



AusNet Electricity Services Pty Ltd

Electricity Distribution Price Review 2016–20

Appendix 4A: CIE Labour Price Forecasts Report

Submitted: 6 January 2016





FINAL REPORT

Labour price forecasts

*Prepared for
Powercor, AusNet Services and CitiPower
23 November 2015*

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CANBERRA

Centre for International Economics
Ground Floor, 11 Lancaster Place
Majura Park
Canberra ACT 2609

GPO Box 2203
Canberra ACT Australia 2601

Telephone +61 2 6245 7800
Facsimile +61 2 6245 7888
Email cie@TheCIE.com.au
Website www.TheCIE.com.au

SYDNEY

Centre for International Economics
Suite 1, Level 16, 1 York Street
Sydney NSW 2000

GPO Box 397
Sydney NSW Australia 2001

Telephone +61 2 9250 0800
Facsimile +61 2 9250 0888
Email ciesyd@TheCIE.com.au
Website www.TheCIE.com.au

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Contents

Summary	5
Measure of wages used, methodology and assumptions	5
Headline forecast for wages	5
Detailed wage forecast	6
1 Introduction	8
2 Background information	9
Economic drivers of wage growth	9
Measure of wages used in this study	9
The industries of interest	10
3 Forecast methodology	12
1. Develop forecast assumptions	12
2. Use forecast assumptions and the CIE-Regions model to project wages growth	12
3. Review and compare forecasts	15
4 The assumptions that drive these forecasts	16
GDP growth	16
GSP growth in Victoria	18
Growth in utilities and construction	18
Export prices and the exchange rate	19
Labour supply	19
Inflation	20
5 Forecasts for wages	22
Real wages growth	22
Nominal wages growth	24
6 How our forecasts have changed	25
GDP growth	25
Labour supply	26
7 Comparison and review of forecasts	27
GDP growth	27
Employment	28
Implied productivity forecasts	28
Real wages growth (and comparison with implied productivity)	29
Inflation	30

Nominal wages growth	31
Real wages at the state and industry level	31
8 Calendar year forecasts	33
References	34

BOXES, CHARTS AND TABLES

1 Forecast assumptions	5
2 Real growth in the WPI for all industries (per cent)	6
3 Growth in real WPI (per cent)	7
4 Growth in nominal WPI (per cent)	7
3.1 Sectors identified in the CIE-Regions model	14
3.2 Elasticity between growth in real all-industry WPI and growth in economic drivers	15
4.1 Growth in real GDP and GSP in Australia and Victoria (per cent)	16
4.2 Real growth in Australian GDP (per cent)	17
4.3 Growth in real GSP in Victoria (per cent)	18
4.4 Growth in Australian labour supply	20
4.5 Growth in Australian CPI and Victorian CPI (per cent)	21
5.1 Real growth in the WPI for all industries (per cent)	23
5.2 Net overseas and interstate migration (2002-03 to 2007-08)	Error! Bookmark not defined.
5.3 Real wage growth across industries (per cent)	23
5.4 Nominal growth in the all-industries WPI (per cent)	24
5.5 Nominal growth in the WPI across industries (per cent)	24
6.1 Forecast for growth in real, Australia, all-industry WPI	25
6.2 Forecasts for real growth in Australian GDP (per cent)	25
6.3 Forecasts for growth in labour supply (per cent)	26
7.1 Forecasts for real GDP growth in Australia	27
7.2 Forecasts for employment growth in Australia	28
7.3 Implied forecast growth in productivity (GDP growth less employment growth)	29
7.4 Forecasts for real growth in <i>all-industries</i> WPI in Australia (per cent)	30
7.5 Forecasts for inflation	30
7.6 Growth in nominal, Australia, all-industry WPI	31
7.7 Forecast growth in real WPI for the utilities industry	32
7.8 Forecast growth in real WPI for the construction industry	32
8.1 Growth in real WPI (per cent)	33
8.2 Growth in nominal WPI (per cent)	33

Summary

Powercor, CitiPower and AusNet Services (hereafter the ‘distributors’) have engaged The CIE to update forecasts for wages growth, in real and nominal terms, for Australia and Victoria, across all industries (combined) and for the electricity, gas, water and waste industry (hereafter ‘utilities’) and the *construction* industry. The forecast period is calendar years, 2015-2020.

Measure of wages used, methodology and assumptions

As required by the distributors, wages are measured with the Wages Price Index (WPI).

To forecast growth in the WPI in the relevant industries in Victoria and in Australia, we develop forecast assumptions for key variables, incorporate these assumptions into The CIE-Regions model and then use the model to develop wage forecasts. Table 1 sets out the key forecast assumptions made for this project.

1 Forecast assumptions

	Australia				Victoria		
	Population	Real GDP	CPI inflation	Exchange rate	Population	Real GSP	Inflation
2014-15	1.75	2.42	1.71	0.83	1.79	2.07	1.40
2015-16	1.76	2.61	2.50	0.71	1.79	2.01	2.75
2016-17	1.76	2.96	2.50	0.72	1.77	2.59	2.75
2017-18	1.75	3.01	2.50	0.72	1.73	2.84	2.50
2018-19	1.73	2.96	2.50	0.72	1.69	2.77	2.50
2019-20	1.71	2.89	2.50	0.72	1.66	2.70	2.50
2020-21	1.71	2.89	2.50	0.72	1.62	2.70	2.50

Source: The CIE

Headline forecast for wages

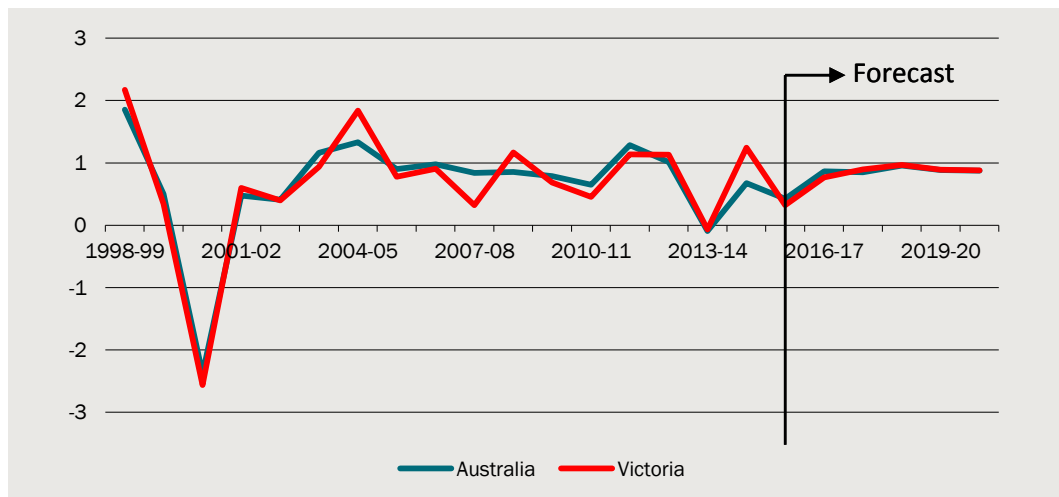
Recently, business conditions have been weak in Australia. The key driver of this has been weakening investment, especially in the mining sector, as commodity prices fall from record highs. Also contributing to this has been the high Australian dollar (until its recent depreciation), which weighed on business conditions in other trade exposed industries (including manufacturing, agriculture and tourism).

Weak business conditions have resulted in weak demand for labour, and real wages growth has been relatively slow in recent years. (See Chart 2).

- In 2013-14 growth in the real *all-industries* WPI dropped sharply relative to growth posted in the 2000s.
- Labour demand was still weak in 2014-15, and growth in nominal wages was weak too. As shown, the real *all-industries* WPI picked up, but only because inflation posted a relatively weak result.

For this project, the CIE has adopted forecasts for Australian GDP published by the IMF. As shown in Table 1 (above), these forecasts see GDP growth and (therefore) business conditions picking up. With this, labour demand is expected to improve and growth in the real *all-industries* WPI returns to growth consistent with its history. This recovery in growth, labour demand and real wages is underpinned by lower interest rates (reflecting a loosening of monetary policy by the RBA in recent years) and the recent depreciation of the Australian dollar.

2 Real growth in the WPI for all industries (per cent)



Note: The CIE-Regions model works in financial years (September quarter-June quarter). Data here are in financial years. The history of the data finishes at 2014-15; forecasts are from 2015-16 onwards. The forecasts incorporate data from the September quarter 2015.

Data source: ABS; CIE-Regions model

Detailed wage forecast

For this project, the distributors requested wage forecasts from 2015-2020 in calendar years. Tables 3 and 4 show these forecasts.

3 Growth in real WPI (per cent)

	Australia			Victoria		
	All industries	Utilities	Construction	All industries	Utilities	Construction
2015	0.55	0.81	0.40	0.78	1.34	1.08
2016	0.65	0.76	0.78	0.54	0.74	0.82
2017	0.86	1.00	1.20	0.83	0.96	1.18
2018	0.90	1.03	1.23	0.93	1.05	1.27
2019	0.92	1.01	1.16	0.93	1.02	1.18
2020	0.88	0.96	1.10	0.88	0.97	1.13

Note: The CIE-Regions model works in financial years (September quarter-June quarter). These calendar year forecasts have been developed with averages (e.g. forecast growth in 2015 is the average of growth in 2014-15 and 2015-16). The forecasts incorporate data from the September quarter 2015.

Source: CIE-Regions model

4 Growth in nominal WPI (per cent)

	Australia			Victoria		
	All industries	Utilities	Construction	All industries	Utilities	Construction
2015	2.54	2.80	2.39	2.71	3.27	3.01
2016	3.02	3.14	3.15	3.13	3.33	3.40
2017	3.36	3.50	3.70	3.46	3.58	3.80
2018	3.40	3.53	3.73	3.43	3.55	3.77
2019	3.42	3.51	3.66	3.43	3.52	3.68
2020	3.38	3.46	3.60	3.38	3.47	3.63

Note: The CIE-Regions model works in financial years (September quarter-June quarter). These calendar year forecasts have been developed with averages (e.g. forecast growth in 2015 is the average of growth in 2014-15 and 2015-16). The forecasts incorporate data from the September quarter 2015.

Source: CIE-Regions model

1 *Introduction*

Powercor, CitiPower and AusNet Services (hereafter the ‘distributors’) have engaged The CIE to update forecasts of wages growth, in real and nominal terms, for Australia and Victoria, across all industries (combined) and for the electricity, gas, water and waste industry (hereafter ‘*utilities*’) and the *construction* industry. The forecast period is calendar years, 2015-2020.

This report is organised as follows.

- Chapter 2 sets out background information.
- Chapter 3 describes the methodology the CIE has used to forecast wages growth.
- Chapter 4 describes the macroeconomic forecasts that are driving expected wages growth.
- Chapter 5 sets out expected wage growth.
- Chapter 6 highlights how our forecasts have changed.
- Chapter 7 compares the CIE’s forecasts with the forecasts of other economists.
- Chapter 8 summarises converts the forecasts to calendar years.

2 Background information

Economic drivers of wage growth

The economic drivers of wage growth can be understood by considering a market for labour, comprising the demand for labour (employers, the users of labour) and the supply of labour (workers), as follows.

- Demand for labour is determined by the amount of additional production generated by additional labour (the marginal product). This in turn reflects factors such as the level of Australian output (including exports), skill levels, capital-labour ratios and productivity. An increase in the demand for labour tends to increase wages growth.
- The supply of labour is determined by individual decisions balancing income and leisure and by demographics. An increase in the supply of labour tends to decrease wages growth.

The CIE has ensured its forecasts for wages growth reflects labour demand and labour supply by developing our forecasts with our own Computable General Equilibrium (CGE) model, the CIE-Regions model. The CIE-Regions model provides a comprehensive, economy-wide analytical approach which takes into consideration the linkages and interactions between industries, regions, commodity and services markets as well as factor markets.

Measure of wages used in this study

As noted in Chapter 1, the distributors require forecast growth for economy-wide (*all-industry*) wages, wages in the *utilities* industry and wages in the *construction* industry, in Australia and Victoria. Further, the distributors require growth to be measured with changes in the Wage Price Index (WPI, published by the ABS).

To meet the distributor's requirements, we forecast growth in the WPI for *all industries*, *construction* and *utilities* for Australia and Victoria.

Labour cost indices produced by the ABS generally attempt to measure one of two things:

- changes in the amount of income or earnings which can be influenced by wage rates and the number of hours worked, or
- changes in wage rates.

The Wage Price Index (WPI) attempts to measure the latter and is discussed in detail below. This discussion is taken from the Concepts, Sources and Methods document for the WPI, published by the ABS 2012.

Sampling method for the WPI

The ABS adopts a two-stage sampling methodology to generate a sample of employee jobs for the WPI. The first stage selects a sample of businesses. Businesses selected in the first stage are asked to select a sample of jobs from their payrolls using instructions provided by the ABS. In the case of a job becoming obsolete or possibly outsourced, a new job is selected. This sampling methodology implies that shifts in the underlying workforce composition can potentially impact movements in the WPI at the margin.

Development of WPI

WPI data is collected by the ABS through quarterly questionnaires, which include questions related to details of overtime provisions, any bonuses, commissions or incentive payments paid during the reference quarter, and any additional information about jobs that have unusual pay or working arrangements.

This information enables the ABS to understand the drivers of wage growth and adjust for:

- changes in the quality and quantity of work performed;
- bonuses;
- salary sacrificing; and
- workplace arrangements that trade-off between employee benefits and salary.

As a result, these factors are likely to have a negligible impact on WPI growth across the industries of focus.

Measures of the WPI

It is understood that overtime is paid in the *utilities* sector. As a result, the most appropriate WPI data is ***Total Hourly Rates of Pay Excluding Bonuses***. Detailed WPI data for industries at the state level were obtained from the ABS by special request over the period September 2008 to September 2015.

The industries of interest

The *utilities* and *construction* industries are described here. These descriptions are taken from the Australia and New Zealand Standard Industrial Classification System 2006 (ANZIC 2006).

The *utilities* industry includes business units mainly engaged in the provision of electricity, gas through mains systems, water, drainage and sewerage services. The sub-industries of the *utilities* industry are:

- Electricity supply;
- Gas supply;
- Water supply, sewerage and drainage services; and
- Waste collection, treatment and disposal services.

The *construction* industry includes business units mainly engaged in the construction of buildings and other structures, additions, alterations, reconstruction, installation, maintenance and repairs of buildings and other structures. The sub-industries of the *construction* industry are:

- Building construction;
- Heavy and civil engineering construction; and
- Construction services.

In ANZSIC 2006, the ABS notes that business units that use similar production functions (the transformation of intermediate inputs, through the application of capital and labour, to produce output) are grouped together in the same industry (ABS 2006).

3 *Forecast methodology*

The CIE has followed three broad steps to complete this project.

1. Develop forecast assumptions

The first step in forecasting wages growth is developing forecast assumptions for GDP, inflation, the exchange rate and export prices. Chapter 4 explains the CIE's forecast assumptions and how they were determined.

2. Use forecast assumptions and the CIE-Regions model to project wages growth

The second step is taking these forecast assumptions and incorporating them into the CIE-Regions model, a general equilibrium model of the Australian economy, which projects wages growth by state and by industry.

The CIE-Regions model

The CIE-Regions model is a general equilibrium model of the Australian economy. It was developed by the CIE based on the publicly available MMRF-NRA model used by the Productivity Commission.¹ The CIE has updated the MMRF-NRA model and introduced a more detailed treatment of state/territory government fiscal revenues and expenditures. A 53-sector version of the CIE-Regions model was used for this analysis because it separately identifies the sectors of interest (see Table 3.1). Some of the key features of CIE-Regions are that it:

- provides a detailed account of industry activity, investment, imports, exports, changes in prices, employment, household spending and savings and many other factors;
- identifies 53 industries and commodities;
- accounts for Australia's six states and two territories as distinct regions including specific details about the budgetary revenues and expenditures of each of the state and territory governments and the Australian Government (the government finances in CIE-Regions align as closely as practicable to the ABS government finance data);
- provides a detailed account of labour demand and supply in each industry in each state/territory, based on economic theory and empirical data;

¹ Productivity Commission 2006, *Potential Benefits of the National Reform Agenda*, Report to the Council of Australian Governments.

- specifically accounts for major taxes including land taxes, payroll taxes, stamp duties and others at the state level, as well as income taxes, tariffs, excise, the GST and other taxes at the federal level;
- traces out the impact of transfers between governments;
- accounts for differing economic fundamentals in the states (for instance, the mining boom in WA and Queensland);
- can produce results on employment and value added at a regional level; and
- can be run in a static or dynamic mode. The dynamic version allows the analysis to trace impacts over time as the economy adjusts, which is particularly useful over the short to medium term.

3.1 Sectors identified in the CIE-Regions model

Sector		Sector	
1	Sheep Cattle	28	Residential Building
2	Grains	29	Other Construction
3	Other Animal	30	Construction Services
4	Other Ag	31	Trade
5	Forestry	32	Accommodation Hotels Cafes
6	Fishing	33	Road Freight Transport
7	Coal	34	Road Passenger Transport
8	Oil	35	Rail Freight Transport
9	Gas	36	Rail Passenger Transport
10	Metal Ores	37	Transport Services
11	Other Mining	38	Water Transport
12	Meat Products	39	Air Freight Transport
13	Other Food Manufacturing	40	Air Passenger Transport
14	Textile Clothing Footwear	41	Communications
15	Wood Products	42	Financial Services
16	Paper Products	43	Dwelling
17	Print Publishing	44	Business Services
18	Refinery	45	Professional Technical Services
19	Chemicals	46	Public Services
20	Non-Metal Construction materials	47	Education
21	Basic Metals	48	Hospital Medical Services
22	Metal Products	49	Other Health Services
23	Transport Equipment	50	Community Care Services
24	Photographic and Scientific Equipment	51	Cultural Services
25	Electronic Equipment	52	Recreational Services
26	Other Manufacturing	53	Other Services
27	Utilities		

Note: The relevant industries are highlighted in Teal: the utilities industry and the components of the construction industry

Source: CIE-Regions model

Key drivers of wages in the CIE-Regions model

To illustrate how the CIE-Regions model works, we have performed a number of scenarios to work out how economic growth, export prices, labour supply and the capital stock impact wages growth in the model. Each of these economic variables were shocked

with a 1 per cent change. From the results, we have calculated the elasticity between the variables and growth in real wages. (See Chart 3.2).

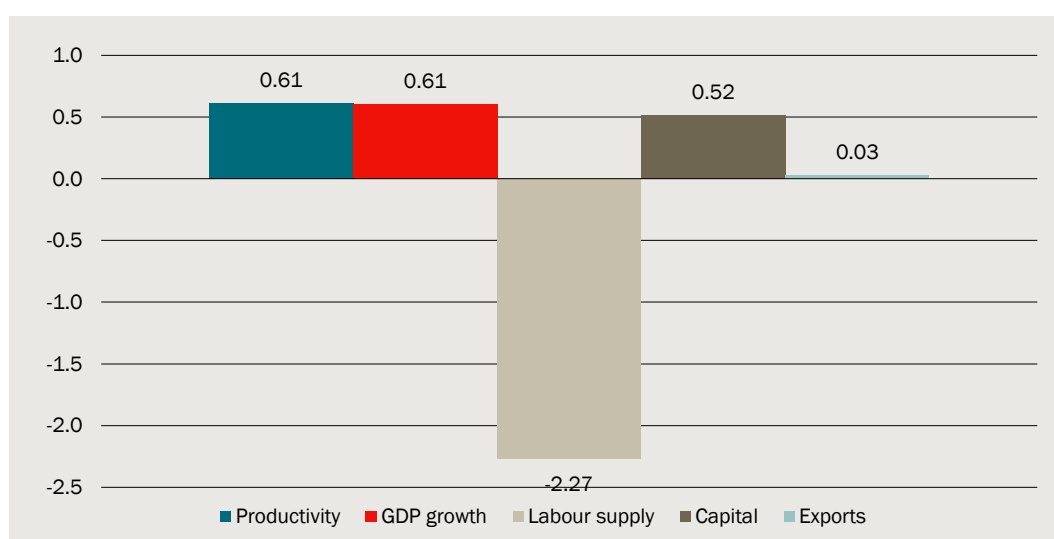
Economic growth has the highest positive impact on wage growth. A one per cent increase in GDP leads to a 0.61 per cent increase in the real wage rate. An increase in economic growth drives an increase in labour demand, which boosts wages growth.

A 1 per cent increase in the capital stock leads to about a 0.5 per cent increase in the wage rate. The higher capital stock increases the capital-labour ratio and increases the marginal productivity of labour, resulting in a higher real wage.

Higher export demand has a positive, but insignificant, impact on wage growth. A one per cent increase in export demand leads to a 0.03 per cent increase in the real wage rate.

By contrast, labour supply has a significant, negative impact on wage growth. A one per cent increase in labour supply would lead to a 2.27 per cent fall in the real wage rate.

3.2 Elasticity between growth in real all-industry WPI and growth in economic drivers



Note: These elasticities are between the growth in *all industries* WPI and national, Australia level economic variables. These elasticities would differ slightly in individual industries and states.

Data source: CIE-Regions model

3. Review and compare forecasts

Our macroeconomic assumptions and wages forecasts are compared to the forecasts of other economists. This is discussed in Chapter 7. This is an important cross-checking exercise.

4 The assumptions that drive these forecasts

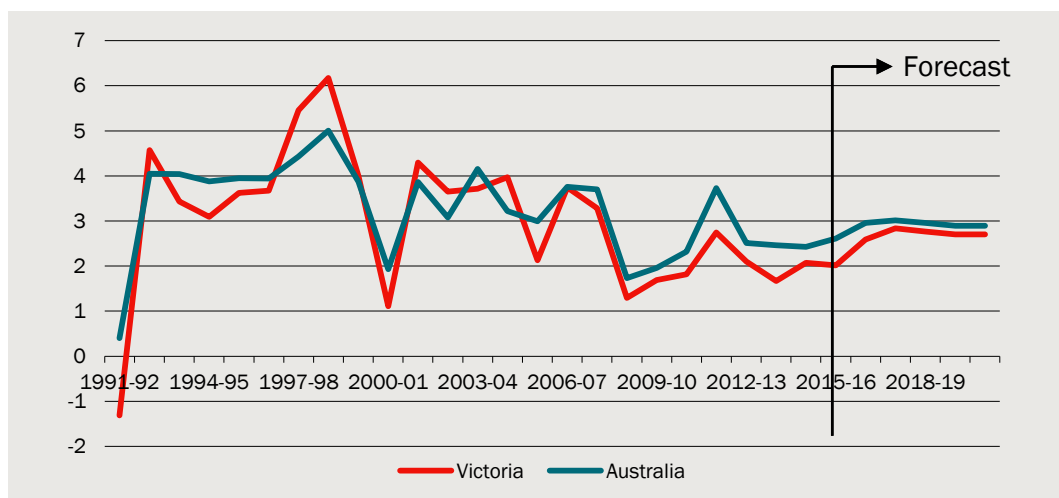
This chapter documents the forecast assumptions the CIE has adopted to forecast growth in wages and explains how we have developed them.

- Assumptions for GDP growth and for export prices and the exchange rate drive demand for labour;
- Assumptions for population and other assumptions determine the supply of labour; and
- Assumptions for inflation determine the difference between real wages growth and nominal wages growth.

GDP growth

Since 2011-12, business conditions have been weak in Australia, and growth in GDP has slowed (see Chart 4.1). The underlying driver of this has been weakening investment, especially in the mining sector, where commodity prices have fallen steeply from record highs (which means there is less incentive to develop new mining projects). Also contributing to weak business conditions has been the high Australian dollar (until its recent depreciation), which weighed on business conditions in other trade exposed industries (including manufacturing, agriculture and tourism). Consumption has also grown slowly as household confidence has weakened with weaker economic conditions.

4.1 Growth in real GDP and GSP in Australia and Victoria (per cent)



Note: The CIE-Regions model works in financial years (September quarter-June quarter). Data here are in financial years. The history of the data finishes at 2014-15; forecasts are from 2015-16 onwards.

Data source: ABS; The CIE

The outlook for GDP growth

Where possible, the most efficient forecast methodology is to adopt the forecasts of an independent forecaster, whose views on the economy are reasonable. The CIE has adopted the forecasts for Australian GDP growth published by the International Monetary Fund (IMF) in their recent October World Economic Outlook (WEO) (shown in Table 4.2, and above Chart 4.1).

The IMF see growth remaining weak in the short-term (at 2.61 per cent in 2015-16): ‘[the] weaker near-term outlook for Australia, reflects the impact of lower commodity prices and resource related investment – partly offset by supportive monetary policy and weaker exchange rate’ (IMF 2015, pp 76). This is reasonable.

4.2 Real growth in Australian GDP (per cent)

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Australian GDP	2.42	2.61	2.96	3.01	2.96	2.89	2.89

Note: The CIE-Regions model works in financial years (September quarter-June quarter). Data here are in financial years. The history of the data finishes at 2014-15; forecasts are from 2015-16 onwards.

Note: The IMF publish their forecasts in calendar years (2015, 2016, etc.). We have estimated financial year forecasts using averages. For example, forecast growth in 2015-16 is the average of forecast growth in 2015 and 2016.

Source: ABS (Cat. 5206); IMF WEO (October 2015)

From 2016-17 the impact of supportive monetary policy and the weaker exchange rate pushes growth back up to its trend rate (around 3 per cent). Within this, the CIE expects export growth in the mining sector to be robust, with recent mining projects expanding production. The implications of these individual trends for *construction* and *utilities* are discussed below. The CIE judges trend growth of 3 per cent to be reasonable (see following discussion).

The IMF’s view of trend growth is broadly reasonable

The IMF have a trend or underlying rate of growth of 3 per cent. This is reasonable for the following reasons.

- With slower economic growth and slower demand for raw materials in Asia, the prices of Australia’s mining exports has fallen since mid-2011. With this, the boom in mining investment that has substantially driven economic conditions in Australia in recent years is unwinding. Therefore, our starting point for ‘trend’ growth in the years ahead is average growth in the pre-mining boom era: 3.2 per cent (average growth between the financial years of 1990 and 2003).
- Economists accept that economic growth the period 1990-2003 was supported by productivity improvements that arose from the economic reforms of the 1980s and 1990s. For example, in a 2010 speech, The Deputy Governor of the Reserve Bank of Australia (RBA), Ric Battellino noted that the reforms: the floating of the Australian dollar, a wide range of reforms to competition and industry policy, labour market reforms and various reforms to the financial system, ‘contributed to a substantial pick-up in productivity growth in the 1990s’ (Battellino, 2010).

- Similar economic reforms have not been made in recent years. Therefore, to determine trend economic growth in the years ahead, we make a downwards adjustment. This adjustment is partially offset by a small upwards adjustment, made to account for the effect of strong expected growth in mining exports. Mining exports are expected to grow strongly as the recent investment boom in mining (which, as discussed, is now declining) has seen the productive capacity of the sector increase substantially.
- Overall, a trend rate of growth of around 3 per cent is reasonable.

GSP growth in Victoria

The CIE has combined Victorian Treasury forecasts for state GSP growth and the headline, IMF forecast for Australian GDP growth to develop assumptions for forecast growth in Victorian GSP (shown in Table 4.3).

4.3 Growth in real GSP in Victoria (per cent)

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Victorian GSP	2.07	2.01	2.59	2.84	2.77	2.70	2.70

Note: The CIE-Regions model works in financial years (September quarter-June quarter). Data here are in financial years. Forecasts are from 2014-15 onwards (as GSP data is released with a significant lag).

Source: ABS; the CIE

The trade exposed manufacturing industry is relatively important to the Victorian economy. As this industry has grown weakly with the effect of the high Australian dollar (before its recent depreciation), Victorian GSP has grown less quickly than the national average in recent years (see Chart 4.1). As conditions in the manufacturing industry improve (with a lower Australian dollar), and with continuing growth in demand for agricultural products from Asia, growth in Victoria is set to increase to a level more consistent with the national average.

Growth in utilities and construction

The CIE-Regions model uses data on the structure of the economy to take growth at the aggregate level (for Australia and Victoria), and project it onto individual industries. A feature of the model is that the structure of the economy is dynamic – it changes from year-to-year as trends in the economy emerge.

As noted, the key drivers of growth are lower interest rates (the RBA has eased the official cash rate from 4.75 per cent in October 2011 to 2.0 per cent at recent meetings) and the weaker exchange rate (which has depreciated from \$1.10 in July 2011 to around \$0.72, immediately before our forecasts were finalised). Also, the CIE expects export growth in the mining sector to be robust, with recent mining projects expanding production. The implications of these drivers for *utilities* and *construction* are discussed below.

Utilities

The lower exchange rate means better business conditions and growth in trade exposed industries. A key one is manufacturing, which is a heavy user of electricity.

The mining industry, where export growth is expected to be robust as new projects expand production, is also a heavy user of electricity.

Combined these trends mean the outlook for growth and labour demand in *utilities* is expected to be relatively strong.

Construction

As noted, investment in mining is currently weakening. This reduces growth in (mining related) construction.

However, lower interest rates are expected to boost housing construction, as it should become easier to borrow and invest in new housing.

Further, investment and (therefore) demand for construction is expected to improve in trade-exposed industries that benefit from the lower dollar (including manufacturing, education and tourism).

Overall, we expect growth and labour demand in *construction* is expected to be relatively strong.

Export prices and the exchange rate

As explained, changes in export demand have a small impact on wages growth. Forecasts for export demand are taken from the Department of Industry and Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES).

A lower exchange rate improves export demand for Australia. The CIE has assumed the value of the Australian dollar (measured in terms of \$US) remains flat at its recent level of US\$0.72, the value before the forecasts were finalised. This methodology is consistent with other forecasters.² Therefore, in our forecasts, changes in the exchange rate do not impact export demand.

Labour supply

In recent decades workforce participation amongst women and older workers (who are staying in work longer) has increased. Partially, this reflects a 'cohort effect' – current generations of women and older workers are more prepared to participate in the labour force than previous generations. Reflecting these trends, over the past 3 decades, annual

² To prepare the forecasts in the May 2015 budget, the Treasury assumed an exchange rate of around US\$0.77. To prepare the forecasts in the August SMP, the RBA assumed the exchange rate was constant at US\$0.74.

growth in employment has been quicker than annual growth in population by around 0.5 percentage points.

For the purposes of forecasting over a 5 year horizon, as is the case in this project, it is reasonable to assume these trends (especially these ‘cohort’ trends) will continue to some extent. There is some evidence these trends may be easing - since the middle of the 2000s, employment growth has slowed relative to population growth. Therefore, to forecast labour supply, we take projections for population growth (from Treasury) and add 0.2 percentage points. Our forecast for growth in labour supply is shown in Table 4.4

4.4 Growth in Australian labour supply

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Labour supply	1.95	1.96	1.96	1.95	1.93	1.91	1.91

Source: Treasury; The CIE

Inflation

Inflation determines the difference between growth in nominal wages and real wages.

In 1993 Australia adopted ‘inflation targeting’, where the goal of the RBA became to use monetary policy to achieve inflation of 2-3 per cent, on average, over the business cycle. Chart 4.5 shows that since the early 2000s, Australian inflation has tracked closely with the RBA’s target band. Therefore, our default position is inflation of 2.5 per cent in each of the forecast years.

Chart 4.1 (above) shows that recently Australia’s economic growth has been weak. This has caused inflation to weaken over the past year (Chart 4.5). Despite this, we expect inflation to pick back up to 2.5 per cent in 2015-16 as the recent depreciation in the exchange rate should support inflation in the near-term. Beyond 2015-16, we expect inflation to be 2.5 per cent per year.

Recently inflation in Victoria has been weaker than the national average. This is expected to turn around the short-term (with slightly stronger inflation in Victoria), before inflation in Victoria settles back to the national average.

4.5 Growth in Australian CPI and Victorian CPI (per cent)



Note: The CIE-Regions model works in financial years (September quarter-June quarter). Data here are in financial years. The history of the data finishes at 2014-15; forecasts are from 2015-16 onwards.

Data source: CIE-Regions model; ABS

5 *Forecasts for wages*

The CIE has projected growth in the relevant wage series using the forecast assumptions described in Chapter 4 and the CIE-Regions model. In the forecast period, there are small fluctuations in growth rates between years. These are normal and are driven by changes in the underlying economic assumptions.

Real wages growth

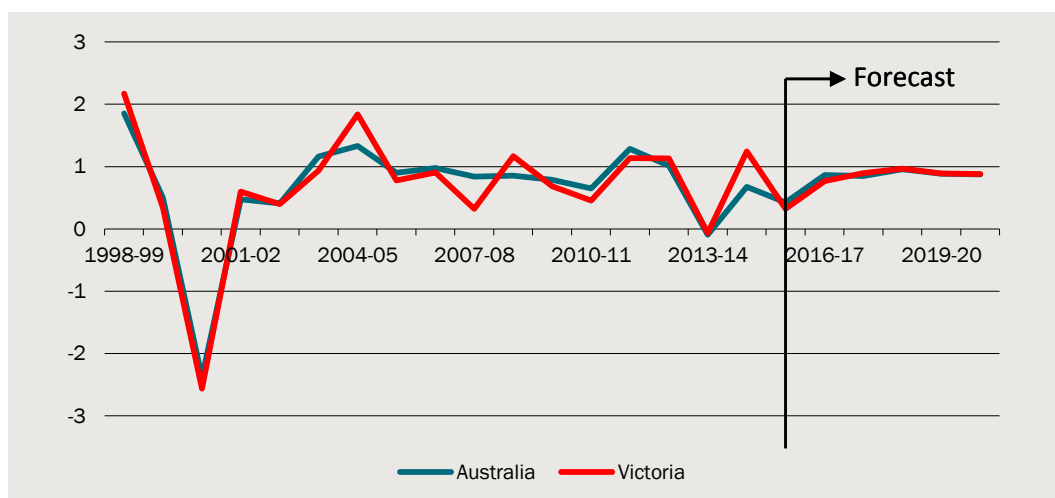
In recent years labour demand has been weak, reflecting weaker economic conditions.

- In 2013-14, the *all-industries* WPI grew very slowly relative to earlier years (see Chart 5.1).
- In 2014-15, real wages growth picked up. This was because inflation was very weak. In fact labour demand and wages both remained weak (see Chart 5.3, below).

As explained in Chapter 4, the IMF forecast for GDP (adopted by the CIE) indicates that economic conditions and (therefore) labour demand are expected to remain weak in the near-term (GDP growth, at 2.6 per cent, is projected to remain significantly below trend pace in 2015-16). Growth in real wages is thus projected to remain weak in 2015-16.

From 2016-17, the IMF forecast for GDP (adopted by the CIE) indicates that growth and business conditions will improve. With this labour demand will improve. Growth in real wages will follow (though wages growth will be partially tempered by growth in labour supply). As shown in Chart 5.1, growth in the real *all-industries* WPI is projected to pick-up to a pace that is consistent with the history of the series (around 1 per cent).

5.1 Real growth in the WPI for all industries (per cent)



Note: The CIE-Regions model works in financial years (September quarter-June quarter). Data here are in financial years. The history of the data finishes at 2014-15; forecasts are from 2015-16 onwards. The forecasts incorporate data from the September quarter 2015.
Data source: ABS; CIE-Regions model

Victoria

Consistent with the history of the series, real growth in the Victoria *all-industries* WPI is projected to be in-line with the growth in the Australia *all-industries* WPI.

Outlook by industry

Business conditions and growth in the *utilities* and *construction* industries are expected to be stronger than the national average. (These trends are explained in Chapter 4). With this, labour demand and real WPI growth is expected to be strong in these industries relative to the national average (this is shown in Table 5.2).

5.2 Real wage growth across industries (per cent)

	Australia			Victoria		
	All industries	Utilities	Construction	All industries	Utilities	Construction
2014-15	0.68	1.07	0.40	1.25	2.08	1.60
2015-16	0.43	0.54	0.40	0.32	0.60	0.57
2016-17	0.87	0.98	1.15	0.77	0.88	1.06
2017-18	0.85	1.01	1.25	0.90	1.04	1.30
2018-19	0.96	1.05	1.21	0.97	1.07	1.24
2019-20	0.89	0.96	1.10	0.89	0.98	1.13
2020-21	0.87	0.95	1.10	0.88	0.97	1.13

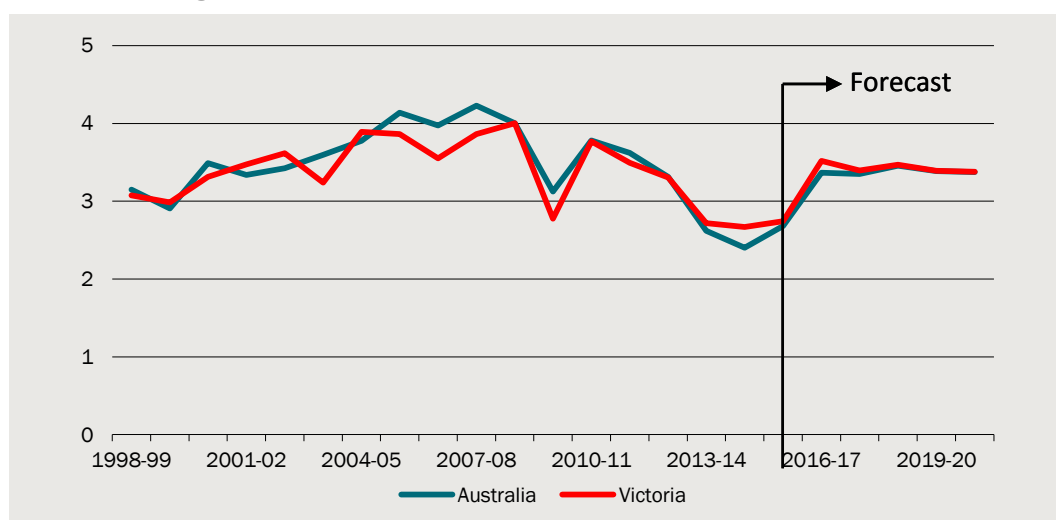
Note: The CIE-Regions model works in financial years (September quarter-June quarter). Data here are in financial years. The history of the data finishes at 2014-15; forecasts are from 2015-16 onwards. The forecasts incorporate data from the September quarter 2015.
Data source: ABS; CIE-Regions model

Nominal wages growth

The trends in nominal wages growth reflect trends in real wages and inflation.

- Growth in the nominal, Australia, all-industry WPI is projected to pick from its current low rate to a rate consistent with historical growth in the series, driven by stronger labour demand. Labour demand picks up with business conditions.
- Consistent with historical trends in the series, nominal WPI growth in Victoria is projected to be close to the national average.
- Nominal WPI growth in the *utilities* and *construction* industries is stronger than the national average, reflecting the stronger outlook for these industries.

5.3 Nominal growth in the all-industries WPI (per cent)



Note: The CIE-Regions model works in financial years (September quarter-June quarter). Data here are in financial years. The history of the data finishes at 2014-15; forecasts are from 2015-16 onwards. The forecasts incorporate data from the September quarter 2015.
Data source: ABS; CIE-Regions model

5.4 Nominal growth in the WPI across industries (per cent)

	Australia			Victoria		
	All industries	Utilities	Construction	All industries	Utilities	Construction
2014-15	2.40	2.81	2.12	2.67	3.52	3.02
2015-16	2.68	2.80	2.66	2.74	3.02	3.00
2016-17	3.37	3.48	3.65	3.52	3.63	3.81
2017-18	3.35	3.51	3.75	3.40	3.54	3.80
2018-19	3.46	3.55	3.71	3.47	3.57	3.74
2019-20	3.39	3.46	3.60	3.39	3.48	3.63
2020-21	3.37	3.45	3.60	3.38	3.47	3.63

Note: The CIE-Regions model works in financial years (September quarter-June quarter). Data here are in financial years. The history of the data finishes at 2014-15; forecasts are from 2015-16 onwards. The forecasts incorporate data from the September quarter 2015.
Data source: ABS; CIE-Regions model

6 *How our forecasts have changed*

Between these current forecasts (November 2015) and our previous set of forecasts developed for the distributors (in December 2014)³, The CIE has downgraded the forecast for growth in the real, Australia-level, *all industries* WPI (shown in Table 6.1). This is caused by our downgrade to forecast GDP growth and our upgrade to forecast labour supply growth.

6.1 Forecast for growth in real, Australia, all-industry WPI

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
December 2014	1.19	1.78	1.96	1.68	1.695	1.77	1.78
November 2015	0.68	0.43	0.87	0.85	0.96	0.89	0.87

Source: The CIE

GDP growth

We have downgraded our forecast for GDP growth in the short-term, shown in Table 6.2. This reduces demand for labour and results in weaker wages growth.

For our forecast in 2014, our approach to forecasting GDP was to forecast the level of activity in each state individually (using State Treasury forecasts) and then sum up to get a forecast for Australia. As shown in Table 6.2, this resulted in a relatively strong forecast in the years 2015-16 and 2016-17. As noted, in our new forecasts, we have taken IMF forecasts. We have evaluated the IMF's forecasts (see Chapter 4) and judged them to be reasonable. Overall, we think the approach of adopting the IMF forecasts gives us forecasts that are more accurate.

6.2 Forecasts for real growth in Australian GDP (per cent)

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
December 2014	2.68	2.98	3.29	3.13	3.12	3.12	
November 2015	2.42	2.61	2.96	3.01	2.96	2.89	2.89

Source: The CIE

³ Published here, under document for 'Appendix 8C' <https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/ausnet-services-sp-ausnet-determination-2016-20/proposal>

Labour supply

We have upgraded our forecast for labour supply. For our forecast in 2014, labour supply grew in line with population. In our new forecasts, we have refined this assumption, and labour supply grows in line with population plus 0.2 percentage points, reflecting increased workforce participation amongst women and older workers.

6.3 Forecasts for growth in labour supply (per cent)

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
December 2014	1.75	1.76	1.76	1.75	1.73	1.71	1.71
November 2015	1.95	1.96	1.96	1.95	1.93	1.91	1.91

Source: The CIE

7 Comparison and review of forecasts

As a way of examining the reliability of projections, we compare and discuss our forecasts with those of other economists.

GDP growth

Economic activity – measured with GDP – is the key driver of labour demand. Therefore, expected GDP growth is the key driver of expected growth in real wages.

As noted, the CIE has adopted the IMF's forecast for GDP growth. Table 7.1 shows competing forecasts for Australian GDP growth.

- The CIE, Deloitte Access Economics (DAE) and the RBA have forecasts that are broadly consistent with one another over the years for which they are published. Their forecasts are weaker than other forecasts.
- BIS-Shrapnel (BIS) and Treasury have relatively strong forecasts. This is especially the case in the medium term. This implies BIS and Treasury have stronger views about the pace of underlying or trend growth in the economy.

7.1 Forecasts for real GDP growth in Australia

	CIE / IMF ^a	DAE	RBA	BIS ^a	Treasury
Publication date	Nov/Oct 15	Jun 15	Aug 15	Nov 14	May 15
2014-15	2.42	2.4	2.25	2.7	2.5
2015-16	2.61	2.7	2-3	3.0	2.75
2016-17	2.96	3.1	2.5-3.5	3.5	3.25
2017-18	3.01	3.0		3.2	3.5
2018-19	2.96	2.7		3.2	3.5
2019-20	2.89	2.8		3.7	
2020-21	2.89	3.0			
	Weaker forecasts			Stronger forecasts	

^a Both the IMF and BIS published GDP growth for calendar years. We convert these to financial year forecasts with averages (i.e. the forecast for 2015-16 is the average of the forecasts in 2015 and 2016).

Source: CIE-Regions model; Commonwealth of Australia 2015, The Treasury, 2015-16 Budget, Budget Paper No. 1 - Budget Strategy and Outlook; Deloitte Access Economics 2015, Forecast growth in labour costs in NEM regions of Australia – Report prepared for the AER; International Monetary Fund 2015, World Economic Outlook October 2015; Jemena Electricity Networks 2015, Real labour and material cost escalation forecasts to 2020 (contains BIS's forecasts); Reserve Bank of Australia 2015, Statement of Monetary Policy August 2015.

Employment

An increase in labour supply reduces wages growth. In the CIE-Regions model, our forecast for labour supply feeds into our forecast for employment.

- The CIE's forecasts for employment are consistent with population growth plus 0.2 percentage points. In the medium term, Treasury have similar forecasts for employment.
- The CIE and Treasury are stronger than DAE. DAE's forecasts for employment are closer to population growth in the medium term.
- BIS's forecasts for population growth are variable.

7.2 Forecasts for employment growth in Australia

	CIE	DAE	RBA	BIS ^a	Treasury
Publication date	Nov 15	Jun 15	Aug 15	Nov 14	May 15
2014-15	1.95	1.2	-	1.0	1.5
2015-16	1.96	1.1	-	1.5	1.5
2016-17	1.96	1.6	-	2.0	2
2017-18	1.95	1.6		1.4	2
2018-19	1.93	1.7		1.1	2
2019-20	1.91	1.6		1.9	
2020-21	1.91	1.6			

^a BIS publishes employment growth for calendar years. We convert these to financial year forecasts with averages (i.e. the forecast for 2015-16 is the average of the forecasts in 2015 and 2016).

Source: CIE-Regions model; Commonwealth of Australia 2015, *The Treasury, 2015-16 Budget, Budget Paper No. 1 - Budget Strategy and Outlook*; Deloitte Access Economics 2015, *Forecast growth in labour costs in NEM regions of Australia - Report prepared for the AER*; International Monetary Fund 2015, *World Economic Outlook October 2015*; Jemena Electricity Networks 2015, *Real labour and material cost escalation forecasts to 2020* (contains BIS's forecasts); Reserve Bank of Australia 2015, *Statement of Monetary Policy August 2015*.

Implied productivity forecasts

The difference between forecast growth in GDP and forecast growth in employment provides the implied forecast for (approximate) growth in labour productivity (defined as output per worker).

Growth in labour productivity is the underlying driver of real wages growth.⁴ Therefore, in the long-run, real wages should grow in-line with growth in labour productivity. In the short-run, growth in labour productivity and wages can diverge, depending on labour market conditions).

⁴ The relationship between implied growth in labour productivity and real growth in wages is imperfect. For example, if hours worked per worker increase, this could see 'labour productivity' (as defined here - output per worker) increase but would not necessarily see growth in the WPI increase. Despite this, the link between labour productivity and real wages growth, in broad terms, is reasonable. It is made to help the reader understand the differences in the forecasts.

- Overall, The CIE has the weakest outlook for implied productivity, with implied growth of around 1 per cent each year.
- Treasury have implied productivity growth picking up smoothly to 1.5 per cent.
- DAE and BIS have more variable forecasts for implied productivity. Overall, they are stronger than the CIE's outlook (DAE averages around 1.3 per cent per year, BIS averages around 1.7 per cent per year).
- Productivity growth of around 1.5 per cent is broadly consistent with productivity growth in the 2000s. Most recent commentary by economists suggests the consensus view is that productivity growth in the short and medium term will be weaker than productivity growth in the 2000s (as recently we have not undertaken much economic reform).

7.3 Implied forecast growth in productivity (GDP growth less employment growth)

	CIE	DAE	RBA	BIS	Treasury
Publication date	Nov 15	Jun 15	Aug 15	Nov 14	May 15
2014-15	0.47	1.20	–	1.75	1.00
2015-16	0.66	1.60	–	1.45	1.25
2016-17	1.00	1.50	–	1.50	1.25
2017-18	1.06	1.40	–	1.80	1.50
2018-19	1.03	1.00	–	2.10	1.50
2019-20	0.98	1.20	–	1.80	
2020-21	0.98	1.40	–		

^a BIS forecasts are in calendar years. We convert these to financial year forecasts with averages (i.e. the forecast for 2015-16 is the average of the forecasts in 2015 and 2016).

Source: CIE-Regions model; Commonwealth of Australia 2015, *The Treasury, 2015-16 Budget, Budget Paper No. 1 - Budget Strategy and Outlook*; Deloitte Access Economics 2015, *Forecast growth in labour costs in NEM regions of Australia - Report prepared for the AER*; International Monetary Fund 2015, *World Economic Outlook October 2015*; Jemena Electricity Networks 2015, *Real labour and material cost escalation forecasts to 2020* (contains BIS's forecasts); Reserve Bank of Australia 2015, *Statement of Monetary Policy August 2015*.

Real wages growth (and comparison with implied productivity)

Table 7.4 shows forecasts for real growth in the Australia *all-industries* WPI.

- In the short-term, projected growth across forecasters is variable.
- In the medium term the CIE expect weaker growth than the DAE and BIS.

7.4 Forecasts for real growth in *all-industries* WPI in Australia (per cent)

	CIE	DAE	RBA	BIS	Treasury
Publication date	Nov 15	Jun 15	Aug 15	Nov 14	May 15
2014-15	0.68	0.8	–	0.5	–
2015-16	0.43	0.3	–	0.6	–
2016-17	0.87	0.1	–	1.2	–
2017-18	0.85	0.9	–	1.4	–
2018-19	0.96	1.1	–	1.3	–
2019-20	0.89	1.1	–	1.5	–
2020-21	0.87	1.1	–	–	–

^a BIS forecasts are in calendar years. We convert these to financial year forecasts with averages (i.e. the forecast for 2015-16 is the average of the forecasts in 2015 and 2016).

Source: CIE-Regions model; Commonwealth of Australia 2015, *The Treasury, 2015-16 Budget, Budget Paper No. 1 - Budget Strategy and Outlook*; Deloitte Access Economics 2015, *Forecast growth in labour costs in NEM regions of Australia – Report prepared for the AER*; International Monetary Fund 2015, *World Economic Outlook October 2015*; Jemena Electricity Networks 2015, *Real labour and material cost escalation forecasts to 2020* (contains BIS's forecasts); Reserve Bank of Australia 2015, *Statement of Monetary Policy August 2015*.

Inflation

Inflation (growth in the CPI) is the difference between real wages growth and nominal wages growth. Consistent with the CIE's approach, most forecasters expect inflation to be around the mid-point of the RBA's range (2-3 per cent).

7.5 Forecasts for inflation

	CIE	DAE	RBA	BIS ^a	Treasury
Publication date	Nov 15	Jun 15	Aug 15	Nov 14	May 15
2014-15	1.71	1.6	–	2.5	1.75
2015-16	2.50	2.1	–	2.9	2.5
2016-17	2.50	2.8	–	2.7	2.5
2017-18	2.50	2.5	–	2.5	2.5
2018-19	2.50	2.5	–	2.5	2.5
2019-20	2.50	2.4	–	2.5	–
2020-21	2.50	2.5	–	–	–

^a BIS forecasts are in calendar years. We convert these to financial year forecasts with averages (i.e. the forecast for 2015-16 is the average of the forecasts in 2015 and 2016).

Source: CIE-Regions model; Commonwealth of Australia 2015, *The Treasury, 2015-16 Budget, Budget Paper No. 1 - Budget Strategy and Outlook*; Deloitte Access Economics 2015, *Forecast growth in labour costs in NEM regions of Australia – Report prepared for the AER*; International Monetary Fund 2015, *World Economic Outlook October 2015*; Jemena Electricity Networks 2015, *Real labour and material cost escalation forecasts to 2020* (contains BIS's forecasts); Reserve Bank of Australia 2015, *Statement of Monetary Policy August 2015*.

Nominal wages growth

Given the similar outlooks for inflation, forecasts for nominal wages (shown in Table 7.6) differ in-line with forecasts for real wages. In the medium term, the CIE is weaker than DAE and BIS.

7.6 Growth in nominal, Australia, all-industry WPI

	CIE	DAE	RBA	BIS ^a	Treasury
Publication date	Nov 15	Jun 15	Aug 15	Nov 14	May 15
2014-15	2.40	2.4	–	2.9	2.5
2015-16	2.68	2.5	–	3.5	2.5
2016-17	3.37	2.9	–	3.8	2.75
2017-18	3.35	3.4	–	3.7	2.75
2018-19	3.46	3.6	–	3.7	3.25
2019-20	3.39	3.6	–	4.0	
2020-21	3.37	3.6	–		

^a BIS forecasts are in calendar years. We convert these to financial year forecasts with averages (i.e. the forecast for 2015-16 is the average of the forecasts in 2015 and 2016).

Source: CIE-Regions model; Commonwealth of Australia 2015, The Treasury, 2015-16 Budget, Budget Paper No. 1 - Budget Strategy and Outlook; Deloitte Access Economics 2015, Forecast growth in labour costs in NEM regions of Australia – Report prepared for the AER; International Monetary Fund 2015, World Economic Outlook October 2015; Jemena Electricity Networks 2015, Real labour and material cost escalation forecasts to 2020 (contains BIS's forecasts); Reserve Bank of Australia 2015, Statement of Monetary Policy August 2015.

Real wages at the state and industry level

Utilities industry

In the *utilities* industry, the CIE are between DAE and BIS (see Table 7.7).

- The CIE expect slightly stronger wages growth in *utilities* than in the national average (see Chapter 4).
- DAE have relatively weak WPI growth in *utilities*. While they note various positive factors for the sector, they expect weak activity growth in the sector, reflecting the ramp-up in electricity prices in recent years.
- BIS expect stronger growth, consistent with their stronger outlook.

7.7 Forecast growth in real WPI for the utilities industry

	CIE	DAE	RBA	BIS	Treasury
Publication date	Nov 15	Jun 15	Aug 15	Nov 14	May 15
2014-15	1.07	1.3	--	0.75	--
2015-16	0.54	0.6	--	0.6	--
2016-17	0.98	-0.1	--	1.15	--
2017-18	1.01	0.5	--	1.6	--
2018-19	1.05	0.7	--	1.9	--
2019-20	0.96	0.8	--	1.9	--
2020-21	0.95	0.9	--	--	--

Source: CIE-Regions model; Commonwealth of Australia 2015, The Treasury, 2015-16 Budget, Budget Paper No. 1 - Budget Strategy and Outlook; Deloitte Access Economics 2015, Forecast growth in labour costs in NEM regions of Australia – Report prepared for the AER; International Monetary Fund 2015, World Economic Outlook October 2015; Jemena Electricity Networks 2015, Real labour and material cost escalation forecasts to 2020 (contains BIS's forecasts); Reserve Bank of Australia 2015, Statement of Monetary Policy August 2015.

Construction industry

In the *construction* industry, the CIE are between DAE and BIS (see Table 7.8).

- As explained in Chapter 4, the CIE expect relatively strong activity growth in *construction*, and this is feeding into wages growth.
- DAE expect relatively weak growth in *construction*, due to the fall in mining-related *construction*. This translates into weaker WPI growth.
- BIS have strong forecasts, reflecting their stronger outlook.

7.8 Forecast growth in real WPI for the construction industry

	CIE	DAE	RBA	BIS	Treasury
Publication date	Nov 15	Jun 15	Aug 15	Nov 14	May 15
2014-15	0.40	0.5	--	0.7	--
2015-16	0.40	0.3	--	0.6	--
2016-17	1.15	0.2	--	1.1	--
2017-18	1.25	1	--	1.3	--
2018-19	1.21	1	--	1.5	--
2019-20	1.10	1	--	1.8	--
2020-21	1.10	1.1	--	--	--

Source: CIE-Regions model; Commonwealth of Australia 2015, The Treasury, 2015-16 Budget, Budget Paper No. 1 - Budget Strategy and Outlook; Deloitte Access Economics 2015, Forecast growth in labour costs in NEM regions of Australia – Report prepared for the AER; International Monetary Fund 2015, World Economic Outlook October 2015; Jemena Electricity Networks 2015, Real labour and material cost escalation forecasts to 2020 (contains BIS's forecasts); Reserve Bank of Australia 2015, Statement of Monetary Policy August 2015.

Victoria

DAE and BIS do not publish data on their forecasts for real growth in the WPI in Victoria.

8 Calendar year forecasts

For this project, the distributors requested wage forecasts from 2015 to 2020, based on calendar years.

We have converted the wage forecasts presented in Chapter 5 into calendar years, using an average across financial years (e.g. the forecast in 2016 is the average of the 2015-16 and 2016-17 forecasts). These converted forecasts are presented here. Table 8.1 shows real wages growth and Table 8.2 shows nominal wages growth.

8.1 Growth in real WPI (per cent)

	Australia			Victoria		
	All industries	Utilities	Construction	All industries	Utilities	Construction
2015	0.55	0.81	0.40	0.78	1.34	1.08
2016	0.65	0.76	0.78	0.54	0.74	0.82
2017	0.86	1.00	1.20	0.83	0.96	1.18
2018	0.90	1.03	1.23	0.93	1.05	1.27
2019	0.92	1.01	1.16	0.93	1.02	1.18
2020	0.88	0.96	1.10	0.88	0.97	1.13

Note: The CIE-Regions model works in financial years (September quarter-June quarter). These calendar year forecasts have been developed with averages (e.g. forecast growth in 2015 is the average of growth in 2014-15 and 2015-16). The forecasts incorporate data from the September quarter 2015.

Source: CIE-Regions model

8.2 Growth in nominal WPI (per cent)

	Australia			Victoria		
	All industries	Utilities	Construction	All industries	Utilities	Construction
2015	2.54	2.80	2.39	2.71	3.27	3.01
2016	3.02	3.14	3.15	3.13	3.33	3.40
2017	3.36	3.50	3.70	3.46	3.58	3.80
2018	3.40	3.53	3.73	3.43	3.55	3.77
2019	3.42	3.51	3.66	3.43	3.52	3.68
2020	3.38	3.46	3.60	3.38	3.47	3.63

Note: The CIE-Regions model works in financial years (September quarter-June quarter). These calendar year forecasts have been developed with averages (e.g. forecast growth in 2015 is the average of growth in 2014-15 and 2015-16). The forecasts incorporate data from the September quarter 2015.

Source: CIE-Regions model

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