.88	7.4%	6.9%		7.0%
Dec-1988		71.26	7.6%	6.3%		7.1%
Mar-1989		72.39	6.8%	6.8%		6.8%
Jun-1989	73.51	73.61	7.6%	6.1%	7.3%	6.6%
Sep-1989		74.54	8.0%	5.8%		6.7%
Dec-1989		75.73	7.8%	6.0%		6.3%
Mar-1990		76.64	8.6%	5.5%		5.9%
Jun-1990	78.55	77.78	7.7%	6.1%	6.9%	5.7%
Sep-1990		78.81	6.1%	6.3%		5.7%
Dec-1990		79.81	6.9%	6.0%		5.4%
Mar-1991		80.36	4.9%	5.2%		4.8%
Jun-1991	80.69	80.68	3.4%	3.9%	2.7%	3.7%
Sep-1991		81.63	3.2%	4.5%		3.6%
Dec-1991		82.10	1.5%	3.4%		2.9%
Mar-1992		82.28	1.7%	2.7%		2.4%
Jun-1992	78.34	82.39	1.2%	2.4%	-2.9%	2.1%
Sep-1992		82.61	0.8%	0.5%		1.2%
Dec-1992		82.73	0.3%	0.3%		0.8%
Mar-1993		82.91	1.2%	0.7%		0.8%
Jun-1993	77.11	82.89	1.9%	0.5%	-1.6%	0.6%
Sep-1993		82.74	2.2%	0.8%		0.2%
Dec-1993		82.49	1.9%	0.3%		-0.3%

Date	Infrastructure construction costs index (ABS Annual National Accounts) Normalised index (Jun-2003 = 100)	Infrastructure construction costs index (ABS Engineering Construction Survey) Normalised index (Jun-2003 = 100)	Consumer prices Year end % change	Infrastructure construction costs index (ABS Quarterly National Accounts) Year end % change	Infrastructure construction costs index (ABS Annual National Accounts) Year end % change	Infrastructure construction costs index (ABS Engineering Construction Survey) Year end % change
Mar-1994		82.73	1.4%	0.7%		-0.2%
Jun-1994	77.53	82.90	1.7%	0.7%	0.5%	0.0%
Sep-1994		83.05	1.9%	0.2%		0.4%
Dec-1994		83.86	2.5%	1.6%		1.7%
Mar-1995		84.64	3.9%	2.1%		2.3%
Jun-1995	80.07	85.11	4.5%	2.9%	3.3%	2.7%
Sep-1995		85.90	5.1%	4.4%		3.4%
Dec-1995		85.90	5.1%	3.2%		2.4%
Mar-1996		86.17	3.7%	2.1%		1.8%
Jun-1996	82.51	86.65	3.1%	1.0%	3.1%	1.8%
Sep-1996		86.48	2.1%	-0.8%		0.7%
Dec-1996		86.73	1.5%	-0.9%		1.0%
Mar-1997		87.01	1.3%	-0.8%		1.0%
Jun-1997	83.43	87.25	0.3%	-0.2%	1.1%	0.7%
Sep-1997		87.48	-0.3%	1.4%		1.1%
Dec-1997		87.64	-0.2%	2.4%		1.0%
Mar-1998		87.95	-0.2%	2.8%		1.1%
Jun-1998	85.84	87.97	0.7%	2.4%	2.9%	0.8%
Sep-1998		88.40	1.3%	1.2%		1.1%
Dec-1998		88.39	1.6%	0.2%		0.9%
Mar-1999		88.85	1.2%	-0.2%		1.0%
Jun-1999	88.52	88.69	1.1%	0.2%	3.1%	0.8%
Sep-1999		90.71	1.7%	3.1%		2.6%
Dec-1999		91.26	1.8%	4.3%		3.3%
Mar-2000		91.73	2.8%	4.9%		3.2%
Jun-2000	92.41	92.96	3.2%	6.4%	4.4%	4.8%
Sep-2000		93.62	6.1%	4.0%		3.2%
Dec-2000		94.44	5.8%	4.1%		3.5%
Mar-2001		95.27	6.0%	4.5%		3.9%
Jun-2001	94.99	95.50	6.0%	3.5%	2.8%	2.7%
Sep-2001		95.77	2.5%	4.2%		2.3%
Dec-2001		95.99	3.1%	3.5%		1.6%
Mar-2002		96.37	2.9%	2.8%		1.2%
Jun-2002	97.30	97.03	2.8%	3.1%	2.4%	1.6%
Sep-2002		97.92	3.2%	2.3%		2.2%
Dec-2002		98.67	3.0%	2.5%		2.8%
Mar-2003		99.17	3.4%	2.3%		2.9%
Jun-2003	**100.00**	**100.00**	2.7%	3.0%	2.8%	3.1%
Sep-2003		100.59	2.6%	3.8%		2.7%
Dec-2003		101.27	2.4%	4.3%		2.6%
Mar-2004		102.13	2.0%	4.8%		3.0%
Jun-2004	106.77	103.98	2.5%	5.5%	6.8%	4.0%
Sep-2004		105.18	2.3%	5.2%		4.6%
Dec-2004		106.42	2.6%	5.3%		5.1%
Mar-2005		108.01	2.4%	5.5%		5.8%
Jun-2005	114.75	109.52	2.5%	4.6%	7.5%	5.3%
Sep-2005		110.64	3.0%	5.5%		5.2%
Dec-2005		111.82	2.8%	5.6%		5.1%
Mar-2006		113.19	3.0%	5.7%		4.8%
Jun-2006	121.84	117.48	4.0%	7.1%	6.2%	7.3%
Sep-2006		122.74	3.9%	7.6%		10.9%
Dec-2006		124.45	3.3%	7.6%		11.3%
Mar-2007		127.18	2.4%	6.8%		12.4%
Jun-2007	130.30	128.08	2.1%	5.3%	6.9%	9.0%
Sep-2007		129.96	1.9%	5.6%		5.9%
Dec-2007		130.94	3.0%	6.1%		5.2%
Mar-2008		133.70	4.2%	7.9%		5.1%
Jun-2008	140.14	136.89	4.5%	8.5%	7.6%	6.9%
Sep-2008		140.25	5.0%	7.9%		7.9%
Dec-2008		136.33	3.7%	4.0%		4.1%
Mar-2009		133.67	2.5%	0.4%		0.0%
Jun-2009	142.61	127.59	1.5%	-5.1%	1.8%	-6.8%
Sep-2009		126.03	1.3%	-6.6%		-10.1%
Dec-2009		126.14	2.1%	-5.6%		-7.5%
Mar-2010		126.87	2.9%	-3.3%		-5.1%
Jun-2010			3.1%	1.2%		

Data for **Figure 3: Australian cost and price indexes and growth – sub-sector comparison**

Date	Transport infrastructure construction costs Index	PPI Road/bridge infrastructure construction costs Index	Telecommunications infrastructure construction costs Index	Eletricity, water and gas infrastructure construction costs Index	Consumer prices Index
Jun-1979	0.19		0.27	0.20	42.40
Sep-1979					43.40
Dec-1979					44.70
Mar-1980					45.70
Jun-1980	0.22		0.30	0.23	47.00
Sep-1980					47.80
Dec-1980					48.80
Mar-1981					50.00
Jun-1981	0.25		0.34	0.26	51.10
Sep-1981					52.10
Dec-1981					54.30
Mar-1982					55.30
Jun-1982	0.28		0.38	0.29	56.60
Sep-1982					58.60
Dec-1982					60.30
Mar-1983					61.60
Jun-1983	0.32		0.44	0.33	62.90
Sep-1983					64.00
Dec-1983					65.50
Mar-1984					65.20
Jun-1984	0.35		0.46	0.35	65.40
Sep-1984					66.20
Dec-1984					67.20
Mar-1985					68.10
Jun-1985	0.36		0.49	0.37	69.70
Sep-1985					71.30
Dec-1985					72.70
Mar-1986					74.40
Jun-1986	0.39		0.55	0.40	75.60
Sep-1986					77.60
Dec-1986					79.80
Mar-1987					81.40
Jun-1987	0.42		0.60	0.43	82.60
Sep-1987					84.00
Dec-1987					85.50
Mar-1988					87.00
Jun-1988	0.45		0.63	0.47	88.50
Sep-1988					90.20
Dec-1988					92.00
Mar-1989					92.90
Jun-1989	0.48		0.67	0.50	95.20
Sep-1989					97.40
Dec-1989					99.20
Mar-1990					100.90
Jun-1990	0.51		0.71	0.54	102.50
Sep-1990					103.30
Dec-1990					106.00
Mar-1991					105.80
Jun-1991	0.53		0.73	0.56	106.00
Sep-1991					106.60
Dec-1991					107.60
Mar-1992					107.60
Jun-1992	0.53		0.71	0.57	107.30
Sep-1992					107.40
Dec-1992					107.90
Mar-1993					108.90
Jun-1993	0.53		0.72	0.57	109.30
Sep-1993					109.80
Dec-1993					110.00

Date	Transport infrastructure construction costs Index	PPI Road/bridge infrastructure construction costs Index	Telecommunications infrastructure construction costs Index	Eletricity, water and gas infrastructure construction costs Index	Consumer prices Index
Mar-1994					110.40
Jun-1994	0.53		0.72	0.56	111.20
Sep-1994					111.90
Dec-1994					112.80
Mar-1995					114.70
Jun-1995	0.54		0.74	0.57	116.20
Sep-1995					117.60
Dec-1995					118.50
Mar-1996					119.00
Jun-1996	0.56		0.76	0.59	119.80
Sep-1996					120.10
Dec-1996					120.30
Mar-1997					120.50
Jun-1997	0.57		0.76	0.59	120.20
Sep-1997		98.30			119.70
Dec-1997		98.60			120.00
Mar-1998		98.80			120.30
Jun-1998	0.58	99.00	0.76	0.61	121.00
Sep-1998		99.60			121.30
Dec-1998		99.80			121.90
Mar-1999		99.90			121.80
Jun-1999	0.61	100.70	0.75	0.62	122.30
Sep-1999		101.80			123.40
Dec-1999		103.10			124.10
Mar-2000		104.40			125.20
Jun-2000	0.64	105.50	0.77	0.65	126.20
Sep-2000		107.10			130.90
Dec-2000		107.80			131.30
Mar-2001		108.30			132.70
Jun-2001	0.66	108.20	0.79	0.67	133.80
Sep-2001		109.10			134.20
Dec-2001		107.90			135.40
Mar-2002		109.50			136.60
Jun-2002	0.67	112.10	0.80	0.69	137.60
Sep-2002		113.60			138.50
Dec-2002		115.30			139.50
Mar-2003		116.80			141.30
Jun-2003	0.70	118.40	0.80	0.70	141.30
Sep-2003		119.30			142.10
Dec-2003		120.30			142.80
Mar-2004		121.10			144.10
Jun-2004	0.74	122.30	0.83	0.74	144.80
Sep-2004		123.70			145.40
Dec-2004		125.20			146.50
Mar-2005		126.40			147.50
Jun-2005	0.80	127.80	0.86	0.79	148.40
Sep-2005		130.20			149.80
Dec-2005		132.30			150.60
Mar-2006		133.90			151.90
Jun-2006	0.85	136.50	0.88	0.85	154.30
Sep-2006		138.60			155.70
Dec-2006		139.50			155.50
Mar-2007		140.20			155.60
Jun-2007	0.92	141.30	0.93	0.94	157.50
Sep-2007		143.70			158.60
Dec-2007		146.20			160.10
Mar-2008		148.60			162.20
Jun-2008	1.00	151.60	1.00	1.00	164.60
Sep-2008		156.40			166.50
Dec-2008		158.20			166.00
Mar-2009		156.80			166.20
Jun-2009	1.02	156.40	1.02	0.98	167.00
Sep-2009		157.60			168.60
Dec-2009		158.80			169.50
Mar-2010		159.40			171.00
Jun-2010		160.50			172.10

Date	Transport infrastructure construction costs Normalised index (Jun-2003 = 100)	PPI Road/bridge infrastructure construction costs Normalised index (Jun-2003 = 100)	Telecommunications infrastructure construction costs Normalised index (Jun-2003 = 100)	Eletricity, water and gas infrastructure construction costs Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)
Jun-1979	27.39		34.07	29.13	30.01
Sep-1979					30.71
Dec-1979					31.63
Mar-1980					32.34
Jun-1980	31.28		37.65	33.06	33.26
Sep-1980					33.83
Dec-1980					34.54
Mar-1981					35.39
Jun-1981	35.67		42.33	37.10	36.16
Sep-1981					36.87
Dec-1981					38.43
Mar-1982					39.14
Jun-1982	40.55		47.77	41.97	40.06
Sep-1982					41.47
Dec-1982					42.68
Mar-1983					43.60
Jun-1983	46.33		54.26	47.37	44.52
Sep-1983					45.29
Dec-1983					46.36
Mar-1984					46.14
Jun-1984	49.71		57.80	50.12	46.28
Sep-1984					46.85
Dec-1984					47.56
Mar-1985					48.20
Jun-1985	51.57		61.43	52.88	49.33
Sep-1985					50.46
Dec-1985					51.45
Mar-1986					52.65
Jun-1986	56.08		68.60	57.08	53.50
Sep-1986					54.92
Dec-1986					56.48
Mar-1987					57.61
Jun-1987	60.28		74.06	61.74	58.46
Sep-1987					59.45
Dec-1987					60.51
Mar-1988					61.57
Jun-1988	64.12		78.38	66.42	62.63
Sep-1988					63.84
Dec-1988					65.11
Mar-1989					65.75
Jun-1989	68.59		83.74	71.86	67.37
Sep-1989					68.93
Dec-1989					70.21
Mar-1990					71.41
Jun-1990	73.25		88.78	76.93	72.54
Sep-1990					73.11
Dec-1990					75.02
Mar-1991					74.88
Jun-1991	76.02		91.08	80.20	75.02
Sep-1991					75.44
Dec-1991					76.15
Mar-1992					76.15
Jun-1992	75.87		88.85	80.67	75.94
Sep-1992					76.01
Dec-1992					76.36
Mar-1993					77.07
Jun-1993	75.48		89.41	80.52	77.35
Sep-1993					77.71
Dec-1993					77.85

Date	Transport infrastructure construction costs Normalised index (Jun-2003 = 100)	PPI Road/bridge infrastructure construction costs Normalised index (Jun-2003 = 100)	Telecommunications infrastructure construction costs Normalised index (Jun-2003 = 100)	Eletricity, water and gas infrastructure construction costs Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)
Mar-1994					78.13
Jun-1994	75.71		90.07	79.64	78.70
Sep-1994					79.19
Dec-1994					79.83
Mar-1995					81.17
Jun-1995	77.86		91.84	81.32	82.24
Sep-1995					83.23
Dec-1995					83.86
Mar-1996					84.22
Jun-1996	80.21		94.01	83.51	84.78
Sep-1996					85.00
Dec-1996					85.14
Mar-1997					85.28
Jun-1997	81.50		94.24	84.17	85.07
Sep-1997		83.02			84.71
Dec-1997		83.28			84.93
Mar-1998		83.45			85.14
Jun-1998	83.48	83.61	95.14	86.41	85.63
Sep-1998		84.12			85.85
Dec-1998		84.29			86.27
Mar-1999		84.38			86.20
Jun-1999	87.56	85.05	93.68	88.87	86.55
Sep-1999		85.98			87.33
Dec-1999		87.08			87.83
Mar-2000		88.18			88.61
Jun-2000	91.83	89.10	95.41	92.91	89.31
Sep-2000		90.46			92.64
Dec-2000		91.05			92.92
Mar-2001		91.47			93.91
Jun-2001	94.28	91.39	98.12	95.84	94.69
Sep-2001		92.15			94.98
Dec-2001		91.13			95.82
Mar-2002		92.48			96.67
Jun-2002	96.74	94.68	99.76	97.70	97.38
Sep-2002		95.95			98.02
Dec-2002		97.38			98.73
Mar-2003		98.65			100.00
Jun-2003	100.00	100.00	100.00	100.00	100.00
Sep-2003		100.76			100.57
Dec-2003		101.60			101.06
Mar-2004		102.28			101.98
Jun-2004	106.29	103.29	103.01	104.95	102.48
Sep-2004		104.48			102.90
Dec-2004		105.74			103.68
Mar-2005		106.76			104.39
Jun-2005	114.42	107.94	107.41	113.21	105.02
Sep-2005		109.97			106.02
Dec-2005		111.74			106.58
Mar-2006		113.09			107.50
Jun-2006	122.54	115.29	109.63	120.82	109.20
Sep-2006		117.06			110.19
Dec-2006		117.82			110.05
Mar-2007		118.41			110.12
Jun-2007	131.46	119.34	116.30	133.97	111.46
Sep-2007		121.37			112.24
Dec-2007		123.48			113.31
Mar-2008		125.51			114.79
Jun-2008	143.35	128.04	124.42	142.51	116.49
Sep-2008		132.09			117.83
Dec-2008		133.61			117.48
Mar-2009		132.43			117.62
Jun-2009	146.57	132.09	127.01	140.00	118.19
Sep-2009		133.11			119.32
Dec-2009		134.12			119.96
Mar-2010		134.63			121.02
Jun-2010		135.56			121.80

Date	Transport infrastructure construction costs Year end % change	PPI Road/bridge infrastructure construction costs Year end % change	Telecommunications infrastructure construction costs Year end % change	Eletricity, water and gas infrastructure construction costs Year end % change	Consumer prices Year end % change
Jun-1979					
Sep-1979					
Dec-1979					
Mar-1980					
Jun-1980	14.19%		10.51%	13.49%	10.85%
Sep-1980					10.14%
Dec-1980					9.17%
Mar-1981					9.41%
Jun-1981	14.03%		12.42%	12.21%	8.72%
Sep-1981					9.00%
Dec-1981					11.27%
Mar-1982					10.60%
Jun-1982	13.69%		12.86%	13.11%	10.76%
Sep-1982					12.48%
Dec-1982					11.05%
Mar-1983					11.39%
Jun-1983	14.24%		13.59%	12.87%	11.13%
Sep-1983					9.22%
Dec-1983					8.62%
Mar-1984					5.84%
Jun-1984	7.30%		6.51%	5.80%	3.97%
Sep-1984					3.44%
Dec-1984					2.60%
Mar-1985					4.45%
Jun-1985	3.74%		6.29%	5.52%	6.57%
Sep-1985					7.70%
Dec-1985					8.18%
Mar-1986					9.25%
Jun-1986	8.75%		11.67%	7.94%	8.46%
Sep-1986					8.84%
Dec-1986					9.77%
Mar-1987					9.41%
Jun-1987	7.50%		7.96%	8.17%	9.26%
Sep-1987					8.25%
Dec-1987					7.14%
Mar-1988					6.88%
Jun-1988	6.36%		5.84%	7.57%	7.14%
Sep-1988					7.38%
Dec-1988					7.60%
Mar-1989					6.78%
Jun-1989	6.97%		6.83%	8.19%	7.57%
Sep-1989					7.98%
Dec-1989					7.83%
Mar-1990					8.61%
Jun-1990	6.80%		6.02%	7.06%	7.67%
Sep-1990					6.06%
Dec-1990					6.85%
Mar-1991					4.86%
Jun-1991	3.77%		2.58%	4.25%	3.41%
Sep-1991					3.19%
Dec-1991					1.51%
Mar-1992					1.70%
Jun-1992	-0.19%		-2.44%	0.59%	1.23%
Sep-1992					0.75%
Dec-1992					0.28%
Mar-1993					1.21%
Jun-1993	-0.51%		0.63%	-0.19%	1.86%
Sep-1993					2.23%
Dec-1993					1.95%

Date	Transport infrastructure construction costs Year end % change	PPI Road/bridge infrastructure construction costs Year end % change	Telecommunications infrastructure construction costs Year end % change	Eletricity, water and gas infrastructure construction costs Year end % change	Consumer prices Year end % change
Mar-1994					1.38%
Jun-1994	0.31%		0.74%	-1.10%	1.74%
Sep-1994					1.91%
Dec-1994					2.55%
Mar-1995					3.89%
Jun-1995	2.83%		1.97%	2.12%	4.50%
Sep-1995					5.09%
Dec-1995					5.05%
Mar-1996					3.75%
Jun-1996	3.03%		2.36%	2.70%	3.10%
Sep-1996					2.13%
Dec-1996					1.52%
Mar-1997					1.26%
Jun-1997	1.60%		0.25%	0.79%	0.33%
Sep-1997					-0.33%
Dec-1997					-0.25%
Mar-1998					-0.17%
Jun-1998	2.43%		0.95%	2.67%	0.67%
Sep-1998		1.32%			1.34%
Dec-1998		1.22%			1.58%
Mar-1999		1.11%			1.25%
Jun-1999	4.89%	1.72%	-1.53%	2.84%	1.07%
Sep-1999		2.21%			1.73%
Dec-1999		3.31%			1.80%
Mar-2000		4.50%			2.79%
Jun-2000	4.87%	4.77%	1.84%	4.55%	3.19%
Sep-2000		5.21%			6.08%
Dec-2000		4.56%			5.80%
Mar-2001		3.74%			5.99%
Jun-2001	2.67%	2.56%	2.85%	3.16%	6.02%
Sep-2001		1.87%			2.52%
Dec-2001		0.09%			3.12%
Mar-2002		1.11%			2.94%
Jun-2002	2.62%	3.60%	1.67%	1.94%	2.84%
Sep-2002		4.12%			3.20%
Dec-2002		6.86%			3.03%
Mar-2003		6.67%			3.44%
Jun-2003	3.37%	5.62%	0.24%	2.35%	2.69%
Sep-2003		5.02%			2.60%
Dec-2003		4.34%			2.37%
Mar-2004		3.68%			1.98%
Jun-2004	6.29%	3.29%	3.01%	4.95%	2.48%
Sep-2004		3.69%			2.32%
Dec-2004		4.07%			2.59%
Mar-2005		4.38%			2.36%
Jun-2005	7.65%	4.50%	4.27%	7.87%	2.49%
Sep-2005		5.25%			3.03%
Dec-2005		5.67%			2.80%
Mar-2006		5.93%			2.98%
Jun-2006	7.10%	6.81%	2.07%	6.72%	3.98%
Sep-2006		6.45%			3.94%
Dec-2006		5.44%			3.25%
Mar-2007		4.71%			2.44%
Jun-2007	7.28%	3.52%	6.08%	10.88%	2.07%
Sep-2007		3.68%			1.86%
Dec-2007		4.80%			2.96%
Mar-2008		5.99%			4.24%
Jun-2008	9.04%	7.29%	6.98%	6.37%	4.51%
Sep-2008		8.84%			4.98%
Dec-2008		8.21%			3.69%
Mar-2009		5.52%			2.47%
Jun-2009	2.25%	3.17%	2.08%	-1.76%	1.46%
Sep-2009		0.77%			1.26%
Dec-2009		0.38%			2.11%
Mar-2010		1.66%			2.89%
Jun-2010		2.62%			3.05%

Data for **Figure 4: UK cost and price indexes**

Date	New infrastructure output prices Index	Public civil engineering works Index	Consumer prices Index	New infrastructure output prices Normalised index (Jun-2003 = 100)	Public civil engineering works Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)
Jun-1979						
Sep-1979						
Dec-1979						
Mar-1980						
Jun-1980						
Sep-1980			61.50			41.81
Dec-1980			62.60			42.56
Mar-1981			64.30			43.71
Jun-1981			66.80			45.41
Sep-1981			68.00			46.23
Dec-1981			69.20			47.04
Mar-1982			70.50			47.93
Jun-1982			72.50			49.29
Sep-1982			72.80			49.49
Dec-1982			73.80			50.17
Mar-1983			74.50			50.65
Jun-1983			75.70			51.46
Sep-1983			76.50			52.01
Dec-1983			77.30			52.55
Mar-1984			77.80			52.89
Jun-1984			79.30			53.91
Sep-1984			79.50			54.04
Dec-1984			80.20			54.52
Mar-1985			81.30			55.27
Jun-1985			83.30			56.63
Sep-1985			83.50			56.76
Dec-1985			84.20			57.24
Mar-1986			84.70			57.58
Jun-1986			85.50			58.12
Sep-1986			85.70			58.26
Dec-1986			86.40			58.74
Mar-1987			87.30			59.35
Jun-1987			88.30			60.03
Sep-1987			88.50			60.16
Dec-1987			89.60			60.91
Mar-1988			90.20			61.32
Jun-1988			91.80			62.41
Sep-1988			92.60			62.95
Dec-1988			93.70			63.70
Mar-1989			94.90			64.51
Jun-1989			96.80			65.81
Sep-1989			97.50			66.28
Dec-1989			99.00			67.30
Mar-1990			100.30			68.18
Jun-1990			103.10			70.09
Sep-1990			104.70			71.18
Dec-1990			106.70			72.54
Mar-1991			107.40			73.01
Jun-1991			111.80			76.00
Sep-1991			113.00			76.82
Dec-1991			114.40			77.77
Mar-1992			115.10			78.25
Jun-1992			117.30			79.74
Sep-1992			117.10			79.61
Dec-1992			118.00			80.22
Mar-1993			118.40			80.49
Jun-1993			120.80			82.12
Sep-1993			121.10			82.32
Dec-1993			121.40			82.53

Date	New infrastructure output prices Index	Public civil engineering works Index	Consumer prices Index	New infrastructure output prices Normalised index (Jun-2003 = 100)	Public civil engineering works Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)
Mar-1994			121.80			82.80
Jun-1994			123.50			83.96
Sep-1994			123.40			83.89
Dec-1994			123.90			84.23
Mar-1995			125.10			85.04
Jun-1995			126.60			86.06
Sep-1995			127.00			86.34
Dec-1995			127.70			86.81
Mar-1996			128.50			87.36
Jun-1996			130.00			88.38
Sep-1996			130.30			88.58
Dec-1996			131.20			89.19
Mar-1997	131.60	131.60	131.60	86.22	86.01	89.46
Jun-1997	131.59	131.59	132.80	86.21	85.96	90.28
Sep-1997	132.04	132.04	133.50	86.51	86.58	90.75
Dec-1997	133.16	133.16	134.30	87.25	87.60	91.30
Mar-1998	133.82	133.82	134.50	87.68	88.05	91.43
Jun-1998	134.64	134.64	136.10	88.21	88.61	92.52
Sep-1998	135.81	135.81	136.10	88.98	89.46	92.52
Dec-1998	135.85	135.85	136.90	89.01	89.37	93.07
Mar-1999	134.97	134.97	137.10	88.43	88.62	93.20
Jun-1999	134.21	134.21	138.60	87.93	88.62	94.22
Sep-1999	134.84	134.84	138.40	88.35	88.62	94.09
Dec-1999	135.60	135.60	139.10	88.84	88.62	94.56
Mar-2000	136.87	136.87	139.10	89.68	89.43	94.56
Jun-2000	138.65	138.65	140.70	90.84	90.24	95.65
Sep-2000	140.67	140.67	140.50	92.17	91.87	95.51
Dec-2000	142.13	142.13	141.20	93.12	92.68	95.99
Mar-2001	143.51	143.51	140.90	94.02	94.22	95.79
Jun-2001	144.66	144.66	143.00	94.78	95.13	97.21
Sep-2001	146.37	146.37	142.90	95.90	96.16	97.14
Dec-2001	147.23	147.23	143.20	96.46	96.91	97.35
Mar-2002	148.21	148.21	143.40	97.11	97.55	97.48
Jun-2002	148.84	148.84	144.60	97.52	98.28	98.30
Sep-2002	150.74	150.74	144.50	98.76	99.30	98.23
Dec-2002	151.30	151.30	145.40	99.13	99.49	98.84
Mar-2003	151.37	151.37	146.00	99.17	100.00	99.25
Jun-2003	152.63	152.63	147.10	**100.00**	**100.00**	**100.00**
Sep-2003	148.84	148.84	147.10	97.52	100.00	100.00
Dec-2003	151.37	151.37	147.70	99.17	100.00	100.41
Mar-2004	151.37	151.37	147.90	99.17	100.00	100.54
Jun-2004	151.37	151.37	148.90	99.17	100.81	101.22
Sep-2004	152.63	152.63	148.60	100.00	101.63	101.02
Dec-2004	160.20	160.20	149.50	104.96	106.50	101.63
Mar-2005	166.50	166.50	149.70	109.09	110.57	101.77
Jun-2005	165.24	165.24	151.10	108.26	110.57	102.72
Sep-2005	170.29	170.29	151.40	111.57	113.82	102.92
Dec-2005	174.07	174.07	152.30	114.05	115.45	103.54
Mar-2006	179.12	179.12	152.50	117.36	117.89	103.67
Jun-2006	179.12	179.12	154.90	117.36	118.70	105.30
Sep-2006	187.95	187.95	156.00	123.14	123.58	106.05
Dec-2006	185.42	185.42	157.10	121.49	123.58	106.80
Mar-2007	194.21	194.21	157.70	127.25	128.72	107.21
Jun-2007	195.75	195.75	159.60	128.26	130.43	108.50
Sep-2007	189.50	189.50	159.20	124.16	126.63	108.23
Dec-2007	187.61	187.61	161.20	122.92	125.78	109.59
Mar-2008	183.30	183.30	162.60	120.09	123.01	110.54
Jun-2008	182.90	182.90	166.50	119.83	122.23	113.19
Sep-2008	184.16	184.16	168.60	120.66	123.57	114.62
Dec-2008	185.42	185.42	168.10	121.49	123.74	114.28
Mar-2009	166.50	166.50	167.40	109.09	110.57	113.80
Jun-2009	172.81	172.81	170.20	113.22	114.63	115.70
Sep-2009	177.85	177.85	171.70	116.53	118.70	116.72
Dec-2009	180.38	180.38	173.90	118.18	119.51	118.22
Mar-2010			176.10			119.71
Jun-2010			179.80			122.23

Date	New infrastructure output prices Year end % change	Public civil engineering works Year end % change	Consumer prices Year end % change
Jun-1979			
Sep-1979			
Dec-1979			
Mar-1980			
Jun-1980			
Sep-1980			
Dec-1980			
Mar-1981			
Jun-1981			
Sep-1981			10.57%
Dec-1981			10.54%
Mar-1982			9.64%
Jun-1982			8.53%
Sep-1982			7.06%
Dec-1982			6.65%
Mar-1983			5.67%
Jun-1983			4.41%
Sep-1983			5.08%
Dec-1983			4.74%
Mar-1984			4.43%
Jun-1984			4.76%
Sep-1984			3.92%
Dec-1984			3.75%
Mar-1985			4.50%
Jun-1985			5.04%
Sep-1985			5.03%
Dec-1985			4.99%
Mar-1986			4.18%
Jun-1986			2.64%
Sep-1986			2.63%
Dec-1986			2.61%
Mar-1987			3.07%
Jun-1987			3.27%
Sep-1987			3.27%
Dec-1987			3.70%
Mar-1988			3.32%
Jun-1988			3.96%
Sep-1988			4.63%
Dec-1988			4.58%
Mar-1989			5.21%
Jun-1989			5.45%
Sep-1989			5.29%
Dec-1989			5.66%
Mar-1990			5.69%
Jun-1990			6.51%
Sep-1990			7.38%
Dec-1990			7.78%
Mar-1991			7.08%
Jun-1991			8.44%
Sep-1991			7.93%
Dec-1991			7.22%
Mar-1992			7.17%
Jun-1992			4.92%
Sep-1992			3.63%
Dec-1992			3.15%
Mar-1993			2.87%
Jun-1993			2.98%
Sep-1993			3.42%
Dec-1993			2.88%

Date	New infrastructure output prices Year end % change	Public civil engineering works Year end % change	Consumer prices Year end % change
Mar-1994			2.87%
Jun-1994			2.24%
Sep-1994			1.90%
Dec-1994			2.06%
Mar-1995			2.71%
Jun-1995			2.51%
Sep-1995			2.92%
Dec-1995			3.07%
Mar-1996			2.72%
Jun-1996			2.69%
Sep-1996			2.60%
Dec-1996			2.74%
Mar-1997			2.41%
Jun-1997			2.15%
Sep-1997			2.46%
Dec-1997			2.36%
Mar-1998	1.69%	2.37%	2.20%
Jun-1998	2.32%	3.08%	2.48%
Sep-1998	2.86%	3.33%	1.95%
Dec-1998	2.02%	2.01%	1.94%
Mar-1999	0.86%	0.65%	1.93%
Jun-1999	-0.32%	0.01%	1.84%
Sep-1999	-0.72%	-0.95%	1.69%
Dec-1999	-0.19%	-0.84%	1.61%
Mar-2000	1.41%	0.92%	1.46%
Jun-2000	3.31%	1.83%	1.52%
Sep-2000	4.32%	3.67%	1.52%
Dec-2000	4.82%	4.59%	1.51%
Mar-2001	4.85%	5.35%	1.29%
Jun-2001	4.33%	5.41%	1.63%
Sep-2001	4.05%	4.67%	1.71%
Dec-2001	3.59%	4.56%	1.42%
Mar-2002	3.28%	3.54%	1.77%
Jun-2002	2.90%	3.31%	1.12%
Sep-2002	2.98%	3.26%	1.12%
Dec-2002	2.77%	2.66%	1.54%
Mar-2003	2.13%	2.51%	1.81%
Jun-2003	2.54%	1.75%	1.73%
Sep-2003	-1.26%	0.70%	1.80%
Dec-2003	0.04%	0.51%	1.58%
Mar-2004	0.00%	0.00%	1.30%
Jun-2004	-0.83%	0.81%	1.22%
Sep-2004	2.54%	1.63%	1.02%
Dec-2004	5.83%	6.50%	1.22%
Mar-2005	10.00%	10.57%	1.22%
Jun-2005	9.17%	9.68%	1.48%
Sep-2005	11.57%	12.00%	1.88%
Dec-2005	8.66%	8.40%	1.87%
Mar-2006	7.58%	6.62%	1.87%
Jun-2006	8.40%	7.35%	2.51%
Sep-2006	10.37%	8.57%	3.04%
Dec-2006	6.52%	7.04%	3.15%
Mar-2007	8.43%	9.19%	3.41%
Jun-2007	9.29%	9.88%	3.03%
Sep-2007	0.83%	2.47%	2.05%
Dec-2007	1.18%	1.78%	2.61%
Mar-2008	-5.62%	-4.44%	3.11%
Jun-2008	-6.57%	-6.29%	4.32%
Sep-2008	-2.82%	-2.41%	5.90%
Dec-2008	-1.16%	-1.62%	4.28%
Mar-2009	-9.16%	-10.12%	2.95%
Jun-2009	-5.52%	-6.21%	2.22%
Sep-2009	-3.42%	-3.94%	1.84%
Dec-2009	-2.72%	-3.42%	3.45%
Mar-2010			5.20%
Jun-2010			5.64%

Data for **Figure 5: US cost and price indexes**

Date	Electricity infrastructure construction costs Index	Highway infrastructure construction costs (1): average FHWA & Six states Index	Highway infrastructure construction costs (2): average PB & NHCCI Index	Consumer prices Index	Electricity infrastructure construction costs Normalised index (Jun-2003 = 100)	Highway infrastructure construction costs (1) Normalised index (Jun-2003 = 100)
Jun-1979						
Sep-1979						
Dec-1979						
Mar-1980						
Jun-1980	190.00				50.95	
Sep-1980				61.50	51.99	
Dec-1980				62.60	53.03	
Mar-1981				64.30	54.08	
Jun-1981	205.50			66.80	55.12	
Sep-1981				68.00	55.96	
Dec-1981				69.20	56.80	
Mar-1982				70.50	57.64	
Jun-1982	218.00			72.50	58.48	
Sep-1982				72.80	58.99	
Dec-1982				73.80	59.49	
Mar-1983				74.50	60.00	
Jun-1983	225.50			75.70	60.50	
Sep-1983				76.50	60.91	
Dec-1983				77.30	61.31	
Mar-1984				77.80	61.71	
Jun-1984	231.50			79.30	62.12	
Sep-1984				79.50	62.48	
Dec-1984				80.20	62.85	
Mar-1985				81.30	63.22	
Jun-1985	237.00			83.30	63.58	
Sep-1985				83.50	63.85	
Dec-1985				84.20	64.11	
Mar-1986				84.70	64.38	
Jun-1986	241.00			85.50	64.64	
Sep-1986				85.70	64.81	
Dec-1986				86.40	64.97	
Mar-1987				87.30	65.14	
Jun-1987	243.50			88.30	65.31	
Sep-1987				88.50	66.67	
Dec-1987				89.60	68.04	
Mar-1988				90.20	69.41	
Jun-1988	264.00			91.80	70.77	
Sep-1988				92.60	71.78	
Dec-1988				93.70	72.79	
Mar-1989				94.90	73.79	
Jun-1989	279.00			96.80	74.80	
Sep-1989				97.50	75.56	
Dec-1989				99.00	76.32	
Mar-1990				100.30	77.08	
Jun-1990	290.50	100.00		103.10	77.83	72.99
Sep-1990				104.70	78.40	73.27
Dec-1990				106.70	78.96	73.56
Mar-1991				107.40	79.53	73.84
Jun-1991	299.00	101.53		111.80	80.09	74.12
Sep-1991				113.00	80.36	73.56
Dec-1991				114.40	80.62	72.99
Mar-1992				115.10	80.89	72.43
Jun-1992	303.00	98.44		117.30	81.15	71.86
Sep-1992				117.10	81.78	72.70
Dec-1992				118.00	82.42	73.53
Mar-1993				118.40	83.05	74.36
Jun-1993	312.50	103.00		120.80	83.68	75.19
Sep-1993				121.10	84.47	75.70
Dec-1993				121.40	85.27	76.20

	Electricity infrastructure construction costs	Highway infrastructure construction costs (1): average FHWA & Six states	Highway infrastructure construction costs (2): average PB & NHCCI	Consumer prices	Electricity infrastructure construction costs	Highway infrastructure construction costs (1)
	Index	Index	Index	Index	Normalised index (Jun-2003 = 100)	Normalised index (Jun-2003 = 100)
Mar-1994				121.80	86.06	76.70
Jun-1994	324.50	105.76		123.50	86.86	77.20
Sep-1994				123.40	87.62	78.94
Dec-1994				123.90	88.39	80.68
Mar-1995				125.10	89.15	82.43
Jun-1995	336.00	115.30		126.60	89.92	84.17
Sep-1995				127.00	89.29	84.46
Dec-1995				127.70	88.67	84.75
Mar-1996				128.50	88.04	85.03
Jun-1996	326.67	116.84		130.00	87.41	85.32
Sep-1996				130.30	87.68	86.70
Dec-1996				131.20	87.94	88.07
Mar-1997				131.60	88.20	89.45
Jun-1997	330.67	124.41		132.80	88.46	90.83
Sep-1997				133.50	89.01	90.23
Dec-1997	336.67			134.30	90.05	89.63
Mar-1998				134.50	90.11	89.04
Jun-1998	338.92	121.13		136.10	90.66	88.44
Sep-1998				136.10	90.79	89.87
Dec-1998	339.83			136.90	90.93	91.30
Mar-1999				137.10	90.43	92.73
Jun-1999	336.08	128.97		138.60	89.94	94.16
Sep-1999				138.40	90.25	95.22
Dec-1999	338.42			139.10	90.56	96.28
Mar-2000				139.10	92.31	97.34
Jun-2000	351.83	134.81		140.70	94.06	98.41
Sep-2000				140.50	94.84	97.88
Dec-2000	357.58			141.20	95.61	97.35
Mar-2001				140.90	96.16	96.82
Jun-2001	361.75	131.93		143.00	96.71	96.29
Sep-2001				142.90	97.61	96.92
Dec-2001	368.33			143.20	98.50	97.55
Mar-2002				143.40	98.67	98.19
Jun-2002	369.50	135.39		144.60	98.83	98.82
Sep-2002				144.50	99.37	99.12
Dec-2002	373.42			145.40	99.90	99.41
Mar-2003			100.00	146.00	99.95	99.71
Jun-2003	373.67	137.01	100.29	147.10	**100.00**	**100.00**
Sep-2003			100.27	147.10	101.08	105.57
Dec-2003	381.83		99.03	147.70	102.15	111.13
Mar-2004			103.53	147.90	105.11	108.82
Jun-2004	404.08	167.57	108.19	148.90	108.07	122.27
Sep-2004			111.19	148.60	110.19	113.28
Dec-2004	419.83		110.75	149.50	112.30	127.00
Mar-2005			112.94	149.70	113.77	126.92
Jun-2005	430.92	205.71	114.84	151.10	115.24	150.13
Sep-2005			119.21	151.40	118.56	152.99
Dec-2005	455.58		120.35	152.30	121.89	152.48
Mar-2006			125.93	152.50	124.35	148.39
Jun-2006	473.83	235.58	134.57	154.90	126.81	171.93
Sep-2006			135.86	156.00	130.65	160.07
Dec-2006	502.17		131.33	157.10	134.49	172.04
Mar-2007			132.56	157.70	136.09	
Jun-2007	514.33	227.22	131.98	159.60	137.69	
Sep-2007			130.48	159.20	143.55	
Dec-2007	557.17		127.44	161.20	149.41	
Mar-2008			135.81	162.60	150.77	
Jun-2008	568.17	253.51	152.55	166.50	152.14	
Sep-2008			143.74	168.60		
Dec-2008			130.65	168.10		
Mar-2009			127.33	167.40		
Jun-2009			125.04	170.20		
Sep-2009			125.13	171.70		
Dec-2009			125.37	173.90		
Mar-2010			130.52	176.10		
Jun-2010		255.07	103.49	179.80		

Date	Highway infrastructure construction costs (2) Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)	Electricity infrastructure construction costs Year end % change	Highway infrastructure construction costs (1) Year end % change	Highway infrastructure construction costs (2) Year end % change	Consumer prices Year end % change
Jun-1979						
Sep-1979						
Dec-1979						
Mar-1980						
Jun-1980						
Sep-1980		41.81				
Dec-1980		42.56				
Mar-1981		43.71				
Jun-1981		45.41	8.18%			
Sep-1981		46.23	7.63%			10.57%
Dec-1981		47.04	7.10%			10.54%
Mar-1982		47.93	6.59%			9.64%
Jun-1982		49.29	6.10%			8.53%
Sep-1982		49.49	5.41%			7.06%
Dec-1982		50.17	4.74%			6.65%
Mar-1983		50.65	4.09%			5.67%
Jun-1983		51.46	3.46%			4.41%
Sep-1983		52.01	3.25%			5.08%
Dec-1983		52.55	3.05%			4.74%
Mar-1984		52.89	2.86%			4.43%
Jun-1984		53.91	2.66%			4.76%
Sep-1984		54.04	2.59%			3.92%
Dec-1984		54.52	2.51%			3.75%
Mar-1985		55.27	2.44%			4.50%
Jun-1985		56.63	2.37%			5.04%
Sep-1985		56.76	2.19%			5.03%
Dec-1985		57.24	2.01%			4.99%
Mar-1986		57.58	1.84%			4.18%
Jun-1986		58.12	1.67%			2.64%
Sep-1986		58.26	1.50%			2.63%
Dec-1986		58.74	1.34%			2.61%
Mar-1987		59.35	1.18%			3.07%
Jun-1987		60.03	1.03%			3.27%
Sep-1987		60.16	2.88%			3.27%
Dec-1987		60.91	4.72%			3.70%
Mar-1988		61.32	6.55%			3.32%
Jun-1988		62.41	8.37%			3.96%
Sep-1988		62.95	7.66%			4.63%
Dec-1988		63.70	6.98%			4.58%
Mar-1989		64.51	6.32%			5.21%
Jun-1989		65.81	5.69%			5.45%
Sep-1989		66.28	5.26%			5.29%
Dec-1989		67.30	4.85%			5.66%
Mar-1990		68.18	4.45%			5.69%
Jun-1990		70.09	4.06%			6.51%
Sep-1990		71.18	3.76%			7.38%
Dec-1990		72.54	3.47%			7.78%
Mar-1991		73.01	3.18%			7.08%
Jun-1991		76.00	2.90%	1.55%		8.44%
Sep-1991		76.82	2.50%	0.39%		7.93%
Dec-1991		77.77	2.10%	-0.77%		7.22%
Mar-1992		78.25	1.71%	-1.91%		7.17%
Jun-1992		79.74	1.32%	-3.05%		4.92%
Sep-1992		79.61	1.77%	-1.17%		3.63%
Dec-1992		80.22	2.22%	0.73%		3.15%
Mar-1993		80.49	2.67%	2.67%		2.87%
Jun-1993		82.12	3.11%	4.64%		2.98%
Sep-1993		82.32	3.29%	4.13%		3.42%
Dec-1993		82.53	3.46%	3.63%		2.88%

Date	Highway infrastructure construction costs (2) Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)	Electricity infrastructure construction costs Year end % change	Highway infrastructure construction costs (1) Year end % change	Highway infrastructure construction costs (2) Year end % change	Consumer prices Year end % change
Mar-1994		82.80	3.63%	3.14%		2.87%
Jun-1994		83.96	3.80%	2.66%		2.24%
Sep-1994		83.89	3.73%	4.29%		1.90%
Dec-1994		84.23	3.66%	5.89%		2.06%
Mar-1995		85.04	3.59%	7.48%		2.71%
Jun-1995		86.06	3.53%	9.04%		2.51%
Sep-1995		86.34	1.91%	6.99%		2.92%
Dec-1995		86.81	0.32%	5.03%		3.07%
Mar-1996		87.36	-1.25%	3.16%		2.72%
Jun-1996		88.38	-2.79%	1.36%		2.69%
Sep-1996		88.58	-1.81%	2.65%		2.60%
Dec-1996		89.19	-0.82%	3.93%		2.74%
Mar-1997		89.46	0.18%	5.20%		2.41%
Jun-1997		90.28	1.20%	6.46%		2.15%
Sep-1997		90.75	1.52%	4.08%		2.46%
Dec-1997		91.30	2.41%	1.77%		2.36%
Mar-1998		91.43	2.16%	-0.47%		2.20%
Jun-1998		92.52	2.48%	-2.63%		2.48%
Sep-1998		92.52	2.00%	-0.40%		1.95%
Dec-1998		93.07	0.97%	1.86%		1.94%
Mar-1999		93.20	0.36%	4.15%		1.93%
Jun-1999		94.22	-0.79%	6.47%		1.84%
Sep-1999		94.09	-0.60%	5.96%		1.69%
Dec-1999		94.56	-0.41%	5.46%		1.61%
Mar-2000		94.56	2.07%	4.98%		1.46%
Jun-2000		95.65	4.58%	4.51%		1.52%
Sep-2000		95.51	5.08%	2.79%		1.52%
Dec-2000		95.99	5.58%	1.11%		1.51%
Mar-2001		95.79	4.18%	-0.54%		1.29%
Jun-2001		97.21	2.82%	-2.15%		1.63%
Sep-2001		97.14	2.92%	-0.98%		1.71%
Dec-2001		97.35	3.02%	0.21%		1.42%
Mar-2002		97.48	2.60%	1.42%		1.77%
Jun-2002		98.30	2.19%	2.63%		1.12%
Sep-2002		98.23	1.81%	2.26%		1.12%
Dec-2002		98.84	1.43%	1.90%		1.54%
Mar-2003	99.45	99.25	1.30%	1.55%		1.81%
Jun-2003	**100.00**	**100.00**	1.18%	1.19%		1.73%
Sep-2003	99.56	100.00	1.72%	6.51%		1.80%
Dec-2003	98.25	100.41	2.25%	11.79%		1.58%
Mar-2004	102.17	100.54	5.16%	9.14%	2.73%	1.30%
Jun-2004	107.17	101.22	8.07%	22.27%	7.17%	1.22%
Sep-2004	109.38	101.02	9.01%	7.31%	9.87%	1.02%
Dec-2004	109.46	101.63	9.94%	14.28%	11.41%	1.22%
Mar-2005	111.70	101.77	8.24%	16.64%	9.33%	1.22%
Jun-2005	113.90	102.72	6.64%	22.79%	6.28%	1.48%
Sep-2005	118.89	102.92	7.60%	35.06%	8.70%	1.88%
Dec-2005	120.74	103.54	8.53%	20.07%	10.30%	1.87%
Mar-2006	125.34	103.67	9.30%	16.91%	12.21%	1.87%
Jun-2006	132.69	105.30	10.04%	14.52%	16.50%	2.51%
Sep-2006	135.82	106.05	10.20%	4.63%	14.23%	3.04%
Dec-2006	131.60	106.80	10.34%	12.82%	9.00%	3.15%
Mar-2007	131.36	107.21	9.44%		4.81%	3.41%
Jun-2007	129.45	108.50	8.58%		-2.45%	3.03%
Sep-2007	127.67	108.23	9.87%		-6.00%	2.05%
Dec-2007	124.68	109.59	11.09%		-5.26%	2.61%
Mar-2008	129.89	110.54	10.79%		-1.12%	3.11%
Jun-2008	141.79	113.19	10.49%		9.53%	4.32%
Sep-2008	138.49	114.62			8.48%	5.90%
Dec-2008	127.91	114.28			2.59%	4.28%
Mar-2009	121.88	113.80			-6.17%	2.95%
Jun-2009	117.15	115.70			-17.38%	2.22%
Sep-2009	116.28	116.72			-16.04%	1.84%
Dec-2009	115.42	118.22			-9.76%	3.45%
Mar-2010	119.38	119.71			-2.05%	5.20%
Jun-2010		122.23				5.64%

Data for **Figure 6: Canada cost and price indexes**

Date	Infrastructure construction costs (Ottawa, Municipal) Index	Electricity infrastructure construction costs Index	Consumer prices Index	Infrastructure construction costs (Ottawa, Municipal) Normalised index (Jun-2003 = 100)	Electricity infrastructure construction costs Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)
Jun-1979						
Sep-1979						
Dec-1979						
Mar-1980						
Jun-1980						
Sep-1980			58.40			43.00
Dec-1980			60.20			44.33
Mar-1981			62.20			45.80
Jun-1981			64.10			47.20
Sep-1981			66.00			48.60
Dec-1981			67.40			49.63
Mar-1982			69.10			50.88
Jun-1982			71.50			52.65
Sep-1982			72.80			53.61
Dec-1982			73.80			54.34
Mar-1983			74.20			54.64
Jun-1983			75.30			55.45
Sep-1983			76.60			56.41
Dec-1983			77.20			56.85
Mar-1984			78.20			57.58
Jun-1984			79.00			58.17
Sep-1984			79.70			58.69
Dec-1984			80.10			58.98
Mar-1985			81.00			59.65
Jun-1985			82.20			60.53
Sep-1985			82.90			61.05
Dec-1985			83.60			61.56
Mar-1986			84.80			62.44
Jun-1986			85.60			63.03
Sep-1986			86.80			63.92
Dec-1986			87.60			64.51
Mar-1987			88.50			65.17
Jun-1987			89.70			66.05
Sep-1987			90.80			66.86
Dec-1987			91.00			67.01
Mar-1988			91.80			67.60
Jun-1988			93.10			68.56
Sep-1988			94.10			69.29
Dec-1988			94.60			69.66
Mar-1989			95.60			70.40
Jun-1989			97.30			71.65
Sep-1989			98.70			72.68
Dec-1989			99.20			73.05
Mar-1990			100.50			74.01
Jun-1990			101.40			74.67
Sep-1990			102.60			75.55
Dec-1990			104.00			76.58
Mar-1991			107.20			78.94
Jun-1991			108.20			79.68
Sep-1991			108.70			80.04
Dec-1991			108.20			79.68
Mar-1992			108.70			80.04
Jun-1992			109.40			80.56
Sep-1992			110.00			81.00
Dec-1992			110.30			81.22
Mar-1993			111.20			81.89
Jun-1993			111.50			82.11
Sep-1993			112.10			82.55
Dec-1993			112.60			82.92

Date	Infrastructure construction costs (Ottawa, Municipal) Index	Electricity infrastructure construction costs Index	Consumer prices Index	Infrastructure construction costs (Ottawa, Municipal) Normalised index (Jun-2003 = 100)	Electricity infrastructure construction costs Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)
Mar-1994			111.80			82.33
Jun-1994			111.50			82.11
Sep-1994			112.20			82.62
Dec-1994			112.40			82.77
Mar-1995			113.90			83.87
Jun-1995			115.10			84.76
Sep-1995			115.30			84.90
Dec-1995			115.30			84.90
Mar-1996			116.00			85.42
Jun-1996			117.30			86.38
Sep-1996			117.50			86.52
Dec-1996			118.50			87.26
Mar-1997			119.20			87.78
Jun-1997			119.80			88.22
Sep-1997			120.30			88.59
Dec-1997			120.10			88.44
Mar-1998			120.90			89.03
Jun-1998			121.20			89.25
Sep-1998			121.40			89.40
Dec-1998			121.40			89.40
Mar-1999			121.70			89.62
Jun-1999			123.40			90.87
Sep-1999			124.40			91.61
Dec-1999			124.50			91.68
Mar-2000			124.90			91.97
Jun-2000			126.20			92.93
Sep-2000			127.30			93.74
Dec-2000			127.50			93.89
Mar-2001			127.90			94.18
Jun-2001	129.58		129.80			95.58
Sep-2001			130.10			95.80
Dec-2001			128.70			94.77
Mar-2002			129.90			95.66
Jun-2002	132.56		132.50			97.57
Sep-2002			134.10			98.75
Dec-2002			134.50			99.04
Mar-2003			136.20			100.29
Jun-2003	135.80	135.80	135.80	**100.00**	**100.00**	**100.00**
Sep-2003			136.20			100.29
Dec-2003			136.00			100.15
Mar-2004			136.90			100.81
Jun-2004	139.69	137.46	138.60	102.86	101.22	102.06
Sep-2004			138.50			101.99
Dec-2004			138.90			102.28
Mar-2005			139.20			102.50
Jun-2005	146.56	139.78	140.60	107.92	102.93	103.53
Sep-2005			141.90			104.49
Dec-2005			141.50			104.20
Mar-2006			141.90			104.49
Jun-2006	155.50	147.20	143.60	114.50	108.39	105.74
Sep-2006			143.30			105.52
Dec-2006			142.20			104.71
Mar-2007			143.70			105.82
Jun-2007	161.98	153.96	145.90	119.27	113.38	107.44
Sep-2007			145.40			107.07
Dec-2007			144.70			106.55
Mar-2008			145.00			106.77
Jun-2008	172.73	158.08	148.20	127.19	116.40	109.13
Sep-2008			149.50			110.09
Dec-2008			146.50			107.88
Mar-2009			146.00			107.51
Jun-2009	177.65	159.78	148.40	130.82	117.65	109.28
Sep-2009			148.80			109.57
Dec-2009			149.00			109.72
Mar-2010			149.70			110.24
Jun-2010						

Date	Infrastructure construction costs (Ottawa, Municipal) Year end % change	Electricity infrastructure construction costs Year end % change	Consumer prices Year end % change
Jun-1979			
Sep-1979			
Dec-1979			
Mar-1980			
Jun-1980			
Sep-1980			
Dec-1980			
Mar-1981			
Jun-1981			
Sep-1981			13.01%
Dec-1981			11.96%
Mar-1982			11.09%
Jun-1982			11.54%
Sep-1982			10.30%
Dec-1982			9.50%
Mar-1983			7.38%
Jun-1983			5.31%
Sep-1983			5.22%
Dec-1983			4.61%
Mar-1984			5.39%
Jun-1984			4.91%
Sep-1984			4.05%
Dec-1984			3.76%
Mar-1985			3.58%
Jun-1985			4.05%
Sep-1985			4.02%
Dec-1985			4.37%
Mar-1986			4.69%
Jun-1986			4.14%
Sep-1986			4.70%
Dec-1986			4.78%
Mar-1987			4.36%
Jun-1987			4.79%
Sep-1987			4.61%
Dec-1987			3.88%
Mar-1988			3.73%
Jun-1988			3.79%
Sep-1988			3.63%
Dec-1988			3.96%
Mar-1989			4.14%
Jun-1989			4.51%
Sep-1989			4.89%
Dec-1989			4.86%
Mar-1990			5.13%
Jun-1990			4.21%
Sep-1990			3.95%
Dec-1990			4.84%
Mar-1991			6.67%
Jun-1991			6.71%
Sep-1991			5.95%
Dec-1991			4.04%
Mar-1992			1.40%
Jun-1992			1.11%
Sep-1992			1.20%
Dec-1992			1.94%
Mar-1993			2.30%
Jun-1993			1.92%
Sep-1993			1.91%
Dec-1993			2.09%

Date	Infrastructure construction costs (Ottawa, Municipal) Year end % change	Electricity infrastructure construction costs Year end % change	Consumer prices Year end % change
Mar-1994			0.54%
Jun-1994			0.00%
Sep-1994			0.09%
Dec-1994			-0.18%
Mar-1995			1.88%
Jun-1995			3.23%
Sep-1995			2.76%
Dec-1995			2.58%
Mar-1996			1.84%
Jun-1996			1.91%
Sep-1996			1.91%
Dec-1996			2.78%
Mar-1997			2.76%
Jun-1997			2.13%
Sep-1997			2.38%
Dec-1997			1.35%
Mar-1998			1.43%
Jun-1998			1.17%
Sep-1998			0.91%
Dec-1998			1.08%
Mar-1999			0.66%
Jun-1999			1.82%
Sep-1999			2.47%
Dec-1999			2.55%
Mar-2000			2.63%
Jun-2000			2.27%
Sep-2000			2.33%
Dec-2000			2.41%
Mar-2001			2.40%
Jun-2001			2.85%
Sep-2001			2.20%
Dec-2001			0.94%
Mar-2002			1.56%
Jun-2002			2.08%
Sep-2002			3.07%
Dec-2002			4.51%
Mar-2003			4.85%
Jun-2003			2.49%
Sep-2003			1.57%
Dec-2003			1.12%
Mar-2004			0.51%
Jun-2004	2.86%	1.22%	2.06%
Sep-2004			1.69%
Dec-2004			2.13%
Mar-2005			1.68%
Jun-2005	4.92%	1.69%	1.44%
Sep-2005			2.45%
Dec-2005			1.87%
Mar-2006			1.94%
Jun-2006	6.10%	5.31%	2.13%
Sep-2006			0.99%
Dec-2006			0.49%
Mar-2007			1.27%
Jun-2007	4.17%	4.60%	1.60%
Sep-2007			1.47%
Dec-2007			1.76%
Mar-2008			0.90%
Jun-2008	6.64%	2.67%	1.58%
Sep-2008			2.82%
Dec-2008			1.24%
Mar-2009			0.69%
Jun-2009	2.85%	1.08%	0.13%
Sep-2009			-0.47%
Dec-2009			1.71%
Mar-2010			2.53%
Jun-2010			

Data for **Figure 7: France cost and price indexes**

Date	Infrastructure construction costs Index	Consumer prices Index	Infrastructure construction costs Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)	Infrastructure construction costs Year end % change	Consumer prices Year end % change
Jun-1979						
Sep-1979						
Dec-1979						
Mar-1980						
Jun-1980	0.49	42.59	45.40	39.43		
Sep-1980	0.50		46.51			
Dec-1980	0.52		47.45			
Mar-1981	0.53		48.63			
Jun-1981	0.54	48.29	49.55	44.72	9.13%	13.40%
Sep-1981	0.55		50.94		9.51%	
Dec-1981	0.57		52.73		11.13%	
Mar-1982	0.60		54.89		12.88%	
Jun-1982	0.61	54.76	56.30	50.71	13.63%	13.40%
Sep-1982	0.62		56.75		11.41%	
Dec-1982	0.62		57.30		8.67%	
Mar-1983	0.64		58.74		7.01%	
Jun-1983	0.65	61.23	59.86	56.69	6.32%	11.80%
Sep-1983	0.66		60.87		7.26%	
Dec-1983	0.67		61.78		7.82%	
Mar-1984	0.68		62.85		7.00%	
Jun-1984	0.69	67.10	63.76	62.13	6.53%	9.60%
Sep-1984	0.70		64.43		5.85%	
Dec-1984	0.70		64.88		5.01%	
Mar-1985	0.71		65.56		4.32%	
Jun-1985	0.72	72.07	66.07	66.73	3.62%	7.40%
Sep-1985	0.72		66.65		3.45%	
Dec-1985	0.73		67.48		4.01%	
Mar-1986	0.74		68.20		4.03%	
Jun-1986	0.75	76.25	68.73	70.60	4.03%	5.80%
Sep-1986	0.75		69.08		3.65%	
Dec-1986	0.76		69.71		3.30%	
Mar-1987	0.76		70.46		3.31%	
Jun-1987	0.77	78.31	70.94	72.51	3.21%	2.70%
Sep-1987	0.78		71.54		3.56%	
Dec-1987	0.78		71.94		3.20%	
Mar-1988	0.79		72.50		2.89%	
Jun-1988	0.79	80.74	73.03	74.75	2.95%	3.10%
Sep-1988	0.80		73.77		3.13%	
Dec-1988	0.81		74.26		3.23%	
Mar-1989	0.81		74.59		2.88%	
Jun-1989	0.81	82.92	74.81	76.77	2.44%	2.70%
Sep-1989	0.81		75.03		1.70%	
Dec-1989	0.82		75.28		1.37%	
Mar-1990	0.83		76.00	78.98	1.89%	
Jun-1990	0.83	85.90	76.59	79.54	2.38%	3.60%
Sep-1990	0.84	87.10	77.33	80.65	3.07%	
Dec-1990	0.85	87.30	78.13	80.83	3.79%	
Mar-1991	0.86	88.20	78.98	81.67	3.92%	3.40%
Jun-1991	0.87	88.90	79.72	82.31	4.09%	3.49%
Sep-1991	0.87	89.40	80.31	82.78	3.85%	2.64%
Dec-1991	0.88	89.90	80.77	83.24	3.38%	2.98%
Mar-1992	0.88	90.80	81.15	84.07	2.74%	2.95%
Jun-1992	0.89	91.20	81.56	84.44	2.30%	2.59%
Sep-1992	0.89	91.40	81.77	84.63	1.82%	2.24%
Dec-1992	0.89	91.70	81.74	84.91	1.20%	2.00%
Mar-1993	0.90	92.80	82.82	85.93	2.06%	2.20%
Jun-1993	0.90	93.00	83.03	86.11	1.80%	1.97%
Sep-1993	0.90	93.40	83.06	86.48	1.58%	2.19%
Dec-1993	0.90	93.60	82.96	86.67	1.49%	2.07%

Date	Infrastructure construction costs Index	Consumer prices Index	Infrastructure construction costs Normalised index (Jun-2003 = 100)	Consumer prices Normalised index (Jun-2003 = 100)	Infrastructure construction costs Year end % change	Consumer prices Year end % change
Mar-1994	0.90	94.20	83.24	87.22	0.51%	1.51%
Jun-1994	0.91	94.60	83.49	87.59	0.56%	1.72%
Sep-1994	0.91	94.90	83.56	87.87	0.60%	1.61%
Dec-1994	0.91	95.10	83.87	88.06	1.10%	1.60%
Mar-1995	0.91	95.90	84.20	88.80	1.15%	1.80%
Jun-1995	0.92	96.20	84.57	89.07	1.29%	1.69%
Sep-1995	0.91	96.80	84.03	89.63	0.55%	2.00%
Dec-1995	0.91	97.00	83.87	89.81	0.00%	2.00%
Mar-1996	0.92	98.20	84.64	90.93	0.52%	2.40%
Jun-1996	0.92	98.40	85.19	91.11	0.73%	2.29%
Sep-1996	0.93	98.30	85.26	91.02	1.47%	1.55%
Dec-1996	0.93	98.70	86.01	91.39	2.56%	1.75%
Mar-1997	0.94	99.20	86.17	91.85	1.81%	1.02%
Jun-1997	0.94	99.30	86.76	91.94	1.85%	0.91%
Sep-1997	0.95	99.60	87.33	92.22	2.43%	1.32%
Dec-1997	0.95	99.80	87.72	92.41	1.98%	1.11%
Mar-1998	0.95	100.00	87.79	92.59	1.88%	0.81%
Jun-1998	0.95	100.30	87.87	92.87	1.28%	1.01%
Sep-1998	0.95	100.00	87.84	92.59	0.58%	0.40%
Dec-1998	0.96	100.00	88.11	92.59	0.45%	0.20%
Mar-1999	0.96	100.40	88.42	92.96	0.71%	0.40%
Jun-1999	0.97	100.60	89.15	93.15	1.46%	0.30%
Sep-1999	0.98	100.70	90.02	93.24	2.48%	0.70%
Dec-1999	0.98	101.30	89.94	93.80	2.08%	1.30%
Mar-2000	0.99	101.90	90.96	94.35	2.87%	1.49%
Jun-2000	1.00	102.30	91.83	94.72	3.00%	1.69%
Sep-2000	1.00	102.90	92.27	95.28	2.50%	2.18%
Dec-2000	1.01	102.90	93.36	95.28	3.81%	1.58%
Mar-2001	1.02	103.20	93.51	95.56	2.81%	1.28%
Jun-2001	1.02	104.40	94.32	96.67	2.72%	2.05%
Sep-2001	1.03	104.40	94.89	96.67	2.84%	1.46%
Dec-2001	1.03	104.30	94.98	96.57	1.73%	1.36%
Mar-2002	1.04	105.40	96.06	97.59	2.72%	2.13%
Jun-2002	1.05	105.90	97.02	98.06	2.86%	1.44%
Sep-2002	1.06	106.30	97.78	98.43	3.05%	1.82%
Dec-2002	1.07	106.70	98.22	98.80	3.40%	2.30%
Mar-2003	1.08	108.10	99.40	100.09	3.48%	2.56%
Jun-2003	1.09	108.00	**100.00**	**100.00**	3.07%	1.98%
Sep-2003	1.09	108.50	100.33	100.46	2.61%	2.07%
Dec-2003	1.10	109.00	101.03	100.93	2.86%	2.16%
Mar-2004	1.11	109.90	102.34	101.76	2.96%	1.67%
Jun-2004	1.14	110.60	104.69	102.41	4.69%	2.41%
Sep-2004	1.15	110.80	105.47	102.59	5.12%	2.12%
Dec-2004	1.15	111.30	106.13	103.06	5.05%	2.11%
Mar-2005	1.16	112.00	106.76	103.70	4.32%	1.91%
Jun-2005	1.17	112.50	107.37	104.17	2.56%	1.72%
Sep-2005	1.18	113.20	108.39	104.81	2.77%	2.17%
Dec-2005	1.20	113.00	110.51	104.63	4.13%	1.53%
Mar-2006	1.22	113.69	112.42	105.27	5.30%	1.51%
Jun-2006	1.23	114.65	113.61	106.16	5.81%	1.91%
Sep-2006	1.25	114.59	114.80	106.10	5.91%	1.23%
Dec-2006	1.26	114.73	115.86	106.23	4.84%	1.53%
Mar-2007	1.26	115.04	116.45	106.52	3.59%	1.19%
Jun-2007	1.29	116.03	118.59	107.44	4.39%	1.20%
Sep-2007	1.30	116.33	119.50	107.71	4.10%	1.52%
Dec-2007	1.32	117.70	121.24	108.98	4.64%	2.59%
Mar-2008	1.34	118.70	123.58	109.91	6.12%	3.18%
Jun-2008	1.37	120.17	126.58	111.27	6.73%	3.57%
Sep-2008	1.40	119.80	128.78	110.93	7.76%	2.98%
Dec-2008	1.37	118.88	126.28	110.07	4.16%	1.00%
Mar-2009	1.37	119.06	125.79	110.24	1.79%	0.30%
Jun-2009	1.37	119.58	125.97	110.72	-0.48%	-0.49%
Sep-2009	1.37	119.37	126.57	110.53	-1.71%	-0.36%
Dec-2009	1.38	119.96	127.15	111.07	0.69%	0.91%
Mar-2010	1.39	120.94	127.87	111.98	1.65%	1.58%
Jun-2010	1.41	121.38	129.52	112.39	2.82%	1.51%

Data for **Figure 8: Gross fixed investment in Australia and comparator countries - recent historical trends**

	Gross Fixed Capital Formation as % of GDP					
	Australia	Canada	France	United Kingdom	United States	OECD Total
Date						
2000	22.00%	19.20%	19.50%	17.10%	20.00%	21.40%
2001	22.90%	19.60%	19.50%	16.80%	19.40%	20.70%
2002	24.80%	19.50%	18.80%	16.80%	18.20%	20.00%
2003	25.40%	19.60%	18.80%	16.40%	18.20%	19.80%
2004	25.80%	20.30%	19.30%	16.70%	18.80%	20.20%
2005	27.00%	21.30%	20.00%	16.70%	19.50%	20.70%
2006	27.20%	22.40%	20.70%	17.10%	19.70%	21.10%
2007	28.30%	22.60%	21.60%	17.80%	18.90%	21.10%
2008	29.40%	22.70%	21.90%	16.80%	17.90%	20.60%

Data for **Figure 9: Inflation-adjusted infrastructure construction costs by country – year-ended percentage change**. See above data series tables for Figure 1 (Australia), Figure 4 (UK), Figure 5 (US) and Figure 7 (France)

Data for **Figure 10: Inflation-adjusted infrastructure construction costs by country – average year-ended percentage change over each period**. See above data series tables for Figure 1 (Australia), Figure 4 (UK), Figure 5 (US) and Figure 7 (France)

Data for **Figure 11: Differential between Australian infrastructure construction costs and consumer prices.** For underlying data see data series table for Figure 1 (Australia).

Date	Differential between Australian infrastructure construction costs and consumer prices Year end percentage point difference
Jun-1980	1.27%
Jun-1981	1.84%
Jun-1982	4.97%
Jun-1983	0.47%
Jun-1984	-0.03%
Jun-1985	1.00%
Jun-1986	-0.63%
Jun-1987	-3.84%
Jun-1988	-1.89%
Jun-1989	0.82%
Jun-1990	-3.45%
Jun-1991	-0.26%
Jun-1992	1.19%
Jun-1993	-0.08%
Jun-1994	-2.02%
Jun-1995	1.56%
Jun-1996	-4.50%
Jun-1997	-1.58%
Jun-1998	3.42%
Jun-1999	-0.79%
Jun-2000	0.79%
Jun-2001	-0.39%
Jun-2002	-1.28%
Jun-2003	0.05%
Jun-2004	2.30%
Jun-2005	3.50%
Jun-2006	1.17%
Jun-2007	4.87%
Jun-2008	4.51%
Jun-2009	-2.55%
Jun-2010	-5.59%

Data for **Figure 12: Oil-based cost drivers and transport infrastructure construction costs – comparison of growth rates and correlations**

Date	World oil prices $A per barrel	World oil prices Year end % change	Fuel prices Index	Fuel prices Year end % change	Asphalt prices Index	Asphalt prices Year end % change
Jun-80	29.52		47.80		43.88	
Jun-81	32.18	9.01%	55.58	16.27%	53.23	21.31%
Jun-82	31.24	-2.91%	59.98	7.92%	60.10	12.92%
Jun-83	34.45	10.25%	69.43	15.76%	69.90	16.31%
Jun-84	33.68	-2.23%	76.53	10.23%	72.20	3.29%
Jun-85	36.11	7.23%	82.23	7.45%	75.50	4.57%
Jun-86	31.15	-13.74%	87.03	5.84%	81.38	7.78%
Jun-87	25.16	-19.24%	89.25	2.56%	85.33	4.85%
Jun-88	25.01	-0.60%	90.70	1.62%	89.13	4.45%
Jun-89	21.10	-15.64%	87.30	-3.75%	93.60	5.02%
Jun-90	25.70	21.83%	99.98	14.52%	100.03	6.86%
Jun-91	32.13	24.99%	115.18	15.20%	108.08	8.05%
Jun-92	27.14	-15.53%	111.03	-3.60%	108.15	0.07%
Jun-93	29.27	7.85%	113.23	1.98%	111.70	3.28%
Jun-94	24.15	-17.48%	111.78	-1.28%	112.25	0.49%
Jun-95	24.93	3.25%	113.78	1.79%	112.65	0.36%
Jun-96	25.41	1.90%	119.33	4.88%	112.43	-0.20%
Jun-97	28.75	13.17%	121.65	1.95%	112.83	0.36%
Jun-98	25.93	-9.81%	119.55	-1.73%	114.05	1.09%
Jun-99	23.08	-11.00%	114.08	-4.58%	114.90	0.75%
Jun-00	41.55	80.02%	133.45	16.98%	117.05	1.87%
Jun-01	56.58	36.16%	156.60	17.35%	123.50	5.51%
Jun-02	45.22	-20.07%	143.40	-8.43%	124.73	0.99%
Jun-03	50.81	12.36%	152.65	6.45%	135.33	8.50%
Jun-04	47.27	-6.98%	156.28	2.37%	142.38	5.21%
Jun-05	64.58	36.63%	174.70	11.79%	143.73	0.95%
Jun-06	86.09	33.30%	209.45	19.89%	152.78	6.30%
Jun-07	80.19	-6.85%	210.05	0.29%	157.30	2.96%
Jun-08	107.29	33.80%	232.80	10.83%	166.28	5.71%
Jun-09	93.68	-12.69%	220.48	-5.29%	178.98	7.64%
Jun-10	85.08	-9.18%	214.38	-2.77%	182.78	2.12%

Date	Transport infrastructure construction costs Index	Transport infrastructure construction costs Year end % change
Jun-80	0.22	
Jun-81	0.25	14.03%
Jun-82	0.28	13.69%
Jun-83	0.32	14.24%
Jun-84	0.35	7.30%
Jun-85	0.36	3.74%
Jun-86	0.39	8.75%
Jun-87	0.42	7.50%
Jun-88	0.45	6.36%
Jun-89	0.48	6.97%
Jun-90	0.51	6.80%
Jun-91	0.53	3.77%
Jun-92	0.53	-0.19%
Jun-93	0.53	-0.51%
Jun-94	0.53	0.31%
Jun-95	0.54	2.83%
Jun-96	0.56	3.03%
Jun-97	0.57	1.60%
Jun-98	0.58	2.43%
Jun-99	0.61	4.89%
Jun-00	0.64	4.87%
Jun-01	0.66	2.67%
Jun-02	0.67	2.62%
Jun-03	0.70	3.37%
Jun-04	0.74	6.29%
Jun-05	0.80	7.65%
Jun-06	0.85	7.10%
Jun-07	0.92	7.28%
Jun-08	1.00	9.04%
Jun-09	1.02	2.25%
Jun-10		

Data for **Figure 13: Input materials cost drivers and infrastructure construction costs – comparison of growth rates and correlations**

Date	Concrete prices Index	Concrete prices Year end % change	Cement prices Index	Cement prices Year end % change	Steel prices Index	Steel prices Year end % change
Jun-80						
Jun-81						
Jun-82						
Jun-83						
Jun-84						
Jun-85						
Jun-86	76.85		83.28		71.55	
Jun-87	79.23	3.09%	88.13	5.82%	76.75	7.27%
Jun-88	83.73	5.68%	91.58	3.91%	83.00	8.14%
Jun-89	92.18	10.09%	94.33	3.00%	91.68	10.45%
Jun-90	100.03	8.52%	99.98	5.99%	99.98	9.05%
Jun-91	110.83	10.80%	107.53	7.55%	107.85	7.88%
Jun-92	107.10	-3.36%	110.98	3.21%	108.23	0.35%
Jun-93	107.83	0.68%	112.38	1.26%	111.15	2.70%
Jun-94	111.93	3.80%	113.73	1.20%	113.40	2.02%
Jun-95	116.50	4.09%	115.00	1.12%	113.60	0.18%
Jun-96	112.63	-3.33%	117.60	2.26%	115.60	1.76%
Jun-97	111.65	-0.87%	119.75	1.83%	118.25	2.29%
Jun-98	112.53	0.78%	122.15	2.00%	120.08	1.54%
Jun-99	111.00	-1.36%	123.65	1.23%	119.53	-0.46%
Jun-00	109.33	-1.51%	124.40	0.61%	116.58	-2.47%
Jun-01	106.20	-2.86%	125.48	0.86%	114.35	-1.91%
Jun-02	107.10	0.85%	128.55	2.45%	114.93	0.50%
Jun-03	124.28	16.04%	132.38	2.98%	120.30	4.68%
Jun-04	131.65	5.93%	133.53	0.87%	126.15	4.86%
Jun-05	136.73	3.85%	139.93	4.79%	147.98	17.30%
Jun-06	142.33	4.10%	146.98	5.04%	154.68	4.53%
Jun-07	146.33	2.81%	157.30	7.03%	160.10	3.51%
Jun-08	152.35	4.12%	162.05	3.02%	168.73	5.39%
Jun-09	163.38	7.24%	164.43	1.47%	238.58	41.40%
Jun-10	160.03	-2.05%	174.18	5.93%	208.60	-12.56%

Date	Infrastructure construction costs Index	Infrastructure construction costs Year end % change
Jun-80		
Jun-81		
Jun-82		
Jun-83		
Jun-84		
Jun-85		
Jun-86	0.44	
Jun-87	0.47	5.48%
Jun-88	0.49	5.45%
Jun-89	0.53	8.16%
Jun-90	0.56	4.58%
Jun-91	0.59	5.01%
Jun-92	0.60	3.09%
Jun-93	0.61	0.94%
Jun-94	0.61	-0.19%
Jun-95	0.64	4.78%
Jun-96	0.64	-0.26%
Jun-97	0.63	-0.28%
Jun-98	0.66	3.40%
Jun-99	0.66	0.52%
Jun-00	0.68	3.17%
Jun-01	0.72	5.59%
Jun-02	0.73	1.58%
Jun-03	0.75	3.14%
Jun-04	0.79	4.65%
Jun-05	0.83	5.94%
Jun-06	0.87	4.37%
Jun-07	0.94	7.79%
Jun-08	1.01	7.91%
Jun-09	1.02	0.58%
Jun-10	0.98	-3.26%

Data for **Figure 14: Australian construction sector wage costs and infrastructure construction costs – comparison of growth rates and correlations**

Date	Construction sector wage costs Index	Construction sector wage costs Year end % change	Infrastructure construction costs Index	Infrastructure construction costs Year end % change
Jun-98	64.50		0.66	
Jun-99	66.60	3.26%	0.66	0.52%
Jun-00	68.50	2.85%	0.68	3.17%
Jun-01	71.30	4.09%	0.72	5.59%
Jun-02	73.60	3.23%	0.73	1.58%
Jun-03	76.10	3.40%	0.75	3.14%
Jun-04	79.00	3.81%	0.79	4.65%
Jun-05	83.20	5.32%	0.83	5.94%
Jun-06	87.30	4.93%	0.87	4.37%
Jun-07	91.50	4.81%	0.94	7.79%
Jun-08	95.60	4.48%	1.01	7.91%
Jun-09	100.00	4.60%	1.02	0.58%
Jun-10	103.20	3.20%	0.98	-3.26%

Data for **Figure 15: Construction and mining sector wage costs**

Date	Construction sector wage costs Index	Construction sector wage costs Year end % change	Mining sector wage costs Index	Mining sector wage costs Year end % change
Jun-98	64.50		64.6	
Jun-99	66.60	3.26%	66.3	2.63%
Jun-00	68.50	2.85%	68	2.56%
Jun-01	71.30	4.09%	70	2.94%
Jun-02	73.60	3.23%	72.5	3.57%
Jun-03	76.10	3.40%	75.1	3.59%
Jun-04	79.00	3.81%	77.2	2.80%
Jun-05	83.20	5.32%	80.4	4.15%
Jun-06	87.30	4.93%	84.5	5.10%
Jun-07	91.50	4.81%	89.5	5.92%
Jun-08	95.60	4.48%	94.7	5.81%
Jun-09	100.00	4.60%	100	5.60%
Jun-10	103.20	3.20%	103.6	3.60%

Data for **Figure 16: Imported machinery/equipment, parts prices and infrastructure construction costs – comparison of growth rates and correlations**

Date	Machinery and equipment import prices Index	Machinery and equipment import prices Year end % change	Infrastructure construction costs Index	Infrastructure construction costs Year end % change	Transport equipment parts import prices Index	Transport equipment parts import prices Year end % change
Jun-92	108.00		0.60		106.48	
Jun-93	123.25	14.12%	0.61	0.94%	118.08	10.89%
Jun-94	127.55	3.49%	0.61	-0.19%	126.78	7.37%
Jun-95	125.23	-1.82%	0.64	4.78%	126.48	-0.24%
Jun-96	124.50	-0.58%	0.64	-0.26%	124.90	-1.25%
Jun-97	118.30	-4.98%	0.63	-0.28%	115.10	-7.85%
Jun-98	129.33	9.32%	0.66	3.40%	123.43	7.23%
Jun-99	140.80	8.87%	0.66	0.52%	134.68	9.11%
Jun-00	138.28	-1.79%	0.68	3.17%	135.68	0.74%
Jun-01	152.75	10.47%	0.72	5.59%	149.05	9.86%
Jun-02	155.23	1.62%	0.73	1.58%	153.68	3.10%
Jun-03	145.08	-6.54%	0.75	3.14%	145.95	-5.03%
Jun-04	130.55	-10.01%	0.79	4.65%	130.43	-10.64%
Jun-05	130.10	-0.34%	0.83	5.94%	127.55	-2.20%
Jun-06	129.30	-0.61%	0.87	4.37%	129.20	1.29%
Jun-07	129.18	-0.10%	0.94	7.79%	132.08	2.23%
Jun-08	123.78	-4.18%	1.01	7.91%	123.65	-6.38%
Jun-09	148.60	20.06%	1.02	0.58%	143.10	15.73%
Jun-10	135.48	-8.83%	0.98	-3.26%	134.30	-6.15%

Date	Transport infrastructure construction costs Index	Transport infrastructure construction costs Year end % change
Jun-92	0.53	
Jun-93	0.53	-0.51%
Jun-94	0.53	0.31%
Jun-95	0.54	2.83%
Jun-96	0.56	3.03%
Jun-97	0.57	1.60%
Jun-98	0.58	2.43%
Jun-99	0.61	4.89%
Jun-00	0.64	4.87%
Jun-01	0.66	2.67%
Jun-02	0.67	2.62%
Jun-03	0.70	3.37%
Jun-04	0.74	6.29%
Jun-05	0.80	7.65%
Jun-06	0.85	7.10%
Jun-07	0.92	7.28%
Jun-08	1.00	9.04%
Jun-09	1.02	2.25%
Jun-10		

Data for **Figure 17: Cost and volume of infrastructure construction activity**

Date	Infrastructure construction costs Index	Infrastructure construction costs Year end % change	Volume of infrastructure construction activity Index	Volume of infrastructure construction activity Year end % change
Jun-1980	25.33		5,178	
Jun-1981	28.58	12.83%	6,536	26.23%
Jun-1982	32.25	12.86%	8,511	30.22%
Jun-1983	36.58	13.41%	8,437	-0.87%
Jun-1984	38.73	5.88%	5,958	-29.38%
Jun-1985	40.90	5.62%	5,398	-9.40%
Jun-1986	44.43	8.62%	5,626	4.22%
Jun-1987	46.70	5.12%	6,348	12.83%
Jun-1988	49.33	5.62%	7,094	11.75%
Jun-1989	52.55	6.54%	7,193	1.40%
Jun-1990	55.63	5.85%	7,597	5.62%
Jun-1991	58.58	5.30%	7,321	-3.63%
Jun-1992	60.48	3.24%	7,102	-2.99%
Jun-1993	60.78	0.50%	6,626	-6.70%
Jun-1994	61.15	0.62%	7,988	20.56%
Jun-1995	62.20	1.72%	7,955	-0.41%
Jun-1996	63.85	2.65%	9,827	23.53%
Jun-1997	63.43	-0.67%	10,889	10.81%
Jun-1998	64.85	2.25%	13,056	19.90%
Jun-1999	65.08	0.35%	16,288	24.75%
Jun-2000	68.13	4.69%	13,795	-15.31%
Jun-2001	70.88	4.04%	10,070	-27.00%
Jun-2002	73.28	3.39%	14,361	42.61%
Jun-2003	75.13	2.52%	18,154	26.41%
Jun-2004	78.58	4.59%	19,059	4.99%
Jun-2005	82.60	5.12%	22,062	15.76%
Jun-2006	87.55	5.99%	28,958	31.26%
Jun-2007	93.53	6.82%	33,952	17.25%
Jun-2008	100.13	7.06%	37,064	9.17%
Jun-2009	101.83	1.70%	43,641	17.74%
Jun-2010	98.13	-3.63%	44,457	1.87%

Data for **Figure 18: Construction costs, employment and contribution to the Australian economy**

Date	Infrastructure construction costs	Infrastructure construction costs	Volume of construction activity	GDP	Volume of construction activity as % of GDP	Construction sector employment
	Index	Year end % change	Index	Index	% of GDP	000's
Jun-1985	40.90	5.62%	19,974	539,481	3.70%	492
Jun-1986	44.43	8.62%	24,553	565,129	4.34%	496
Jun-1987	46.70	5.12%	25,924	576,763	4.49%	514
Jun-1988	49.33	5.62%	30,949	607,694	5.09%	529
Jun-1989	52.55	6.54%	33,488	634,841	5.28%	598
Jun-1990	55.63	5.85%	35,749	653,574	5.47%	577
Jun-1991	58.58	5.30%	30,299	651,737	4.65%	544
Jun-1992	60.48	3.24%	24,517	655,557	3.74%	515
Jun-1993	60.78	0.50%	22,475	681,794	3.30%	548
Jun-1994	61.15	0.62%	23,161	707,972	3.27%	558
Jun-1995	62.20	1.72%	25,472	736,865	3.46%	606
Jun-1996	63.85	2.65%	31,803	767,665	4.14%	597
Jun-1997	63.43	-0.67%	35,284	797,605	4.42%	576
Jun-1998	64.85	2.25%	38,177	832,939	4.58%	620
Jun-1999	65.08	0.35%	44,366	875,919	5.07%	643
Jun-2000	68.13	4.69%	41,413	910,519	4.55%	698
Jun-2001	70.88	4.04%	32,353	928,547	3.48%	657
Jun-2002	73.28	3.39%	36,050	964,109	3.74%	708
Jun-2003	75.13	2.52%	46,049	994,574	4.63%	724
Jun-2004	78.58	4.59%	49,158	1,035,750	4.75%	801
Jun-2005	82.60	5.12%	53,533	1,065,166	5.03%	854
Jun-2006	87.55	5.99%	64,368	1,097,866	5.86%	892
Jun-2007	93.53	6.82%	72,291	1,139,256	6.35%	941
Jun-2008	100.13	7.06%	79,681	1,181,750	6.74%	985
Jun-2009	101.83	1.70%	86,506	1,195,707	7.23%	1,000
Jun-2010	98.13	-3.63%	79,408	1,223,538	6.49%	1,027

Date	Total workforce 000's	Construction sector employment as % of total workforce % of total workforce
Jun-1985	6,658	7.39%
Jun-1986	6,979	7.11%
Jun-1987	7,104	7.24%
Jun-1988	7,355	7.19%
Jun-1989	7,721	7.75%
Jun-1990	7,908	7.29%
Jun-1991	7,704	7.07%
Jun-1992	7,633	6.75%
Jun-1993	7,650	7.16%
Jun-1994	7,879	7.08%
Jun-1995	8,229	7.36%
Jun-1996	8,335	7.16%
Jun-1997	8,383	6.87%
Jun-1998	8,585	7.23%
Jun-1999	8,698	7.40%
Jun-2000	8,948	7.80%
Jun-2001	9,071	7.24%
Jun-2002	9,215	7.68%
Jun-2003	9,465	7.65%
Jun-2004	9,636	8.31%
Jun-2005	9,965	8.57%
Jun-2006	10,213	8.73%
Jun-2007	10,553	8.92%
Jun-2008	10,834	9.09%
Jun-2009	10,927	9.15%
Jun-2010	11,170	9.19%

Data for **Figure 19: World oil price forecast scenarios: comparison with historical trends**

Date	World oil price Real 2009 US $ per barrel History and central case forecast	World oil price Real 2009 US $ per barrel Low case forecast	World oil price Real 2009 US $ per barrel High case forecast
1980	$86.24		
1981	$83.25		
1982	$69.35		
1983	$58.44		
1984	$54.08		
1985	$49.72		
1986	$26.25		
1987	$32.60		
1988	$26.22		
1989	$31.07		
1990	$37.14		
1991	$31.53		
1992	$29.45		
1993	$25.86		
1994	$23.59		
1995	$24.79		
1996	$29.17		
1997	$26.72		
1998	$18.52		
1999	$24.33		
2000	$37.47		
2001	$31.37		
2002	$31.08		
2003	$36.25		
2004	$46.95		
2005	$61.93		
2006	$70.08		
2007	$73.93		
2008	$99.57		
2009	$62.00		
2010	$77.50	$77.50	$77.50
2011	$81.00	$60.01	$109.34
2012	$84.50	$56.87	$125.55
2013	$88.00	$56.00	$135.00
2014	$91.34	$55.47	$140.64
2015	$94.53	$54.97	$146.03
2016	$97.55	$54.49	$151.16
2017	$100.41	$54.04	$156.03
2018	$103.12	$53.61	$160.65
2019	$105.66	$53.20	$165.01
2020	$108.05	$52.82	$169.12
2021	$110.28	$52.46	$172.97
2022	$112.35	$52.13	$176.56
2023	$114.26	$51.82	$179.89
2024	$116.01	$51.53	$182.97
2025	$117.60	$51.27	$185.79
2026	$119.03	$51.03	$188.36
2027	$120.30	$50.81	$190.67
2028	$121.42	$50.62	$192.72
2029	$122.37	$50.45	$194.51
2030	$123.17	$50.31	$196.05
2031	$123.81	$50.19	$197.33
2032	$124.28	$50.09	$198.36
2033	$124.60	$50.02	$199.13
2034	$124.76	$49.97	$199.64
2035	$125.00	$50.00	$200.00

Data for **Figure 20: Demand and supply of engineering tradespersons employed in Australian construction sector.** Underlying data not available

Data for **Figure 21: GDP growth forecasts for Australia and comparator countries: comparison with recent historical trends**

Country/Period	2002-07	2010-15 (F)
	Average calendar year ended percentage change	Average calendar year ended percentage change
US	2.60%	2.50%
UK	2.60%	2.10%
Canada	2.65%	2.60%
France	1.87%	1.77%
Germany	1.32%	2.20%
Spain	3.38%	0.80%
Australia	3.55%	2.90%
Advanced economies	2.53%	2.43%

Data for **Figure 22: Gross fixed capital formation growth forecasts for Australia and comparator countries: comparison with recent historical trends**

Country/Period	2002-07	2010-11 (F)
	Average calendar year ended percentage change	Average calendar year ended percentage change
US	2.20%	4.30%
UK	4.40%	2.00%
Canada	5.92%	5.30%
France	3.12%	-0.10%
Germany	1.15%	4.45%
Spain	5.52%	-4.20%
Australia	9.24%	9.75%
Advanced economies	2.63%	3.10%

Data for **Figure 23:** CPI growth forecasts for Australia and comparator countries: comparison with recent historical trends

Country/Period	2002-07	2010-15 (F)
	Average calendar year ended percentage change	Average calendar year ended percentage change
US	3.05%	1.43%
UK	2.15%	2.53%
Canada	2.20%	1.93%
France	2.18%	1.70%
Germany	1.93%	1.57%
Spain	3.35%	1.50%
Australia	3.00%	2.83%
Advanced economies	2.37%	1.53%

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