



Australian Government  
The Treasury

**TSY/AU**

# Analysis of wage growth

November 2017



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# Foreword

In June 2017 the Treasurer tasked Treasury to complete a thorough analysis of wage growth in Australia. This paper sets out analysis on recent trends in wage growth, wage growth in capital city and regional areas, the key drivers of wage growth, international comparisons of wage growth, the changing nature of the labour force, trends in the labour share of income, wage growth by employee characteristics, wage growth by business characteristics, and trends in the method of pay setting.

## Summary

On a variety of measures, wage growth is low. Regional mining areas have experienced faster wage growth, but wage growth has slowed in both mining and non-mining regions. Wage growth has been fairly similar across capital cities and regional areas, although the level of wages is higher in the capital cities.

The key driver of wage growth over the long-term is productivity and inflation expectations. This means that real wage growth – wage growth relative to the increase in prices in the economy – reflects labour productivity growth. However, fluctuations across the business cycle can result in real wage growth diverging from productivity growth. There are two ways of measuring real wages. One is from the producer perspective and the other is from the consumer perspective. Producers are concerned with how their labour costs compare to the price of their outputs. Consumers are concerned with how their wages compare with the cost of goods and services they purchase.

Generally, consumer and producer prices would be expected to grow together in the long-term, so the real producer wage and real consumer wage would also grow together. Consumer and producer prices diverged during the mining investment boom due to strong rises in commodity export prices. The unwinding of the mining investment boom and spare capacity in the labour market are important cyclical factors that are currently weighing on wage growth.

It is unclear whether these cyclical factors can explain all of the weakness in wage growth. Many advanced economies are also experiencing subdued wage growth. In particular, labour productivity growth has slowed in many economies. However, weaker labour productivity growth seems unlikely to be a cause of the current period of slow wage growth in Australia. Over the past five years, labour productivity in Australia has grown at around its 30-year average annual growth rate.

It is difficult to draw firm conclusions on the effect of structural factors on wage growth, given they have been occurring over a long timeframe and global low-wage growth is a more recent phenomenon. Three key trends are the increasing rates of part-time employment, growth in employment in the services industries, and a gradual decline in the share of routine jobs, both manual and cognitive, and a corresponding rise in non-routine jobs.

Both cyclical and structural factors can affect growth in real producer wages and labour productivity, so such factors can also affect the labour share of income. Changes in the labour share of income occur as a result of relative growth in the real producer wage and labour productivity. Since the early 1990s, the labour share of income has remained fairly stable. Nonetheless, different factors have placed both upward and downward pressure on the labour share of income.

An examination of wage growth by employee characteristics using the Household Income and Labour Dynamics in Australia (HILDA) survey and administrative taxation data suggests that recent subdued wage growth has been experienced by the majority of employees, regardless of income or occupation. Workers with a university education had higher wage growth than those with no post-school education over the period 2005-2010, but have since experienced lower wage growth than individuals with no post-school education.

An examination of wage growth by business characteristics using the Business Longitudinal Analysis Data Environment (BLADE) suggests that higher-productivity businesses pay higher real wages and employees at these businesses have also experienced higher real wage growth. Larger businesses (measured by turnover) tend to be more productive, pay higher real wages and have higher real wage growth. Capital per worker appears to be a key in differences in labour productivity and hence real wages between businesses, with more productive businesses having higher capital per worker.

Wage growth is low across all methods of pay setting. In recent years, increases in award wages have generally been larger than the overall increase in the Wage Price Index. At the same time, award reliance has increased in some industries while the coverage of collective agreements has fallen. There are a range of reasons for the decline in bargaining including the reclassification of some professions, the technical nature of bargaining, natural maturation of the system and award modernisation which has made compliance with the award system easier than before.

## CHAPTER 1<sup>3</sup>

# Recent trends in wage growth

On a variety of measures, wage growth in Australia is low. This is true across the States and Territories, across industries, and across both the public and private sectors. Real wage growth – wage growth relative to the increase in prices in the economy – has also been low.

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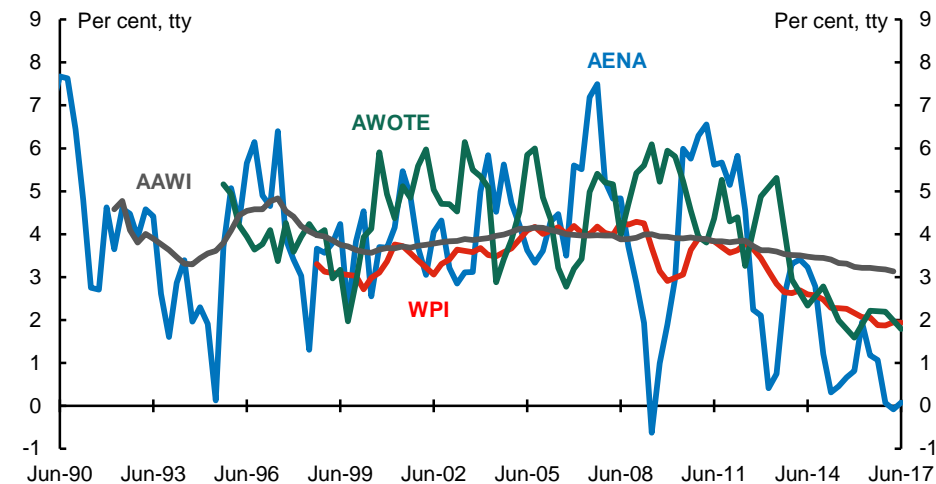
<sup>3</sup> The views expressed in this chapter are those of The Treasury and do not necessarily reflect those of the Australian Government. This chapter was prepared by Angelia Grant and Angus Moore in Macroeconomic Group. Analysis in the note includes information available as at 8 September 2017.

## Available measures of wages show low growth

On a variety of measures, wage growth is low.

A number of measures of aggregate wages show low growth (Chart 1). The Wage Price Index (WPI) grew by 1.9 per cent through the year to the June quarter 2017, which is the lowest through-the-year growth since the beginning of the series in 1997. The WPI is a pure price measure of wage growth — it measures the change in wages and salaries where the quality and quantity of labour are held constant.

**CHART 1**  
Aggregate wage growth



Growth in Average Earnings in the National Accounts (AENA) is also low. AENA increased by 0.1 per cent through the year to the June quarter 2017. AENA is a broader measure of wage growth than the WPI. It is calculated as total compensation of employees (i.e. total remuneration, in cash or in kind, paid to an employee, including both wages and salaries and contributions by employers to pension and superannuation funds) divided by the number of wage and salary earners. This means that AENA is affected by compositional change in the labour market. For example, if employment shifts towards industries with lower relative pay, this will show up in AENA.

Other measures of wage growth, such as Average Weekly Earnings (AWE), Average Weekly Ordinary Time Earnings (AWOTE), or Average Annualised Wage Increase (AAWI) implied from active Enterprise Bargaining Agreements, are also low.

AWE gives a value of average wages and salaries from a survey of employers. It provides a dollar measure of average weekly earnings and is affected by compositional changes such as occupations, skill levels and hours worked. It excludes superannuation, irregular payments, payments in kind, salary sacrifice and redundancy payments. AWOTE is a measure of average weekly earnings for full-time adult employees, excluding overtime. It is part of the same survey as AWE. AAWI is constructed by the Department of Employment. It is the average annualised wage increase in federally registered enterprise bargaining agreements that provide for quantifiable wage increases over the life of the agreement. It is a measure of wage growth at the agreement level, and does not measure job- or employee-level wage growth.

## All States and Territories are experiencing low wage growth

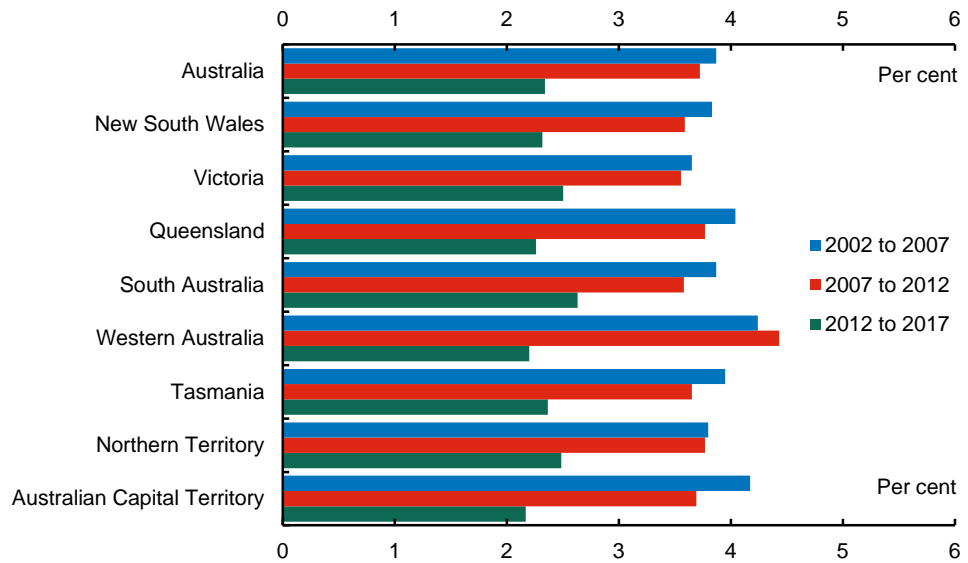
Over the past five years wage growth has been significantly lower across all States and Territories.

All States and Territories have experienced significantly lower wage growth over the past five years compared to the decade prior (Chart 2). In most States and Territories, wage growth has been around 1 to 1½ percentage points lower over the past five years compared to the five years prior. Only South Australia and Western Australia fall outside that range. All States and Territories recorded average wage growth of between 3½ and 4½ per cent between 2002 and 2012 and growth of around 2½ per cent over the past five years.

CHAPTER 1 3B Recent trends in wage growth

The slowdown in average annual wage growth has been particularly pronounced in Western Australia. Wage growth in Western Australia has fallen by over 2 percentage points in the past five years, compared with the preceding five year period.

**CHART 2**  
Wage growth by State and Territory, five-year annual average



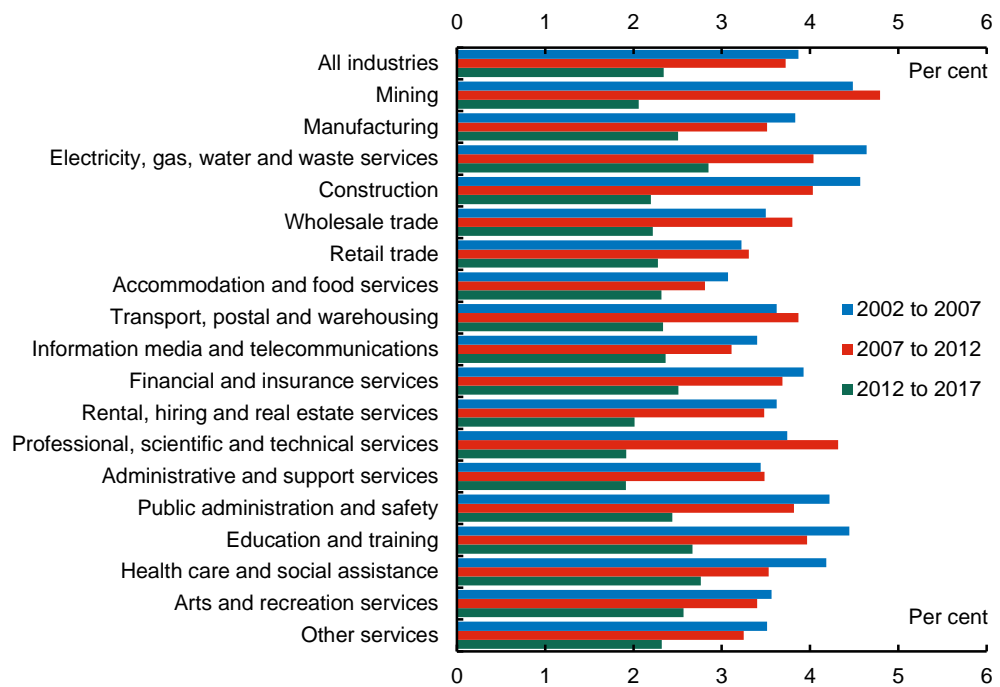
Source: ABS Cat. no. 6345.0.

All industries are experiencing low wage growth

Wage growth has slowed across all industries. The largest slowing in annual wage growth has occurred in the mining industry.

All industries have experienced lower wage growth in the past five years compared to earlier periods (Chart 3).

**CHART 3**  
Wage growth by industry, five-year annual average



Source: ABS Cat. no. 6345.0.



The slowing in wage growth in the mining industry has been particularly large. Annual wage growth in the mining industry averaged 4.8 per cent between 2007 and 2012 and around 4.5 per cent in the preceding five year period. Annual wage growth in the professional, scientific and technical services industry was also strong over 2007-2012 and has since slowed, likely because parts of this industry service the mining industry.

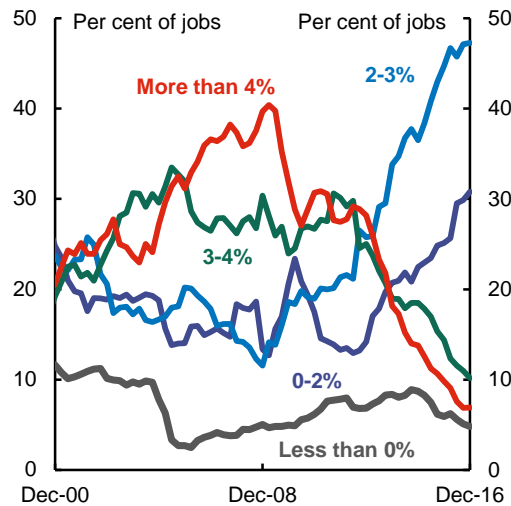
### Low wage growth is also evident at the job level

Fewer than 10 per cent of jobs are receiving pay rises in excess of 4 per cent when their wages are adjusted — the lowest level since at least 2000.

Wage growth is also low when job-level data is examined. The ABS and RBA have produced analysis using data on wage growth for around 18,000 jobs (Bishop 2016).<sup>4,5</sup>

As at September 2016, fewer than 10 per cent of jobs whose wages were changed received pay rises in excess of 4 per cent. This is the lowest level since at least 2000 (Chart 4). Moreover, the average size of pay rises in excess of 4 per cent has fallen from 7½ per cent in 2012 to 5¾ per cent in 2016.

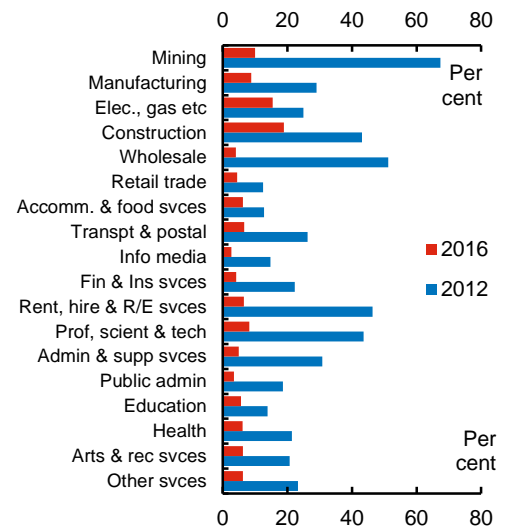
**CHART 4**  
Wage changes of different sizes



Source: Joint ABS and RBA research.

Note: Smoothed using a four-quarter moving average.

**CHART 5**  
Share of wage rises in excess of 4 per cent



Source: Joint ABS and RBA research.

This decline has been universal across industries — consistent with weak average growth at the industry level (Chart 5). Only the construction and utilities industries record that more than 10 per cent of wage adjustments receive pay rises in excess of 4 per cent.

The frequency of wage adjustment is also at its lowest level since at least 2000 (Bishop 2016). The average time between wage changes has risen from once every 4 quarters in 2012 to once every 4¼ quarters in 2016. The declining size of wage rises has contributed more than two-thirds of the overall fall in wage growth, while the decline in the frequency of wage changes accounts for the remaining one-third.

<sup>4</sup> Bishop J (2016), *The Size and Frequency of Wage Changes*, ABS Feature Article, September.

<sup>5</sup> The WPI, on which the analysis is based, is a measure of job-level wage growth, not employee-level wage growth. Employees may receive higher wage growth than these numbers imply by changing into higher paid jobs.

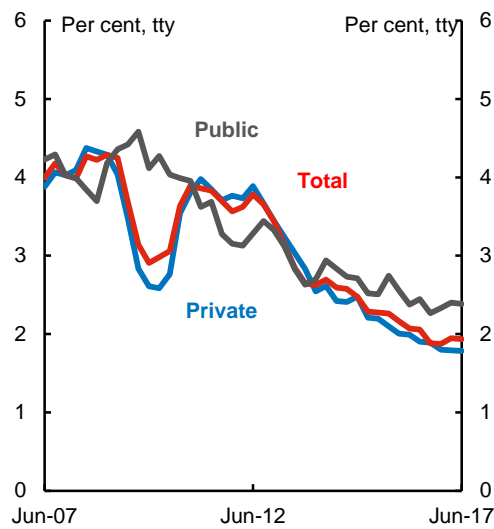
## Both public sector and private sector wage growth are low

Public and private sector wage growth is low, although public sector wage growth has exceeded private sector growth recently.

Public sector wage growth is low by historical standards although it has been higher than private sector wage growth over the past few years (Chart 6). The public sector WPI grew by 2.4 per cent through the year to the June quarter 2017, compared with growth of 1.8 per cent for the private sector. On average, since the WPI was introduced in 1997, public sector WPI has grown about a quarter of a percentage point faster than the private sector WPI annually.

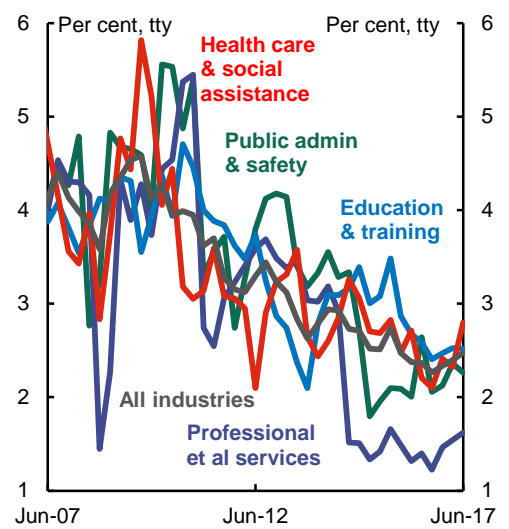
The weakness in public sector wage growth is broad-based across the industries for which data on the public sector industry splits are available (Chart 7). Only education and training has meaningfully outstripped overall public sector WPI growth in the past few years. The professional, scientific and technical services industry has experienced especially weak growth in the public sector since 2013, broadly consistent with the experience of the industry overall.

**CHART 6**  
WPI growth by sector



Source: ABS Cat. no. 6345.0.

**CHART 7**  
Public sector wage growth



Source: ABS Cat. no. 6345.0.

Note: The industries shown account for around 87 per cent of public sector wage expenditure.

## Real wage growth is also low

Real wage growth has also been low, but the slowing is less pronounced than nominal wage growth because inflation has also been low.

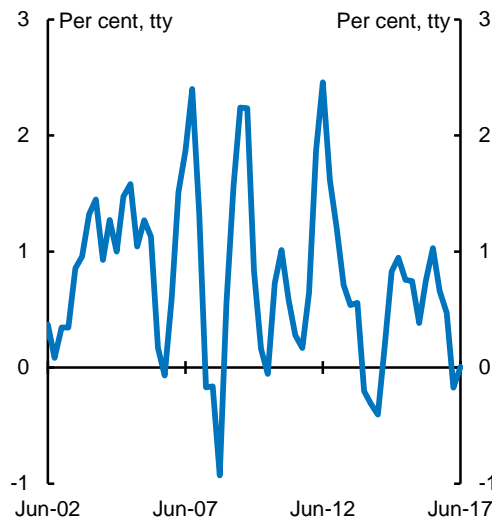
Another way to examine wage growth is to adjust it for changes in inflation. This is referred to as real wage growth. It measures the increase in wages relative to the increase in other prices in the economy. For consumers, real wages matter for their standard of living — real wage growth measures how well wage growth keeps pace with inflation in consumer prices.

There are a number of ways of measuring real wage growth. A common measure for assessing real wages from a consumer perspective uses the WPI deflated by the headline Consumer Price Index (CPI), which reflects changes in the prices that consumers face.

Real wage growth has been low over the past few years (Chart 8). However, because CPI inflation has also been low, the weakness in real wage growth has not been as pronounced as the weakness in nominal wage growth.

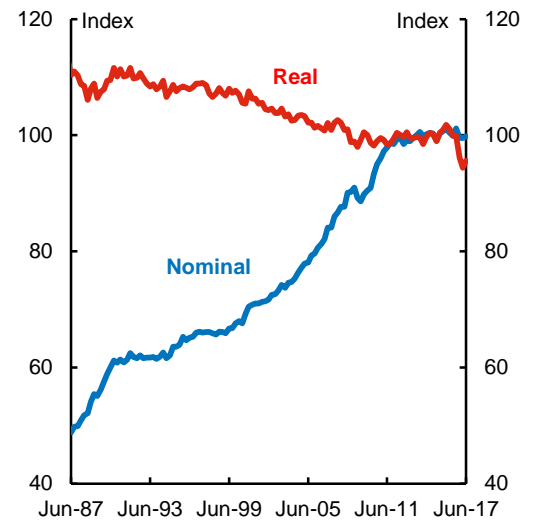
Over the past five years, annual real wage growth (measured by the WPI) has averaged 0.4 per cent, compared with 1.0 per cent in the decade prior. By comparison, annual nominal WPI growth has averaged 2.3 per cent over the past five years and 3.8 per cent in the decade prior.

**CHART 8**  
Real wage growth



Source: ABS Cat. no. 6345.0 and 6401.0.

**CHART 9**  
Unit labour costs



Source: ABS Cat. no. 5206.0.

### Growth in nominal unit labour costs is also low

Nominal unit labour costs have been broadly flat since the peak of the terms of trade in 2011.

Nominal unit labour costs represent the labour cost of producing a unit of output. They are measured as AENA adjusted for productivity. In the long run, nominal unit labour costs are closely related to inflation.

Nominal unit labour costs have been broadly flat since the peak of the terms of trade in 2011, which is the longest period of flat nominal unit labour costs since at least the early 1990s (Chart 9). In through-the-year terms, nominal unit labour costs fell by 0.1 per cent to the June quarter 2017. This means that productivity grew faster over this period than AENA.

Real unit labour costs have also been flat or falling over recent years. Real unit labour costs are nominal unit labour costs adjusted by the price of firms’ outputs (the GDP deflator). They are related to the labour share of income — that is, the proportion of total income in the economy that comprises compensation of employees.

Over the past year, real unit labour costs have declined, falling 4.3 per cent through the year to the June quarter 2017. This means that the prices of firms’ outputs have been growing faster than the labour cost of producing those outputs. The recent increases in the terms of trade have been an important part of the decline in real unit labour costs.

## CHAPTER 2<sup>6</sup>

# Wage growth in capital city and regional areas

Wage growth has been fairly similar across capital cities and regional areas, although the level of wages is higher in the capital cities. The trends in the level and growth rates of wages across capital cities are also similar for real wages. Regional mining areas have experienced faster wage growth than non-mining regions, but wage growth has slowed sharply in both mining and non-mining regions.

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<sup>6</sup> The views expressed in this chapter are those of The Treasury and do not necessarily reflect those of the Australian Government. This chapter was prepared by Kieran Davies, Angelia Grant and Melissa Ljubic in Macroeconomic Group. Analysis in the note includes information available as at 8 September 2017.

## There are differences between regional and aggregate wage data

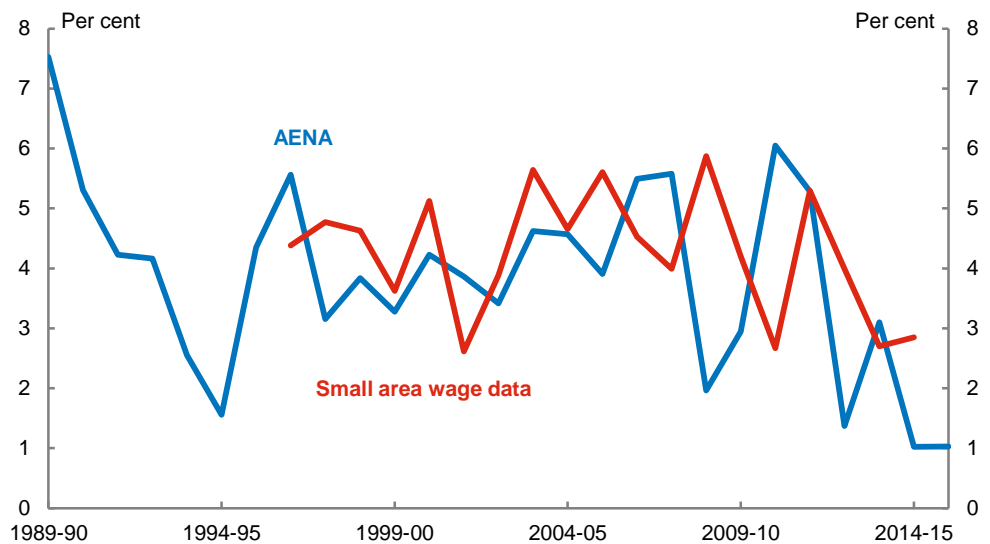
Average wages across capital cities and regional areas can be examined using ‘small area’ statistics.

‘Small area’ wage statistics published by the ABS can be used to examine average wages across capital cities and regional areas (i.e. rest of state outside capital cities).<sup>7</sup> The ABS source the data from ATO data on individual tax returns and employer payment summaries.<sup>8</sup> The data extend from 1995-96 to 2014-15.

The conceptual basis for the small area wage data and the National Accounts data is similar, but a key difference between the personal income tax data and Average Earnings on a National Accounts (AENA) basis is the count of employed persons. AENA uses labour force data that only counts people employed at the time of the survey, while the tax data includes all people who were employed *at any time* during the year. Owing to significant flows in and out of employment over the course of any year the tax data count will always be higher than the number of employed persons in the labour force survey.

Both the national total of regional wages and AENA have shown slower growth since 2010, although the growth in the small area wage data was stronger (Chart 1). The small area wage data shows an increase of 3.7 per cent on average per annum from 2010-11 to 2014-15 while AENA increased by 2.7 per cent over the same period.

**CHART 1**  
Growth in AENA compared with growth in small area wage data<sup>9</sup>



Source: ABS Cat. no. 5204.0, 6524.0.55.001, 6524.0.55.002, Treasury.

7 These geographies are a “statistical area level 4” (SA4), which are the largest sub-state regions defined by the ABS. In regional areas they tend to have a population of 100,000–300,000. In metropolitan areas, SA4s tend to have larger populations (300,000–500,000).  
 8 See ABS, *Estimates of personal income for small areas*, Cat. no. 6524.0.55.002 and ABS, *Information paper: Experimental estimates of personal income for small areas, taxation and income support data*, Cat. no. 6524.0.  
 9 Another difference between the measures is National Accounts data is derived from ABS surveys such as the Economic Activity Survey and balanced against other ABS data to ensure consistency. Most recent years show a divergence owing to timing of individuals lodging their tax returns which can be up to 16 months after the end of the income year. Both the administrative and survey data are subject to later revisions. The small area data has breaks in series that reflect changes in tax reporting requirements.

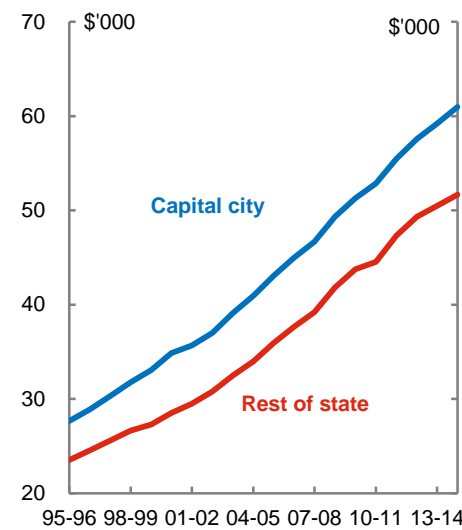
## Wage levels are higher in capital cities than regional areas

Average wage levels for those in capital cities have been 17–22 per cent higher than in regional areas between 1994–95 and 2014–15.

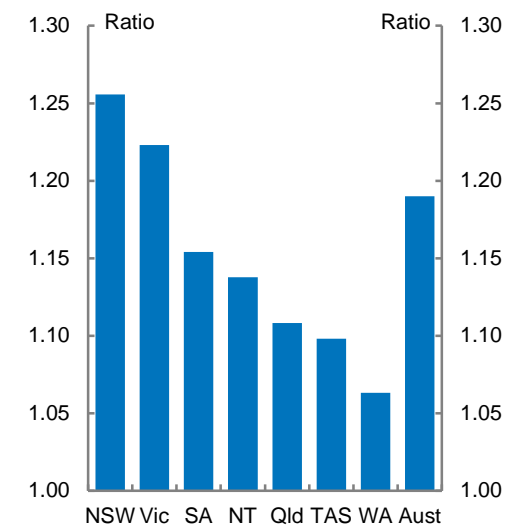
Those who live in capital cities have earned 17 to 22 per cent more than people who live in the rest of the country on average since 1995-96 (Chart 2).

This national comparison masks considerable variability. Individuals in Sydney and Melbourne earn around 20 per cent more than people employed in the rest of NSW and Victoria. In contrast, people in Brisbane, Hobart and Perth earn only around 5 to 10 per cent more than those in the rest of their States (Chart 3).

**CHART 2**  
Average wage level across all capital cities compared with rest of state areas



**CHART 3**  
Premium for working in capital cities (ratio over rest of state regions)



Source: ABS Cat. no. 6524.0, 6524.0.55.002, Treasury.

## Some capital cities have higher average wage levels than others

Average wage levels in Perth and Darwin overtook those in Sydney by 2014–15.

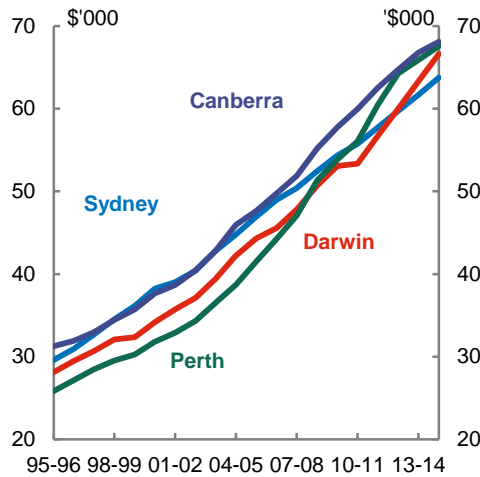
Comparing average wages across capital cities, in 1995-96 the level of employee income was highest in Canberra, closely followed by Sydney and then Darwin. However, by 2014-15 Perth and Darwin had overtaken Sydney and caught up to Canberra (Chart 4). Brisbane wages followed Perth and Darwin higher, overtaking Melbourne, but not Sydney.

In comparison, Melbourne wages have been around the middle of the spectrum, while Adelaide and Hobart are consistently lower than the other capitals (Chart 5).

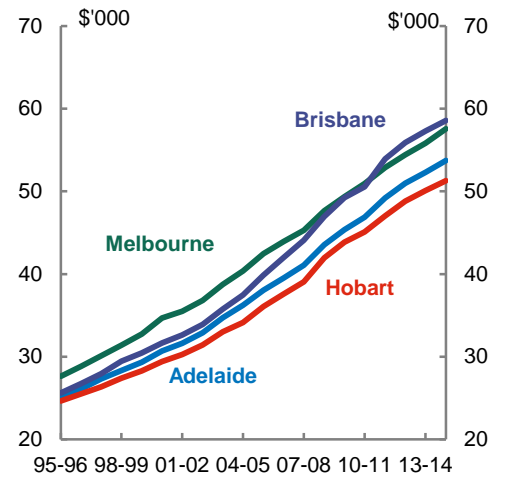
The relatively high wage levels in Perth, Darwin and Brisbane likely reflect faster growth in these cities during the mining boom. Darwin has also been unusual in spanning both mining construction and a large share of public servants in defence.

Interestingly, although the terms of trade peaked in 2011, the wedge between the mining and non-mining capital cities remained large as at 2014-15, even though wage growth had slowed sharply in Perth and Brisbane.

**CHART 4**  
Wage levels in capital cities



**CHART 5**  
Wage levels in capital cities



Source: ABS Cat. no. 6524.0, 6524.0.55.002, Treasury.

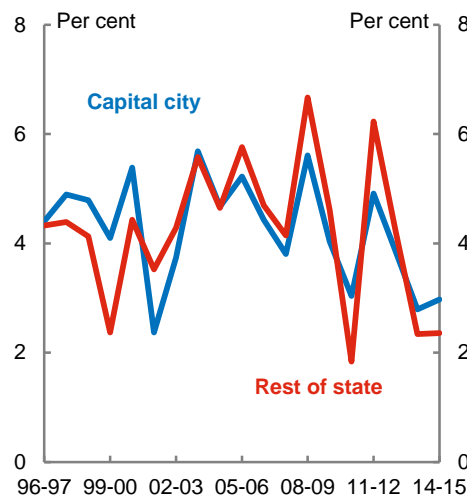
**Wage growth in capital cities and regional areas has been similar**

Notwithstanding differences in the level of average wages between capital cities and regional areas, wage growth has been fairly similar.

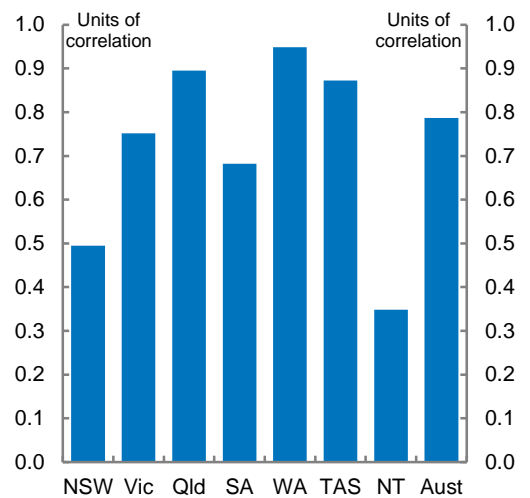
Although people who live in capital cities earn more in absolute terms, growth in capital city and regional area wages has been similar over the past two decades (Chart 6). Average annual growth for capital cities and regional areas has been 4.2 per cent over the past two decades.

The relationship between growth in wages in capital cities and regional areas is also quite high across most of Australia, with a correlation of 0.7 to 0.9 for the period from 1995-96 to 2014-15. The exceptions are New South Wales and the Northern Territory (Chart 7).

**CHART 6**  
Comparison of average wage growth across capital cities and rest of state regions



**CHART 7**  
The relationship between wage growth in capital cities and respective rest of state areas



Source: ABS Cat. no. 6524.0, 6524.0.55.002, Treasury.

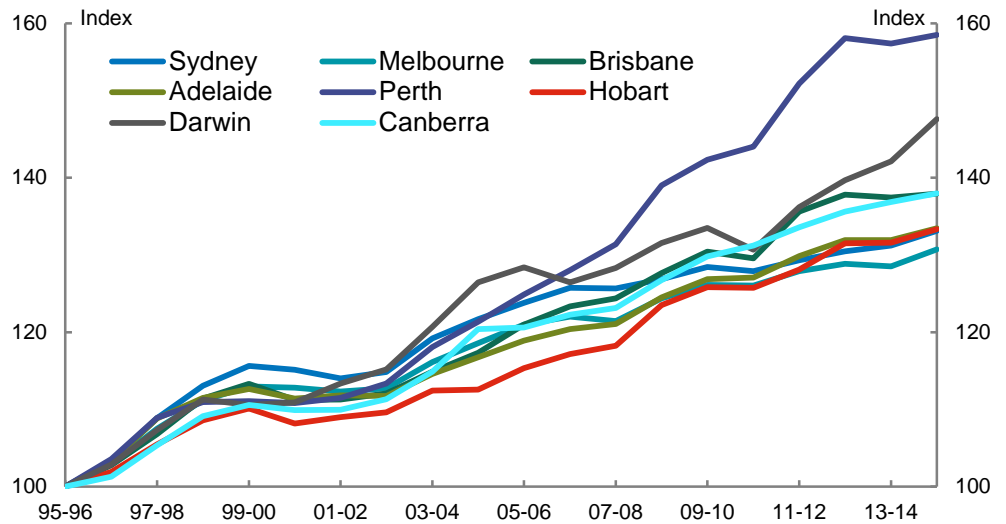
### These trends are similar for real wages in capital cities

The trends in the level and growth rates of wages across capital cities are also similar for real wages.

Real wage growth measures the increase in wages relative to the increase in other prices in the economy. Consumer real wage growth measures how well wage growth keeps pace with inflation in consumer prices, as measured by the Consumer Price Index (CPI).

Since 2006-07, Perth has had the highest cumulative real wage growth. Until 2011-12, Hobart experienced the lowest cumulative real wage growth when Melbourne slowed relative to the other capitals (Chart 8).

**CHART 8**  
Cumulative real wage growth in capital cities



Source: ABS Cat. no. 6401.0, 6524.0, 6524.0.55.002, Treasury.

Note: Index=100 in 1995-96.



## Wages in regional mining areas are no longer growing at a faster rate than wages in non-mining regional areas

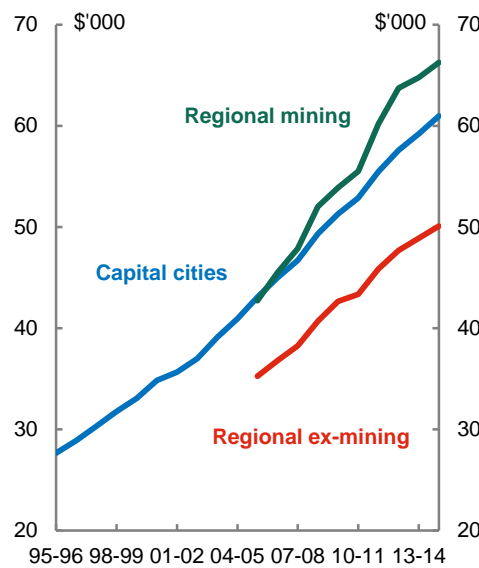
Wage growth has recently slowed in both mining and non-mining regional areas.

Focusing on wages outside the capital cities, a mining/non-mining split of regional wages can be constructed by defining mining as covering: 1) the north and south outback of Western Australia; 2) the central and Mackay-Isaac-Whitsunday areas in Queensland; and 3) the outback in South Australia (including towns such as Whyalla and Port Augusta).<sup>10</sup>

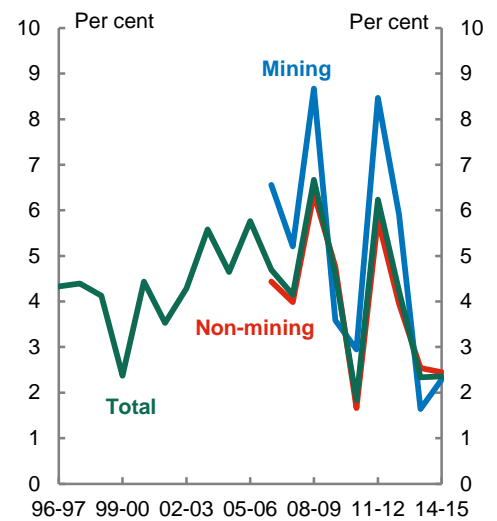
A comparison of a finer disaggregation of the small area wage data is only available from 2005-06 to 2014-15 owing to changes in geographical boundaries. Regional mining areas have higher wage levels and growth compared with non-mining regional areas (and capital cities) (Charts 9 and 10).

Wage growth has recently slowed in both mining and non-mining regional areas. For example, regional mining wage growth fell from around 8.5 per cent in 2011-12 to around 2.3 per cent in 2014-15. For non-mining regional areas over the same period, wage growth fell from 5.8 to 2.4 per cent. Regional non-mining wages grew at almost the same average annual rate as the capital cities at 4.1 and 3.9 per cent, respectively, from 2005-06 to 2014-15. Figures 1 and 2 show a graphical depiction of wage growth by SA4.

**CHART 9**  
Wage levels in capital cities, mining and non-mining regions



**CHART 10**  
Wage growth for mining and non-mining regions compared with the aggregate

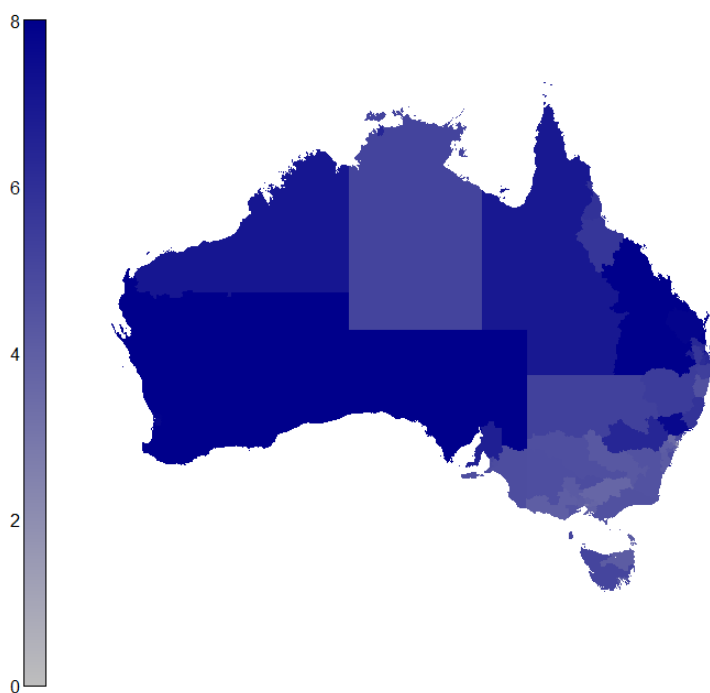


Source: ABS Cat. no. 6524.0, 6524.0.55.002, Treasury.

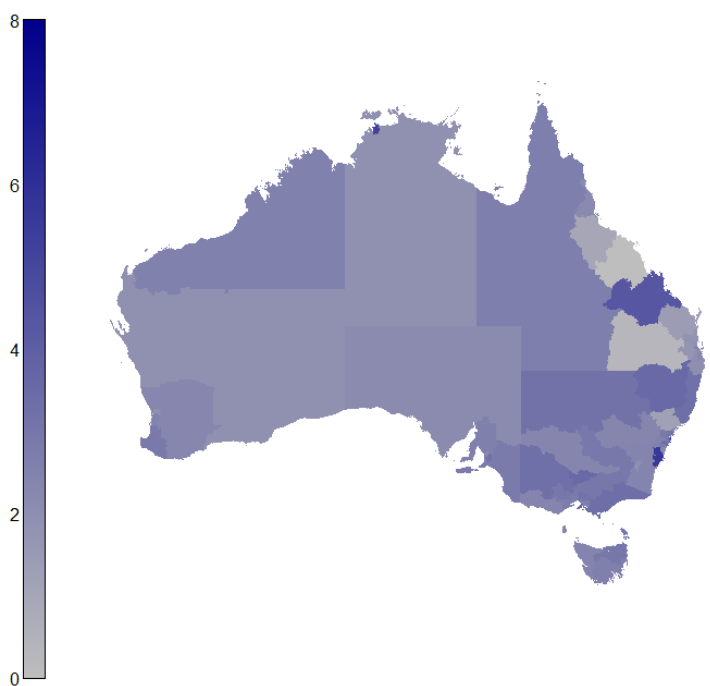
Note: Regional wages are calculated for geographies outside the capital cities. These charts exclude unknown state/territory areas so do not add to the total.

<sup>10</sup> Australian Bureau of Statistics (2013) *ABS Cat. no. 4102.0 - Australian Social Trends, 'Towns of the mining boom'*, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features10April+2013>.

**FIGURE 1**  
Average wage growth (per cent) by SA4<sup>11</sup> in 2011-12



**FIGURE 2**  
Average wage growth (per cent) by SA4 in 2014-15



<sup>11</sup> These geographies are “statistical area level 4” (SA4), which are the largest sub-state regions defined by the ABS. In regional areas they have a population of 100,000-300,000. In metropolitan areas, SA4s tend to have larger populations (300,000 – 500,000 people).

## CHAPTER 3<sup>12</sup>

# Key drivers of wage growth

Over the long-term, wage growth is driven by productivity and inflation expectations. This means that real wage growth reflects labour productivity growth. Fluctuations across the business cycle can result in real wage growth diverging from productivity growth. The unwinding of the mining investment boom and spare capacity in the labour market are important cyclical factors that are currently weighing on wage growth.

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<sup>12</sup> The views expressed in this chapter are those of The Treasury and do not necessarily reflect those of the Australian Government. This chapter was prepared by Angelia Grant, Patrick Fazzino and Angus Moore in Macroeconomic Group. Analysis in the note includes information available as at 30 September 2017.

## Labour productivity drives real wage growth in the long term

Over the long-term market forces ensure workers are compensated for labour productivity and inflation.

In the long-term, the key driver of real wage growth is labour productivity. If workers are more productive relative to their cost to firms, firms find it profitable to hire more workers. This increased demand for labour places upward pressure on wages.

There are two ways of measuring real wages. One is from the producer perspective and the other is from the consumer perspective.

Producers are concerned with how their labour costs compare to the price of their outputs. This is referred to as the real producer wage – average earnings in the national accounts deflated by the GDP deflator.

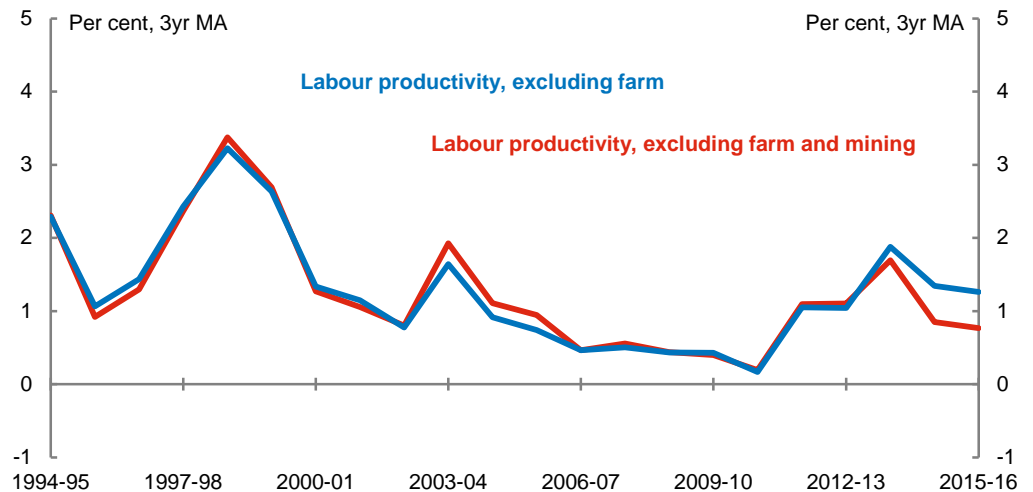
Consumers are concerned with how their wages compare with the cost of goods and services they purchase. This is referred to as the real consumer wage – the nominal wage deflated by the prices consumers pay for goods and services (in this case, the household final consumption deflator).

## Recent productivity growth has been around average

Over the past five years, labour productivity in Australia has grown at around the 30-year average annual growth rate of 1.6 per cent.

Labour productivity is driven by capital deepening (growth in capital per worker) and multifactor productivity (MFP), which reflects the overall efficiency with which labour and capital are used by firms to produce goods and services. MFP growth may be the result of innovation and technological improvements, efficiency improvements arising from economies of scale and scope, improved resource allocation within and between firms or through improvements in management practices and changes in organisational structure.

**CHART 1**  
Labour productivity growth



Source: ABS Cat. no. 5204.0, 6291.0.55.003, Treasury.

Note: Productivity is on a heads basis, and is a three year moving average of growth rates.

Lower labour productivity growth has been observed in a number of advanced economies, and has been suggested as a driver behind low wage growth in those economies. Possible explanations for low global labour productivity growth include: declining investment growth, particularly in knowledge based capital; slowing in the 'quality' of technological advance, meaning that the productivity gains from technological advance may be less than they have

been in the past; and an inability of non-frontier firms to adopt the new technologies and knowledge of firms that operate at the global productivity frontier.<sup>13</sup>

Weaker labour productivity growth seems unlikely to be a cause of the current period of low wage growth in Australia, at least in aggregate. Over the past five years, labour productivity in Australia has grown at around the 30-year average annual growth rate of 1.6 per cent and has generally been higher than in other countries.

### The mining investment boom created a wedge between the real wages faced by consumers and producers

Consumer and producer real wages diverged during the mining investment boom due to strong rises in commodity export prices.

Generally, consumer and producer prices would be expected to grow together in the long-term, so the real producer wage and real consumer wage would grow together. However, wedges can open between the two when relative prices change. In particular, after growing broadly in line with one another, a wedge opened up between the real consumer wage and the real producer wage during the terms of trade boom (Chart 2).<sup>14</sup>

**CHART 2**  
Real wages and labour productivity during the mining investment boom



Source: ABS Cat. no. 5206.0, Treasury

Note: The real producer wage is Average Earnings in the National Accounts (AENA) per hour deflated by the GDP deflator; the real consumer wage is AENA (per hour) deflated by the household consumption deflator; labour productivity is per hour.

This occurred because of the dramatic increase in Australia’s export prices. This meant that, in aggregate, firms could sell their output at higher prices. Meanwhile, consumers did not see their living costs increase to the same extent, in part because of lower import prices following the sizeable appreciation of the Australian dollar. This income shock meant that the real consumer wage grew by more than labour productivity during the mining investment boom. It also encouraged more people to enter the labour force, by increasing the labour force participation rate, increasing interstate migration to mining states and increasing net overseas immigration, particularly from New Zealand.

Despite the current environment of weak wage growth, the real producer wage has continued to grow at a rate similar to the pre-boom period, and has been growing largely in line with labour productivity. This is because declines in the terms of trade have weighed on the GDP

<sup>13</sup> OECD (2015), *Frontier Firms, Technology Diffusion and Public Policy: Micro Evidence from OECD Countries*, OECD Productivity Working Papers.

<sup>14</sup> For more detailed analysis, see Davis K, McCarthy M and Bridges J (2016), *The Labour Market during and after the Terms of Trade Boom*, RBA Bulletin.

deflator. In contrast, the real consumer wage has been broadly flat since 2011, as growth in incomes has been matched by growth in consumer prices. With the unwinding of the terms of trade, the real consumer wage would be expected to grow by less than labour productivity as the economy transitions. Much of the current divergence in growth rates between the consumer and producer real wages likely reflects this adjustment in the terms of trade.

### Spare capacity in the labour market is also affecting wages

The current unemployment rate is above the equilibrium rate, which is likely weighing on wage growth.

Spare capacity in the labour market is an important short-term cyclical factor that influences wage growth. When there is significant spare capacity, the pool of unemployed persons seeking employment can reduce the bargaining power of existing employees and so reduce the pace of wage growth. This inverse relationship between the unemployment rate and wage growth is referred to as the ‘Phillips curve’.

The unemployment rate that is consistent with stable inflation is called the non-accelerating inflation rate of unemployment (NAIRU). A rate of unemployment above the NAIRU is associated with downward pressure on prices and wages. The unemployment rate has come down in the past two years. However, some slack remains in the labour market — at 5.5 per cent, the unemployment rate is above the Treasury estimate of the NAIRU of around 5.0 per cent.

### Wage growth is weaker than the unemployment rate implies

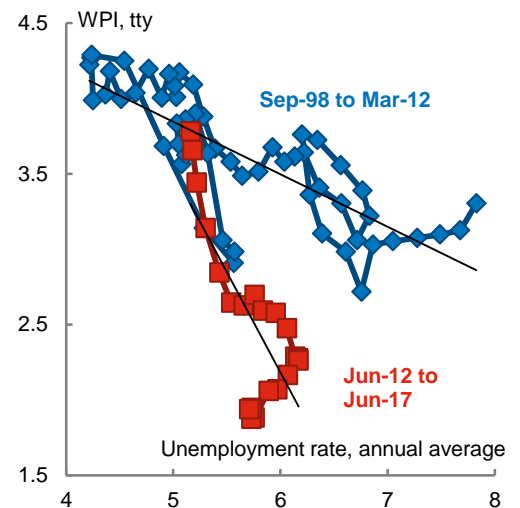
Wage growth is weaker than the historical relationship between wage growth and the unemployment rate would imply.

There appears to have been a fairly stable Phillips curve relationship between wages and unemployment from the late 1990s to around 2012. The decline in wage growth since late 2012 is unusually large compared to this previous relationship (Chart 3).

The unemployment rate is usually a key cyclical factor for wage growth and so the divergence from this relationship is puzzling. One possibility – discussed below – is that the unemployment rate is not adequately capturing the degree of slack in the labour market. Alternatively, it may be that structural factors are weighing on wage growth.

Australia’s recent experience with subdued wage growth is broadly consistent with other advanced economies, where wage growth has declined since the global financial crisis, even as some economies (such as the United States) have reached estimates of full employment.

**CHART 3**  
The Phillips curve relationship between the unemployment rate and wage growth



Source: ABS Cat. no. 6202.0 and 6345.0

### Heightened underemployment suggests there may be more spare capacity than implied by the unemployment rate

There may be more spare capacity than implied by the unemployment rate.

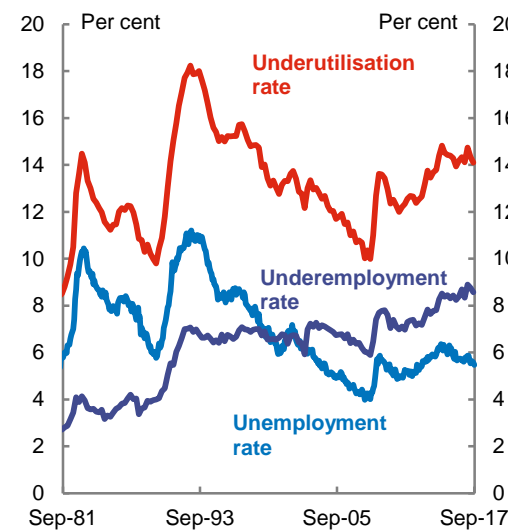
The unemployment rate is only one measure of spare capacity in the labour market. One possible explanation for the disconnect between wage growth and the unemployment rate is that there may be more spare capacity in the labour market than the unemployment rate implies.

Evidence of additional spare capacity in the labour market can be seen in the underutilisation rate, which includes both the unemployed and those who are employed but would like to work more hours (the underemployed). While the unemployment rate has declined over the past two years, the underemployment and underutilisation rates have remained elevated (Chart 4). This suggests that there may be more spare capacity in the labour market than is reflected in the unemployment rate. However, underemployed persons are, on average, not seeking the same amount of additional work as unemployed persons and so do not contribute to spare capacity to the same extent.

A broader measure of labour market slack than underutilisation is Treasury’s Labour Market Conditions Index<sup>15</sup>. This index is designed to summarise a wide range of labour market variables, including the unemployment rate, participation rate and hours worked. The index is standardised such that zero represents average labour market conditions (since February 1992).

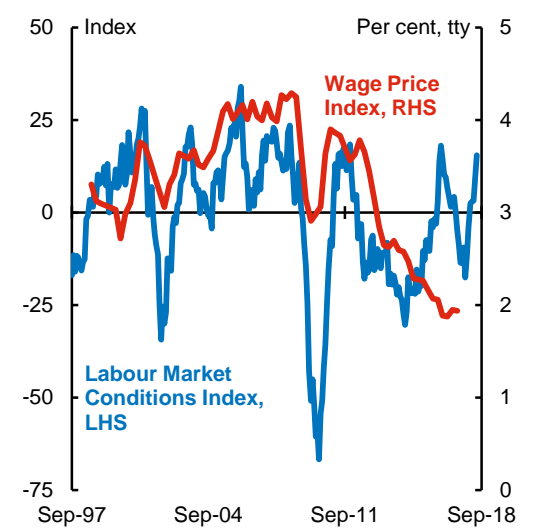
As at September 2017, the index was positive (Chart 5). This indicates that conditions in the labour market are tighter than average. This follows a prolonged period of weak labour market conditions. Between August 2011 and August 2015, the index was negative and reached very low levels in late 2013 and early 2014.

**CHART 4**  
Measures of labour market spare capacity



Source: ABS Cat. no. 6202.0.

**CHART 5**  
Treasury’s Labour Market Conditions Index



Source: ABS Cat. no 6345.0; Grant et al (2016).

Note: Labour market conditions index is lagged 3 quarters.

<sup>15</sup> Grant A, Gillies W, Harris R and Ljubic M (2016), *An Australian Labour Market Conditions Index*, Treasury Working Paper 2016-04.

### Labour market flexibility may have increased, affecting the Phillips curve

Greater flexibility in the labour market may partly explain why underemployment has risen even as the unemployment rate has fallen.

Labour market flexibility is a possible explanation for the change in the relationship between wage growth and unemployment, and the rise in the underemployment rate. Employers may be increasingly able to reduce hours of work, rather than reducing the number of employees when faced with adverse conditions. This may be reflected in elevated underemployment.

RBA research has suggested that, in recent downturns, labour market adjustment has occurred more through a reduction in average hours worked, rather than in a reduction of number of persons employed.<sup>16</sup> This has not been the case for other advanced economies. In part, this reflects that the downturns in Australia since the late 1990s have been short and shallow. Labour market reforms and increased costs of hiring and training new workers may also have a role (Bishop *et al* (2016)).

### Although labour productivity is critical for real wages, inflation expectations affect nominal wages

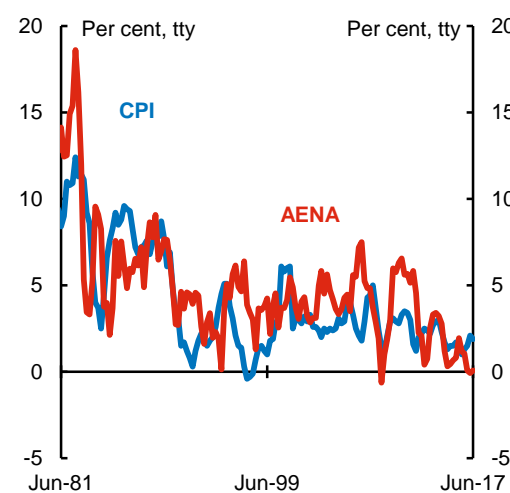
Inflation and expectations for inflation have been low recently. This has likely weighed on wage growth.

Recent low nominal wage growth has occurred alongside low inflation. This has also been accompanied by a decline in expectations for inflation in the future.

Over the long-term, wage growth and inflation tend to be related (Chart 6). Employees are ultimately concerned with the purchasing power of their wage. Accordingly, lower inflation may lead to smaller wage increases than otherwise.

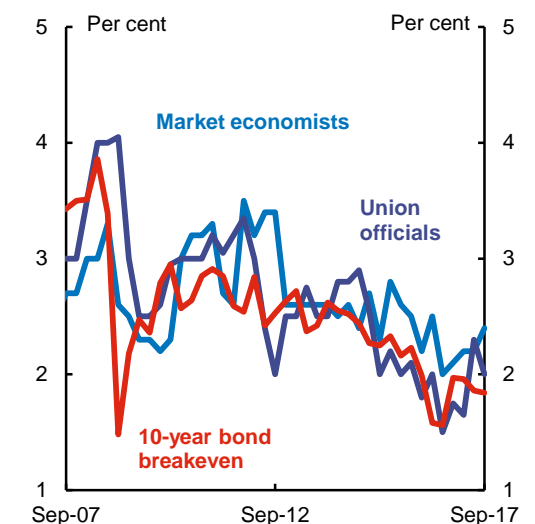
Inflation expectations have also declined noticeably in recent times, which may have weighed on wage growth (Chart 7). Inflation expectations are important because wage-setting decisions are forward looking and wages are typically negotiated infrequently. Thus, how firms and employees expect inflation to evolve over the period for which wages are set will influence wage negotiation. Lower inflation expectations are a cyclical drag on wage growth that is likely to abate as inflation picks up.

**CHART 6**  
Headline inflation (CPI) and wage growth (AENA)



Source: ABS Cat. no. 5206.0 and 6401.

**CHART 7**  
Inflation expectations



Source: ACTU, RBA.

<sup>16</sup> Bishop J, Gustafsson L and Plumb M (2016), *Jobs or Hours? Cyclical Labour Market Adjustment in Australia*, RBA Research Discussion Paper No 2016-06.



## CHAPTER 4<sup>17</sup>

# International comparisons of wage growth

Many advanced economies have experienced subdued wage growth in recent years. While cyclical factors such as spare capacity in the labour market have weighed on wage growth globally, it is unclear if they can explain all of the weakness in wage growth and a range of longer-term structural factors may also be relevant.

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<sup>17</sup> The views expressed in this chapter are those of The Treasury and do not necessarily reflect those of the Australian Government. This chapter was prepared by Angelia Grant, Oskar Mezgailis and Thomas Williamson in Macroeconomic Group. Analysis in the note includes information available at 8 September 2017.

## Many advanced economies have experienced low wage growth

Subdued wage growth in recent years has been experienced in many advanced economies.

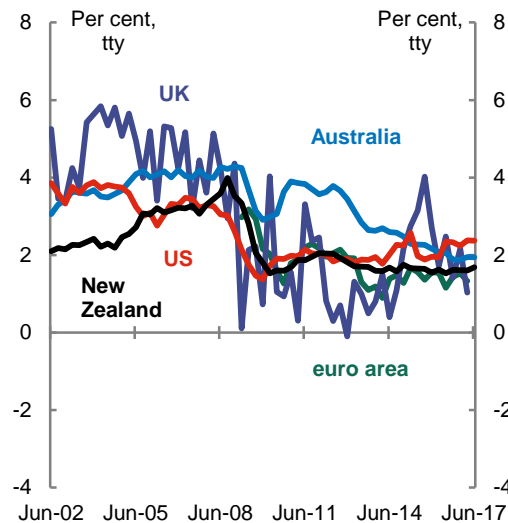
Many advanced economies have experienced lower wage growth in the period since the global financial crisis (GFC) than in the years beforehand (Chart 1).

For example, the US experienced average annual wage growth of 3.4 per cent between 2002 and 2008 and this fell to 2.0 per cent between 2009 and 2016. Australia’s average annual wage growth was 3.8 per cent between 2002 and 2008 and 3.0 per cent between 2009 and 2016.

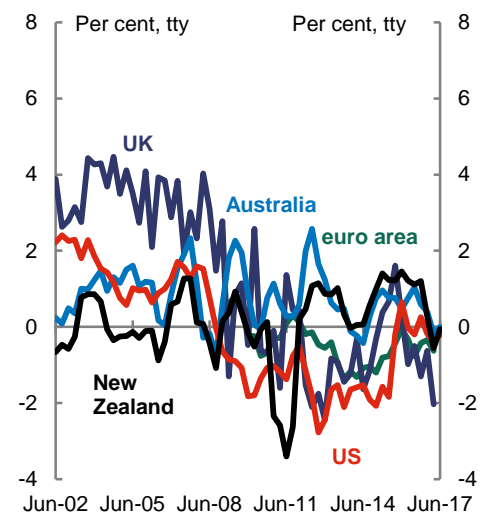
Real wage growth — which adjusts for inflation — has also fallen in recent years (Chart 2).

Though difficult to disentangle, there are a number of trends that have been seen across many advanced economies that could help explain these weak wage growth outcomes. These include slower productivity growth, lower inflation expectations, slow absorption of slack in labour markets, and other factors relating to labour market composition.

**CHART 1**  
Nominal wage growth



**CHART 2**  
Real wage growth



Source: Eurostat, Thomson Reuters.

Note: Measures used are Wage Price Index for Australia, Employment Cost Index for the US, and Labour Cost Index for the euro area, the UK and New Zealand. Real wage measures are constructed using the same series and headline CPI.

## Labour productivity growth has slowed

Labour productivity growth has slowed in many advanced economies, but Australia’s experience has been somewhat different.

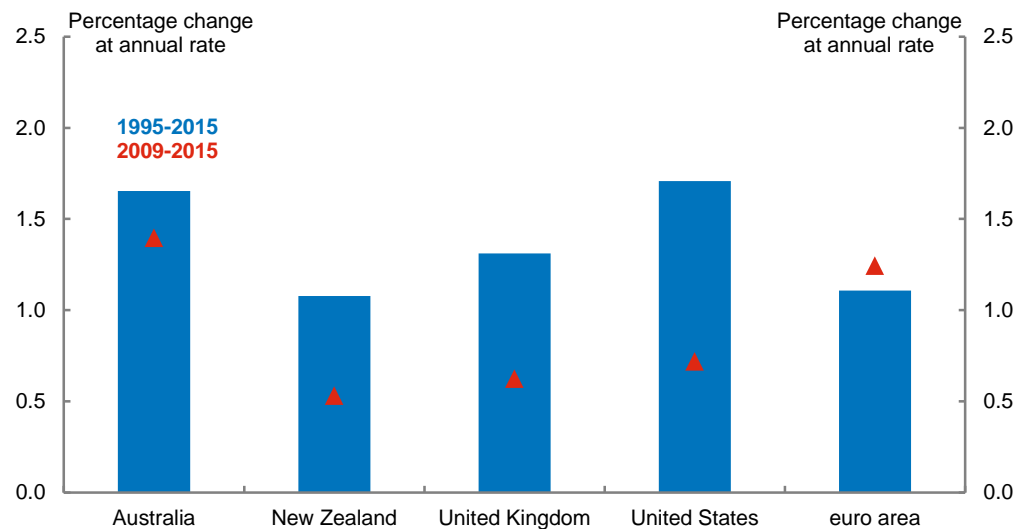
Weaker labour productivity growth in recent years in many advanced economies has likely placed downward pressure on wage growth, as real wages tend to be driven by labour productivity growth over the long term (Chart 3).

The US, the UK and New Zealand have all experienced markedly slower labour productivity growth post-GFC than in the years beforehand, and slower labour productivity growth in advanced economies pre-dates the GFC in many cases.

Australia has recently experienced higher average labour productivity growth than many other advanced economies. But this partly reflects the fact that mining labour productivity growth has been strong over the past several years. Australia’s non-mining labour productivity growth has been relatively low.

Some of the GFC-related factors restraining productivity growth may eventually fade, but to the extent that long-run factors — such as the waning effects of the IT revolution — are at work, productivity growth in the future may be below historical averages.<sup>18</sup>

**CHART 3**  
Labour productivity growth



Source: OECD.

### Inflation expectations have been relatively subdued

Inflation expectations have remained below pre-crisis levels.

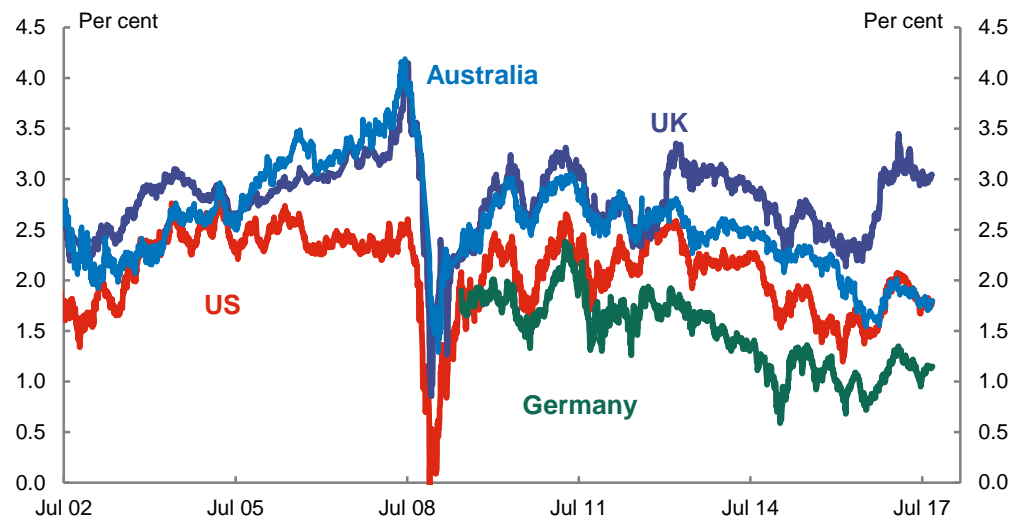
Inflation expectations affect nominal wage growth because wage-setting decisions are forward looking and employees are concerned with the purchasing power of their wage.

Market inflation expectations – one type of inflation expectations – declined sharply in many advanced economies during the GFC (Chart 4). After partially recovering immediately following the crisis, US, UK and Australian market inflation expectations declined gradually over subsequent years. This is a trend that has also been seen in the euro area.

Most recently, there was a pick-up in market inflation expectations in mid-2016 in Australia, the US, the UK and the euro area. UK market inflation expectations have picked up the most markedly, alongside a weaker sterling.

<sup>18</sup> US Federal Reserve (July 2017), *Monetary Policy Report*.

**CHART 4**  
Market inflation expectations



Source: Bloomberg.

Note: 10 year breakeven rates are used to show market inflation expectations. Break-evens are a measure of inflation expectations constructed by taking the difference in yield between nominal bonds and inflation indexed bonds. Germany inflation expectations data is shown as there is no 10 year breakeven rates data for euro area; no 10 year breakeven rates data is available for New Zealand.

### Spare capacity in labour markets following the GFC has continued to be absorbed

Wage growth has remained subdued despite tightening labour market conditions.

Spare capacity in labour markets is another important factor influencing wage growth. Unemployment rates in the US, the UK and the euro area rose sharply during the GFC — to the highest rates since the early 1980s in the US and highest ever, apart from the sovereign debt crisis, in the euro area’s history. Cyclical dynamics relating to the labour market shock created by the GFC are an important driver of recent weaker wage growth in many advanced economies.

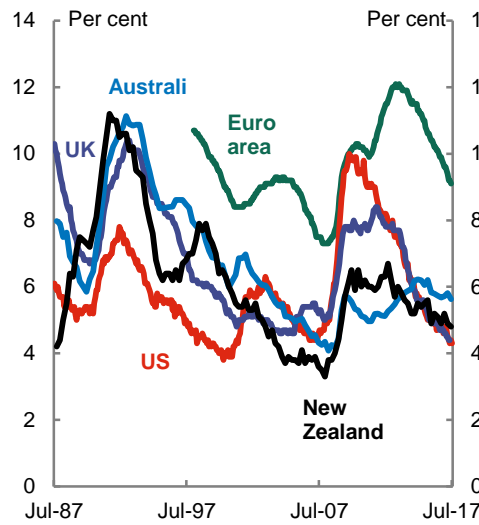
Unemployment rates in many advanced economies have since declined significantly (Chart 5) and are now around estimates of the non-accelerating inflation rate of unemployment (NAIRU). Australia’s unemployment rate has taken a slightly different path, increasing following the GFC — albeit to a much lesser extent than in other advanced economies — and remaining around those rates.

Declining unemployment rates alongside subdued wage growth suggest there may be more spare capacity than is reflected in unemployment rates alone.

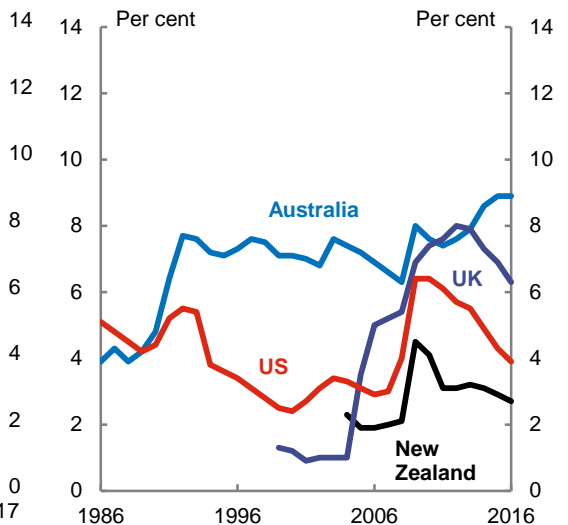
While underemployment rates — which capture part-time employees that would like to work more hours — in the US, the UK and New Zealand have declined over the past few years, they remain above rates seen prior to the GFC (Chart 6). Among the same countries, underutilisation rates — which capture both unemployment and underemployment — are relatively low (Chart 7).

In Australia, the increase in underemployment was not as stark as in other countries during the GFC. But taking a longer view, Australia’s higher underemployment since the 1990s recession is somewhat out of step with other selected advanced economies, and has contributed to an underutilisation rate that is significantly above the OECD average, despite the unemployment rate being in line with the OECD average.

**CHART 5**  
Unemployment rates



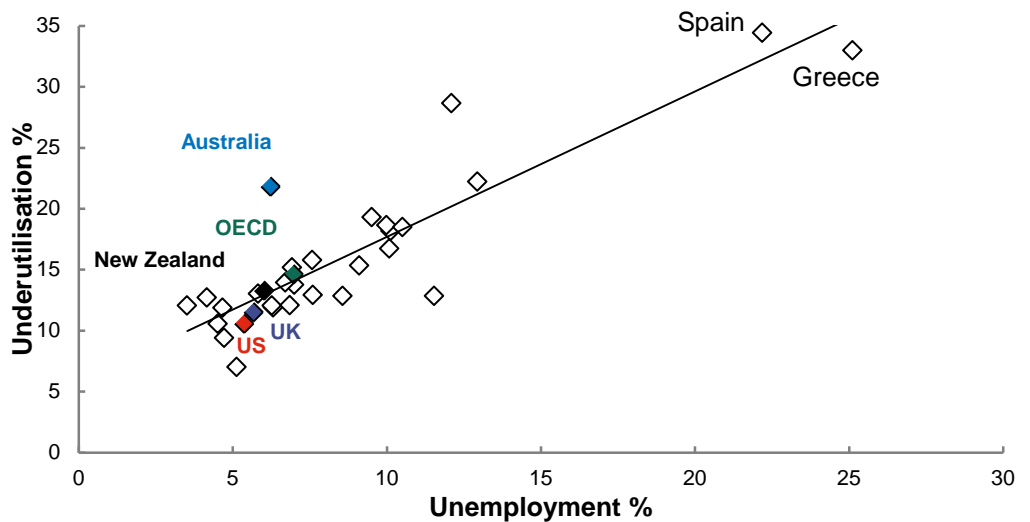
**CHART 6**  
Underemployment rates



Source: Thomson Reuters, ILO.

Note: Australian and New Zealand unemployment data are quarterly; other countries are monthly. The ILO underemployment rate data conveys the number of persons in time-related underemployment as a per cent of the total number of persons in employment. Persons in time-related underemployment comprise all persons in employment, who satisfy the following three criteria during the reference period: a) are willing to work additional hours; b) are available to work additional hours i.e., are ready, within a specified subsequent period, to work additional hours, given opportunities for additional work; and c) worked less than a threshold relating to working time. Data are not available for underemployment for the euro area.

**CHART 7**  
Measures of labour market slack in OECD countries —  
Unemployment and underutilisation, 2015



Source: OECD.

Note: The labour underutilisation rate used by the OECD is defined as the combined number of persons who are unemployed, marginally attached (i.e. persons not in the labour force who did not look for work during the past four weeks but who wish and are available to work) or underemployed (full-time workers working less than usual during the survey reference week for economic reasons and part-time workers who wanted to but could not find full-time work), expressed as a percentage of the labour force. Linear trend line has been added.

## Subdued wage growth may also reflect changes in hours worked and increasing part-time employment

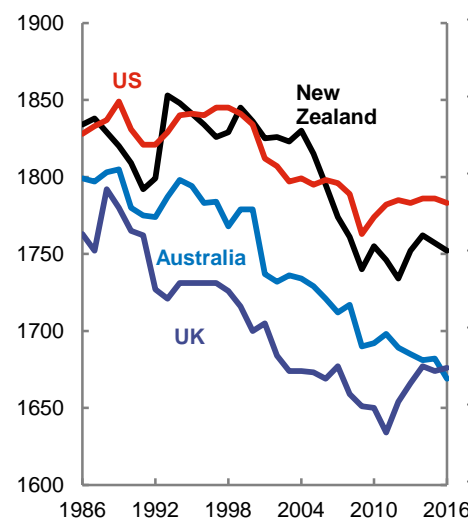
Subdued wage growth and some evidence of underemployment may reflect employers being able to more easily adjust wages and hours worked and paid for.

Average annual hours worked are slightly lower in some advanced economies than prior to the GFC and had been decreasing for a period before the crisis in some cases (Chart 8). For example, US average annual hours worked remain lower than before the GFC, following a sharp reduction during the crisis, and were already declining.

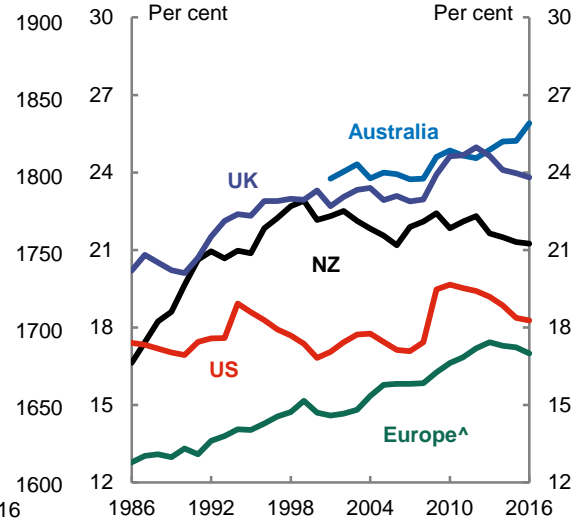
There has also been an increase in the part-time share of employment in selected advanced economies over the medium-term (Chart 9). In the US and the UK, there was a strong shift towards part-time employment following the GFC, which has since reversed somewhat.

Australia’s labour market remained relatively resilient following the GFC, with a relatively rapid recovery in full-time employment compared to other economies, as it underwent a transition from mining investment to broader-based drivers of growth at the same time. That said, like other countries Australia also saw an increase in part-time employment following the GFC. Australia’s part-time share of employment has generally been higher than for other advanced economies since 2002, which may reflect institutional and industrial factors.

**CHART 8**  
Average annual hours worked



**CHART 9**  
Part-time share of employment



Source: OECD, US Bureau of Labor Statistics (BLS).

Note: Data for average annual hours worked are not available for the euro area. OECD data are used for international comparisons of part-time work except in the case of Australia where ABS data are used and for the US where BLS data are used as OECD data are not available. The OECD defines part-time employment as employment for less than 30 hours per week in a main job. By contrast, the ABS and US BLS consider part-time employment to include employed persons who usually worked less than 35 hours a week (in all jobs). ^Europe data are used for part-time employment as there are no data available for the euro area.

## Other changes to global labour markets may also be influencing wage growth

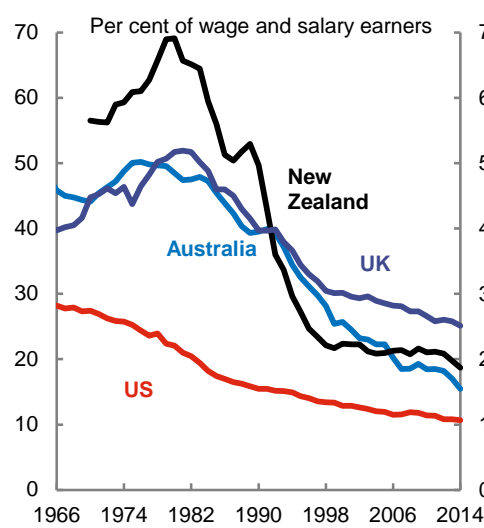
While cyclical factors are weighing on wage growth globally, it is unclear whether they can explain all of the weakness.

Bank of England Economist Andrew Haldane suggested recently that wages have been weaker than can be explained either by low productivity growth or by the other factors which typically affect wages, such as the degree of slack in the labour market. He noted that there is evidence that trends towards self-employment, flexible working, zero-hours contracts and de-unionisation — whether voluntary or involuntary — may have affected wages.<sup>19</sup> Federal Reserve Bank of San Francisco researchers have noted that labour market composition changes related to population ageing may also be an explanatory factor of weak wage growth.<sup>20</sup>

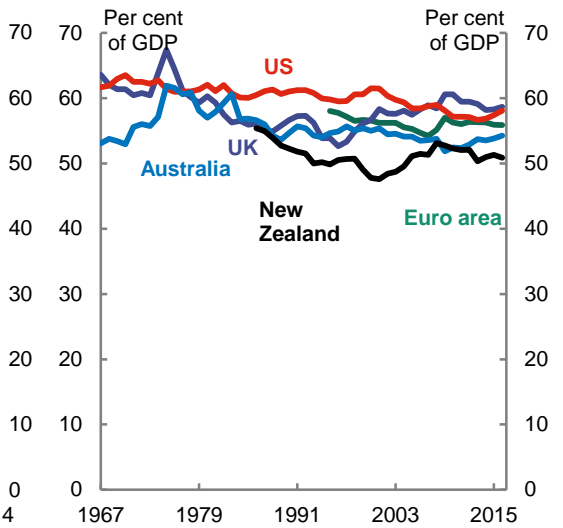
A number of economies have experienced a structural decline in trade union density, although the recent decline in the US has not been as sharp as in Australia (Chart 10). BIS research has suggested that, for G7 countries, a decline in labour’s pricing power may explain some part of why wages have become less sensitive to recent tightening of the labour market.<sup>21</sup>

More broadly, the extent to which wage growth exceeds or falls short of labour productivity growth and inflation is reflected in the labour share of income (Chart 11). Trends in the labour share of income are considered in a separate note.

**CHART 10**  
Trade union density



**CHART 11**  
Labour share of income



Source: ABS Cat no. 5204.0, European Commission AMECO Database and OECD.

Note: The measure used for countries’ labour share of income is the adjusted wage share as a per cent of GDP at current prices. ABS data are used for Australia, with the labour share of income is expressed as a share of total factor income, and may not be directly comparable to other countries’ series.

<sup>19</sup> Haldane A (2017), *Work, Wages and Monetary Policy*, Bank of England Speech.

<sup>20</sup> Daly M, Hobijn B, and Pyle B (2016), *What’s Up With Wage Growth?* Federal Reserve Bank of San Francisco Economic Letter.

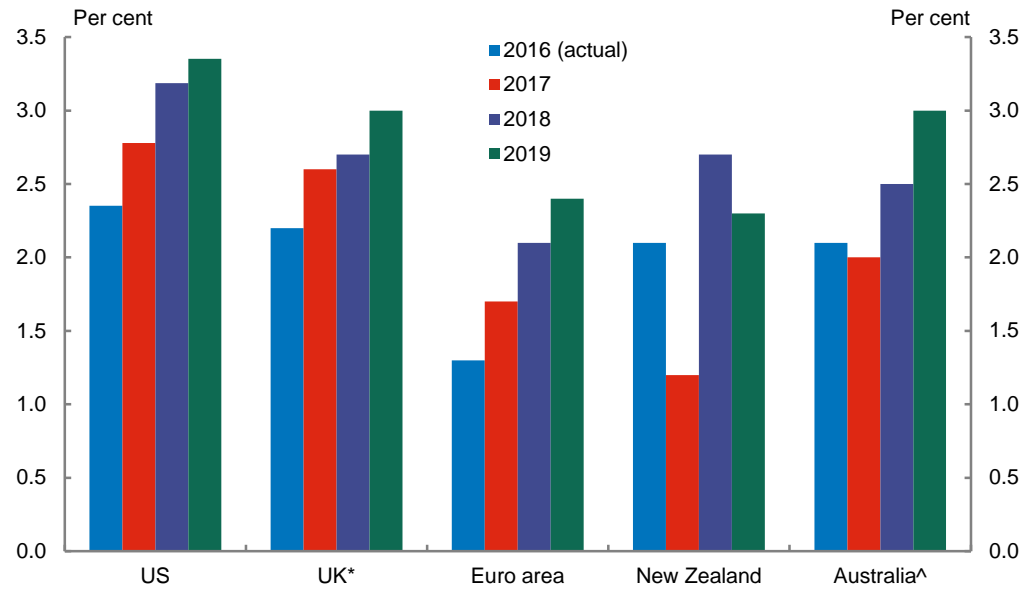
<sup>21</sup> BIS (2017), *Annual Report 2016-17*.

## Authorities expect wage growth to accelerate

Authorities expect wage growth to accelerate.

Looking forward, authorities in advanced economies expect wage growth to accelerate from current lower levels over the next few years, although the timing and pace of a pickup is highly uncertain (Chart 12).

**CHART 12**  
**Authorities' forecasts for wage growth**



Source: Australian Budget, US CBO, New Zealand Treasury, UK OBR, ECB.

Note: \*UK figure for 2016 was still a forecast at time at publication. ^Australian figures are for fiscal year 2015-16 onwards. Variables forecast are the same as those reported in Chart 1, except that the euro area forecasts compensation per employee, the UK forecasts average earnings and New Zealand forecasts average ordinary-time hourly wages.



## CHAPTER 5<sup>22</sup>

# Changing nature of the labour force

This note discusses trends that have been changing the nature of the labour force for some time. However, it is difficult to draw firm conclusions on the effect of these trends on wage growth, given they have been occurring over a long timeframe and the low-wage growth environment is a more recent phenomenon. The three trends discussed in this note are: the share of part-time employment, which has gradually increased to a third of total employment; the share of employment in services industries, which has also been gradually increasing and is now around 80 per cent of the total, and changes in technology and globalisation, including the gradual decline in the share of routine jobs, both manual and cognitive, and a corresponding rise in non-routine jobs.

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<sup>22</sup> The views expressed in this chapter are those of The Treasury and do not necessarily reflect those of the Australian Government. This chapter was prepared by Angelia Grant, Patrick Fazzone and Melissa Ljubic in Macroeconomic Group. Analysis in the note includes information available as at 8 September 2017.

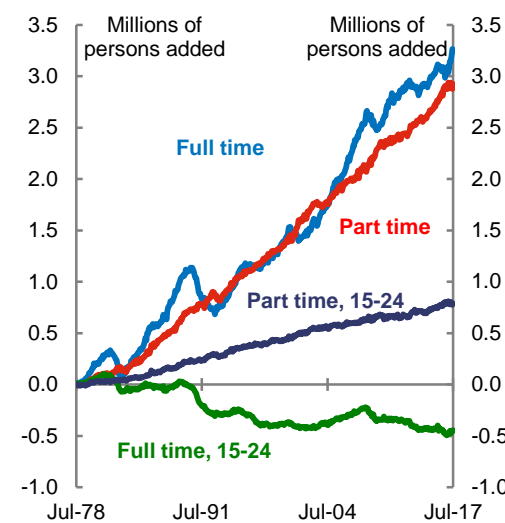
## Increasing part-time employment has been a feature of the labour market for many years

The share of part-time employment has increased to almost one third.

Since the late 1970s, the share of part-time employment has increased to almost one third of total employment, while growth in part-time work accounts for around half of the growth in employment (Chart 1). Notwithstanding the recent strength in full-time employment, on average, over the past ten years part-time employment growth has been more than twice as strong as growth in full-time employment (2.7 and 1.1 per cent respectively). More youth (15-24) are both studying full-time and seeking part-time work, to support themselves financially while studying.

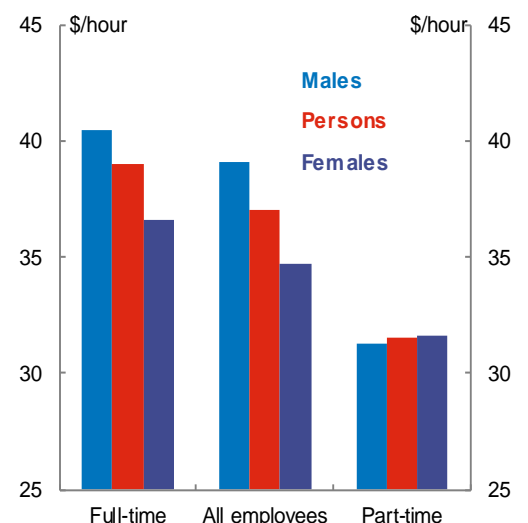
Average hours have been falling for at least 30 years, reflecting the move to part-time work and the decline in full-time average hours since the late 1990s.

**CHART 1**  
Employees added since 1978



Source: ABS Cat. no. 6202.0.

**CHART 2**  
Wages per hour



Source: ABS Cat. no 6306.0.

Note: As at May-16.

The move to part-time work could have a dampening effect on average wages.

Part-time employees work fewer hours and also tend to receive lower hourly wages (Chart 2). This effect could appear in a wage measure like average earnings on a National Accounts basis (AENA).

However, changes in the composition of employment such as the move to part time work would not affect the Wage Price Index (WPI), which is a measure of wage growth that abstracts from quality or quantity changes in the labour market, and the WPI remains at historically low rates of growth.

Some of the growth in part-time employment likely reflects spare capacity in the labour market, because most underemployed persons are part-time employees.<sup>23</sup> On the other hand, employees who prefer the flexibility of part-time work may trade-off wage growth for greater flexibility.

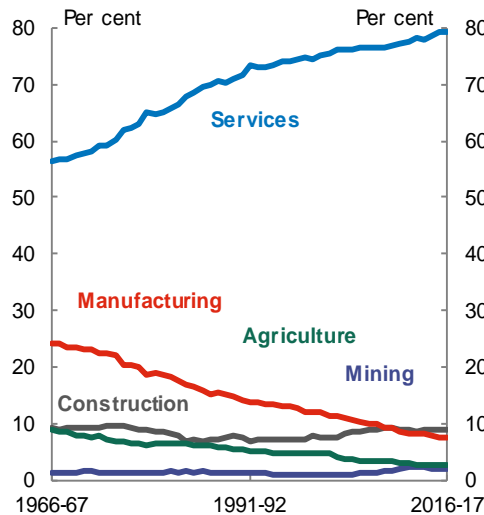
<sup>23</sup> Full-time employees can be considered underemployed, if they worked less than 35 in a week for economic reasons, although this is a small share of the total.

## Services industries have grown

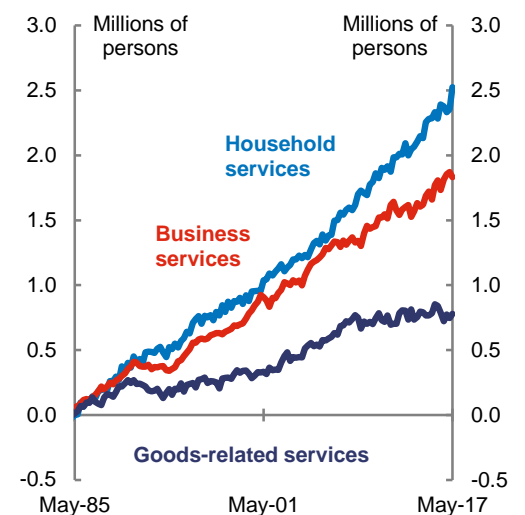
The share of employment in services has been steadily increasing.

Since the mid-1960s, the share of employment in services industries has gradually increased: currently services comprise around 80 per cent of total employment (Chart 3). Services growth has been most pronounced in household and business services, while it has been relatively flat in goods-related services over the past ten years (Chart 4).<sup>24</sup>

**CHART 3**  
Share of employment by industry



**CHART 4**  
Services industries growth



Source: ABS Cat. no. 6291.0.55.003 and historical data.

Note: See footnote 3 for the breakdown of household, business and goods-related services.

<sup>24</sup> Household services include accommodation and food services; education and training; health care and social assistance; arts and recreational services; and other services. Business services include information media and telecommunications; financial and insurance services; rental, hiring and real estate services; professional, scientific and technical services; administrative and support services; and public administration and safety. Goods-related services include electricity, gas, water and waste services; wholesale trade; retail trade; and transport, postal and warehousing.

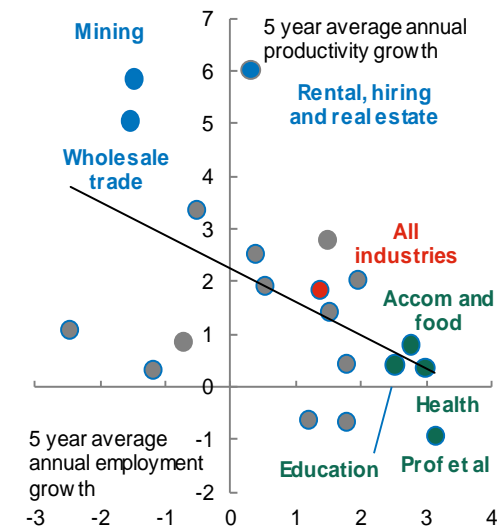
The transition towards services could weigh on wage growth.

The transition towards services could weigh on wage growth. In the past five years, strong employment growth has come from low productivity growth industries (Chart 5). This has implications for the future path of wage growth because in the long run real wage growth is driven by labour productivity growth.

However, over the longer-term, rates of productivity growth within the services industries have been similar to the broader economy, and the more recent weaker rates of productivity growth in some industries might be temporary.<sup>25</sup>

Services employment growth has been more concentrated in below-average wage industries. Since 1994-95, almost 3.6 million jobs have been added in the services industries – of these, a little over 1.9 million have been in industries with below-average wages versus a little over 1.6 million in above-average wage industries (Chart 6).

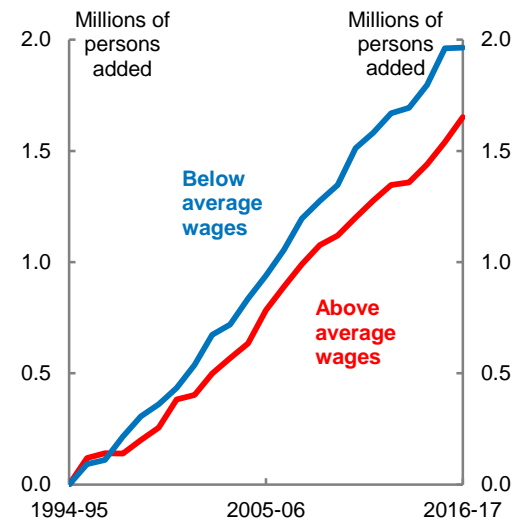
**CHART 5**  
Employment and productivity growth by industry



Source: ABS Cat. no. 5204.0 and 6291.0.55.003.

Note: Blue industries indicate highest productivity growth, green industries indicate highest employment growth.

**CHART 6**  
Services employment growth, in below and above average wage industries



ABS Cat. no. 6302.0 and 6291.0.55.003.

Note: Average wages for all industries in 2015-16 are based on average weekly ordinary time earnings (AWOTE).

### Routine jobs are declining as a result of automation

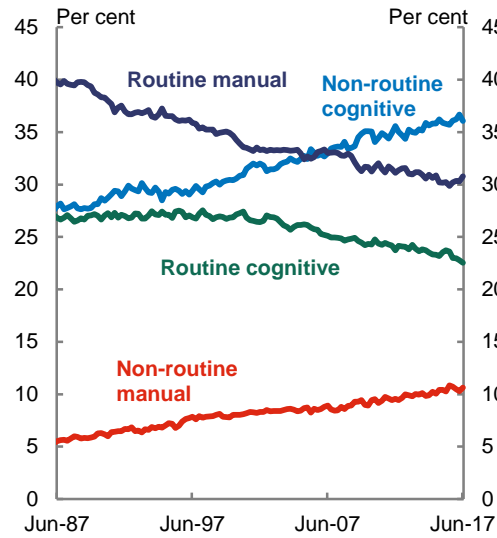
There has been a gradual decline in the share of routine jobs.

As technology has developed, there has been a move away from routine to non-routine tasks. Routine and predictable tasks are more susceptible to displacement by technology and automation than non-routine tasks. This is true for both manual and cognitive tasks (Chart 7).<sup>26</sup> This trend has been related to the move to the services sectors as the vast majority of non-routine work has been added in household and business services (Chart 8).

<sup>25</sup> Note: it is advisable to interpret services industries productivity data with caution, because of measurement difficulties.

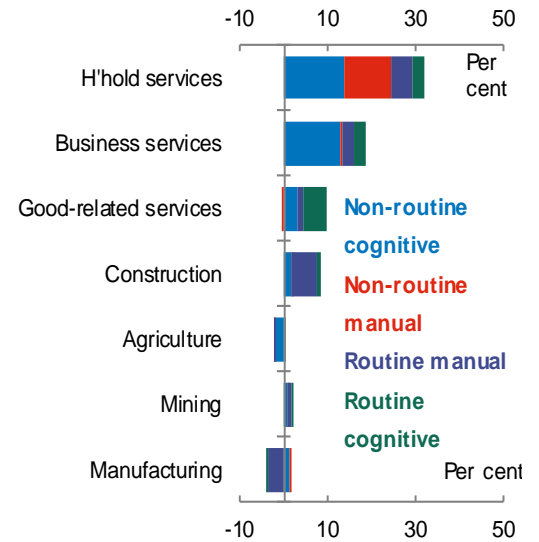
<sup>26</sup> Gruen D (2017), *The Future of Work*, Speech to the 2017 Economic and Social Outlook Conference. <https://www.pmc.gov.au/news-centre/domestic-policy/dr-david-gruens-speech-2017-economic-and-social-outlook-conference>.

**CHART 7**  
Employment share by skill type<sup>27</sup>



Source: ABS Cat no. 6291.0.55.003.

**CHART 8**  
Contribution to growth in employment by skill by industry



Source: ABS Cat no. 6291.0.55.003.

Note: See footnote 3 for the breakdown of household, business and goods-related services. Chart 8 is contribution to growth in total annual employment from May-87 to May-17.

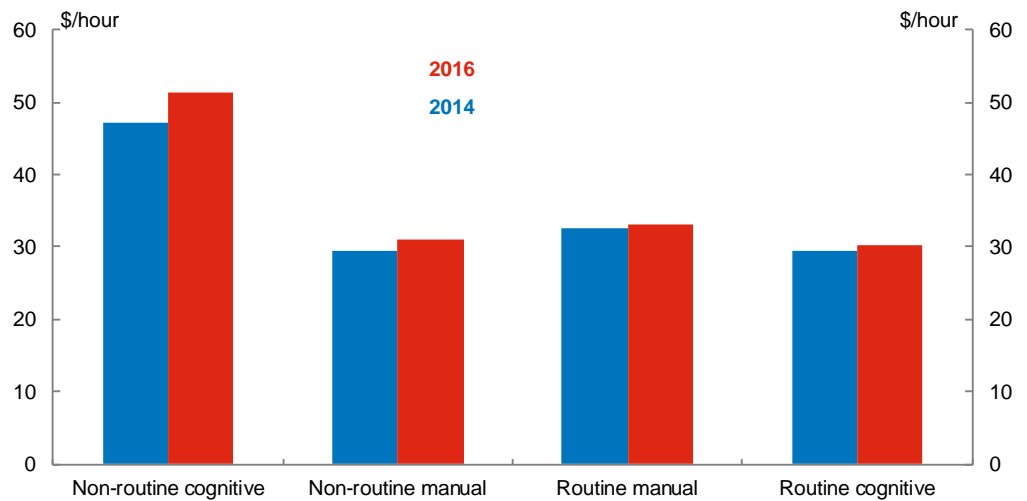
**Automation could affect the distribution of wages.**

It is unclear what the falling share of routine jobs means for wage growth. On the one hand, the move to non-routine tasks would generally be associated with higher skilled and higher paid employment. This is true of non-routine cognitive jobs, which are paid around 40 per cent more on average than other jobs (Chart 9). On the other hand, this could weigh on wage growth as lower skilled workers come under pressure and seek smaller wage increases.

There are also potential distributional consequences of the automation of routine tasks. For example many advanced countries, including Australia, have seen significant ‘job polarisation’ – the simultaneous growth of high-education, high-wage and low-education, low-wage jobs at the expense of middle-education, middle-wage jobs. Job polarisation would affect the distribution of wage growth for various groups in society.

<sup>27</sup> Routine manual includes labourers, trades workers and machinery operators. Routine cognitive includes salespeople or administrative workers. Non-routine manual includes service occupations related to assisting others such as nurses and hospitality workers. Non-routine cognitive includes manager and professionals.

**CHART 9**  
Wages by skill type



Source: ABS Cat. no. 6306.0.

## Globalisation and automation have many people in advanced economies concerned about job security

Globalisation and technological change have affected perceptions about job security.

Many people in advanced economies feel like they are facing more competition, from two main sources: firstly, globalisation has increased competition for work as companies can and have outsourced tasks to low-wage developing economies; secondly, technological change in some industries has led many people to worry that their jobs will be automated.<sup>28</sup>

However the advance of technology affects the number of jobs in the economy in two ways which work in opposite directions: automation, which tends to take away existing jobs; and the invention of new, more complicated tasks, which tends to create new jobs.<sup>29</sup>

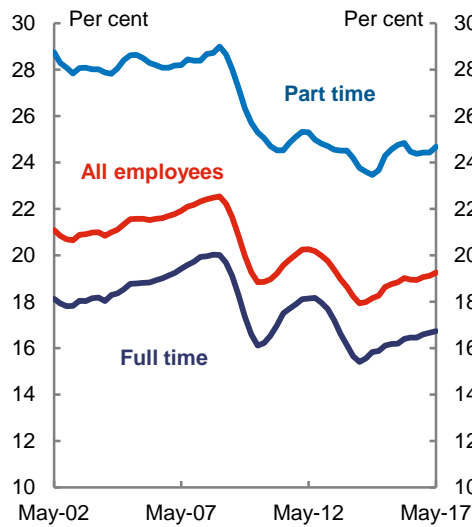
In the long-term, these two factors have kept around the same pace, so that enough new jobs have been created to make up for the existing jobs that have been destroyed.

These factors are difficult to measure. However, for Australia, ABS data tends to indicate that these technological advancements have not as yet had a meaningful effect on job tenure or workers' short term beliefs about their job tenure (Charts 10 and 11).

<sup>28</sup> Lowe P (2017), *The Labour Market and Monetary Policy*, Address to the Anika Foundation Luncheon: <http://www.rba.gov.au/speeches/2017/sp-gov-2017-07-26.html>.

<sup>29</sup> Gruen D (2017), *The Future of Work*, Speech to the 2017 Economic and Social Outlook Conference: <https://www.pmc.gov.au/news-centre/domestic-policy/dr-david-gruens-speech-2017-economic-and-social-outlook-conference>; and Acemoglu D and Restrepo P (2016), *The race between machines and humans: Implications for growth, factor shares and jobs*, VOX. CEPR's Policy Portal: <http://voxeu.org/article/job-race-machines-versus-humans>.

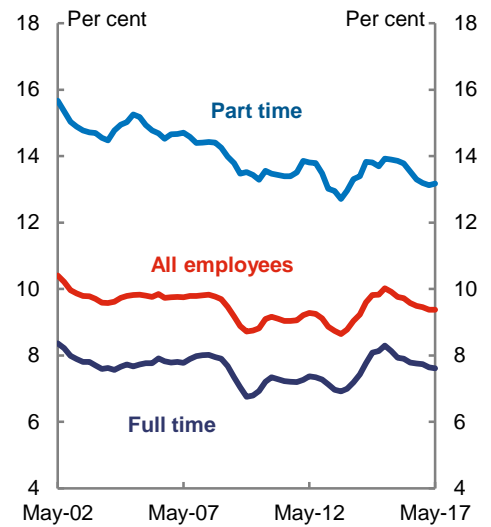
**CHART 10**  
Job tenure



Source: ABS Cat. no. 6291.0.55.003.

Note: share of employees who have been with their current employer for less than 1 year; 4 quarter moving average.

**CHART 11**  
Perceptions of job tenure



Source: ABS Cat. no. 6291.0.55.003.

Note: share of employees that do not expect to be with their current employer in 12 months; 4 quarter moving average.

However, there are risks around globalisation and automation, particularly if these forces are increasing workers’ feelings of uncertainty. Globalisation has increased competition for jobs between people in advanced economies and people in developing economies. Similarly, the loss of routine manual tasks which are now being automated could be weighing on wage growth, as people who face more competition are less likely to demand stronger wage growth.

The services industries, traditionally less subject to these forces, are now open to foreign competition via technology or new entrants. This could be suppressing wage growth in affected industries; the retail industry is a particularly good example.

### Improvements in technology and the desire for flexibility are also changing the nature of work

There are potentially significant changes posed by the emerging ‘sharing’ or ‘gig economy’.

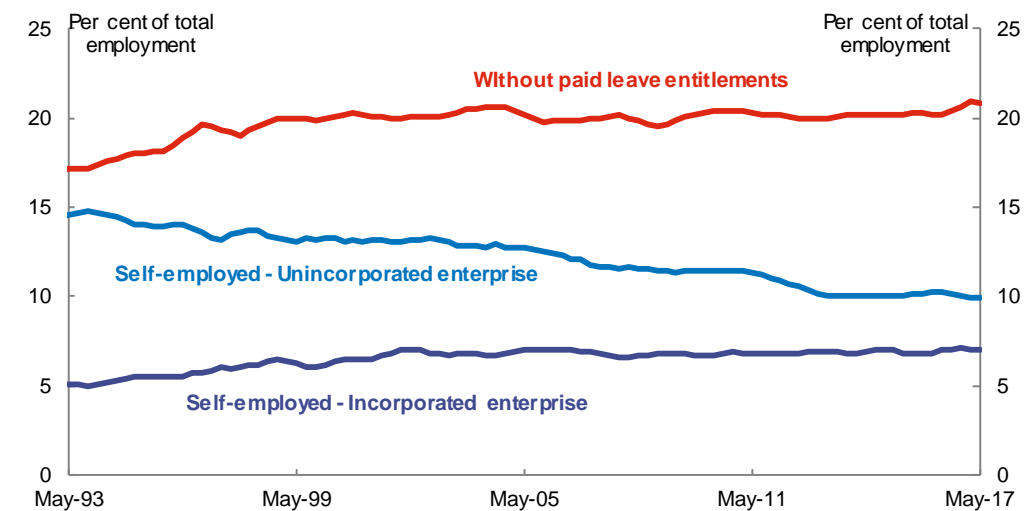
There are also potentially significant changes to work arrangements brought about by the emerging ‘sharing’ or ‘gig economy’ which refers to online platforms that provide a form of labour matching service. Examples include Uber, Airtasker and Deliveroo. While still small, these platforms are growing.

These trends are difficult to measure, but there is some evidence indicating flexible work patterns are already a feature of the Australian labour market.

A significant proportion of people do not have access to paid leave entitlements. The share increased significantly in the 1990s, but has remained steady since the 2000s. It is currently around 21 per cent of employment. Many people are independent contractors, around 8.6 per cent in 2016. Of those, more than half reported having more than one active contract. On the other hand, available evidence suggests that the share of self-employed people has declined over time (Chart 12).<sup>30</sup>

<sup>30</sup> Note: Self-employment data come from the Labour Force Survey and refers only to a person’s main job. The number of self-employed people could be higher, if secondary jobs were taken into account. Also, these figures capture the “usual resident population”, which

**CHART 12**  
**Self-employed and employees that are without paid leave entitlements**



Source: ABS Cat. no. 6291.0.55.003 and 6105.0

Note: Self-employed persons are owner-managers of unincorporated or incorporated enterprises with and without employees; 4 quarter moving average.

broadly means those who are resident in Australia for at least 12 months. This excludes temporary migrants and without this data it is difficult to discern if temporary residents on wage growth has changed.



## CHAPTER 6<sup>31</sup>

# Trends in the labour share of income

The labour share of income has been broadly unchanged since the early 1990s, with different factors exerting both upward and downward pressure. This note examines both cyclical and structural factors that impact the labour share of income. A divergence between growth in the real producer wage and labour productivity growth will cause a shift in the labour share of income. Movements in the terms of trade have had a significant effect on the labour share of income. A long-term shift in the industry structure of employment toward labour intensive services industries has put upward pressure on the labour share of income; however, this may be offset by other factors.

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<sup>31</sup> The views expressed in this chapter are those of The Treasury and do not necessarily reflect those of the Australian Government. This chapter was prepared by Angelia Grant, Harry Withers and Kahlia Vandyk in Macroeconomic Group. Analysis in the note includes information available as at 6 September 2017.

## Shares of national income

National income is shared between labour and capital.

The labour share of income represents the proportion of national income which accrues to employees in the form of wages, salaries and other employee benefits. Labour income is measured in gross terms, and does not account for individuals' tax liabilities, or other forms of income such as government payments.

The capital share of income represents the proportion of national income that accrues to the owners of capital in the form of profits.

Gross mixed income (GMI) represents the income derived by unincorporated enterprises, which cannot be easily separated into labour income and capital income. This often includes the self-employed, such as farmers.

## Changes in the labour share of income reflect relative growth in the real producer wage and labour productivity

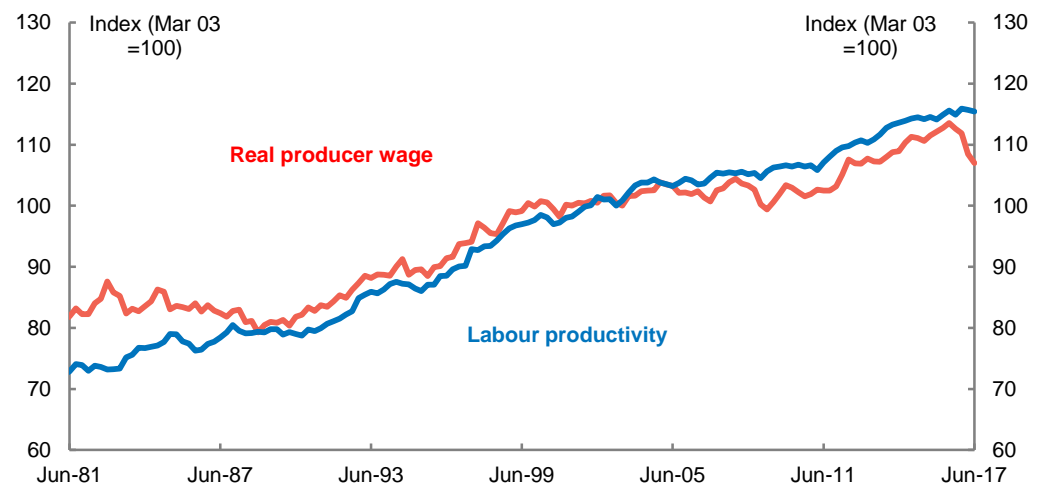
If the real producer wage grows at a faster (slower) rate than labour productivity, the labour share of income will increase (decrease).

The key long-term driver of real wage growth is labour productivity. In the long term, measures of real wage growth — the real consumer and real producer wage — can be expected to move together (Chart 1).

As long as the relationship between the real producer wage and labour productivity is stable, the labour share of income will be stable over time. However, a divergence between growth in the real producer wage and labour productivity growth will cause a shift in the labour share of income.

### CHART 1

#### Real producer wage and labour productivity



Source: ABS Cat. no. 5206.0, Treasury.

Note: The real producer wage is Average Earnings in the National Accounts (per hour) deflated by the GDP deflator; labour productivity is per head.

Slower growth in the real producer wage relative to labour productivity results in a decrease in the labour share of income. Slower growth in the real producer wage could be expected if growth rates of nominal wages slow compared to the prices producers receive for their output. During a terms of trade boom, sharp increases in output prices could be expected to outpace a pickup in wage growth, driving down the real producer wage and the labour income share.

Alternatively, if there is an improvement in national income with everything else held constant, including wages, a rise in labour productivity will result in a fall in the labour share of income. Overall income increases that are not driven by increases in employment or wages growth are driven by increases in the amount of income accruing to capital.

Conversely, faster growth in the real producer wage relative to labour productivity results in an increase in the labour income share.

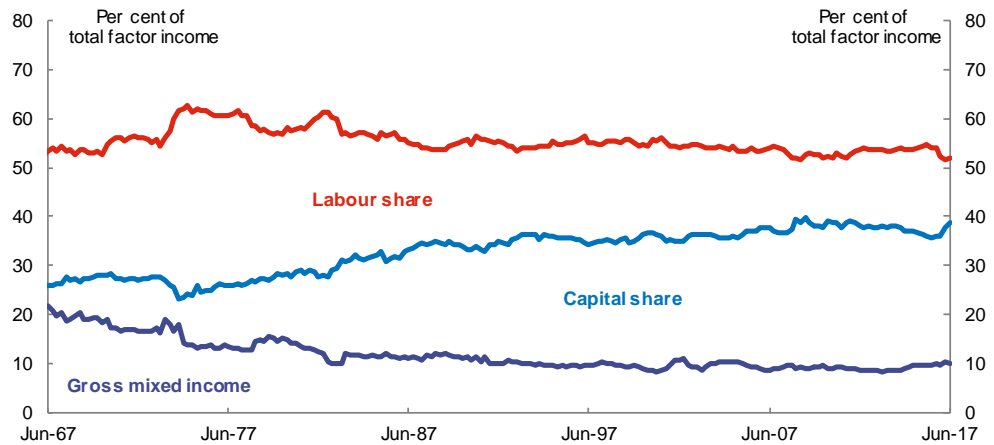
An increase in employment or wages growth, with everything else held constant, would result in a decrease in labour productivity. An increase in employment growth could reflect an increase in the proportion of labour-intensive industries across the economy. Structural change towards labour-intensive industries, such as services industries, will typically increase employment and the labour share of income.

### Historical movements in the labour share of income

The labour share of income has been steady in recent decades.

The labour share of income in Australia has not declined in recent decades as it has in some other advanced economies. After rising sharply in the early 1970s, the labour share of income fell from 63 per cent of total factor income in 1974 to 55 per cent of total factor income in 1992. It has since fluctuated within a range of around 52 to 57 per cent of income (Chart 2).

**CHART 2**  
Income shares over time



Source: ABS Cat. no. 5206.0, Treasury.

The sharp rise in the labour share of income in the early 1970s reflected strong growth in the real producer wage beyond that of labour productivity. The labour share of income gradually declined from the late 1970s, as real wage growth moderated and growth in labour productivity picked up. From 1992 to 2005, the labour share of income fluctuated within a range of around 53 per cent to 56 per cent of income, comparable to the pre-1970s level. Since 2005, the labour share of income has fluctuated within a range of around 52 per cent to around 55 per cent of income.

The capital share of income steadily increased from 22 per cent of total factor income in 1974 to around 35 per cent in 1992. The rise in the capital share of income was sharper than the fall in the labour share of income, partly reflecting increasing incorporation of farm income. Since 2005, the capital share of income has remained relatively stable, fluctuating between 35 and 40 per cent of income.

The declining contribution of the farm sector and associated long-term decline in unincorporated farm income, which fell from around 13 per cent in 1959 to around 1 per cent in 2016, has resulted in a shift of farm income from the household sector (GMI) to the corporate sector.

### Impact of movements in the terms of trade

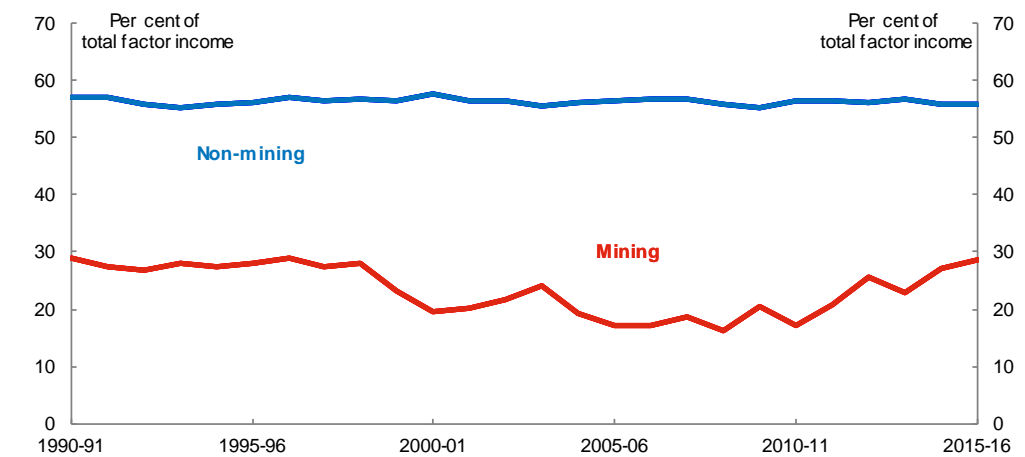
Movements in the terms of trade have had a significant impact on output prices, therefore having a significant impact on the real producer wage and the labour share of income.

During the upswing of the mining investment boom, the terms of trade reached record highs and mining firms employed additional workers to take advantage of rising output prices. There was an increase in wages for mining employees in a relatively tight labour market. However, this rise in wages was smaller than the increase in output prices, contributing to a fall in the real producer wage and the labour income share.

The labour share of income fell from 54 per cent in the September quarter 2007 to 51 per cent in the March quarter 2009. As the terms of trade subsequently fell from its peak, the labour share of income rose, partly as growth in output prices slowed more than growth in nominal wages, resulting in a rise in the real consumer wage. The labour share of income rose gradually from 51 per cent in the March quarter 2009 to 54 per cent in the September quarter 2016.

The disaggregation of the labour share of income into mining<sup>32</sup> and non-mining components illustrates that while terms of trade movements caused fluctuations in the mining labour income share, the labour income share in the non-mining economy remained broadly stable during the mining boom (Chart 3). In recent quarters, the strong rise in the terms of trade has resulted in an increase in the profit share.

**CHART 3**  
Labour share of income in mining and non-mining industries



Source: ABS Cat. no. 5204. 0.

### Impact of structural change

A long-term shift in the industry structure of employment toward labour intensive services industries has put upward pressure on the labour share of income.

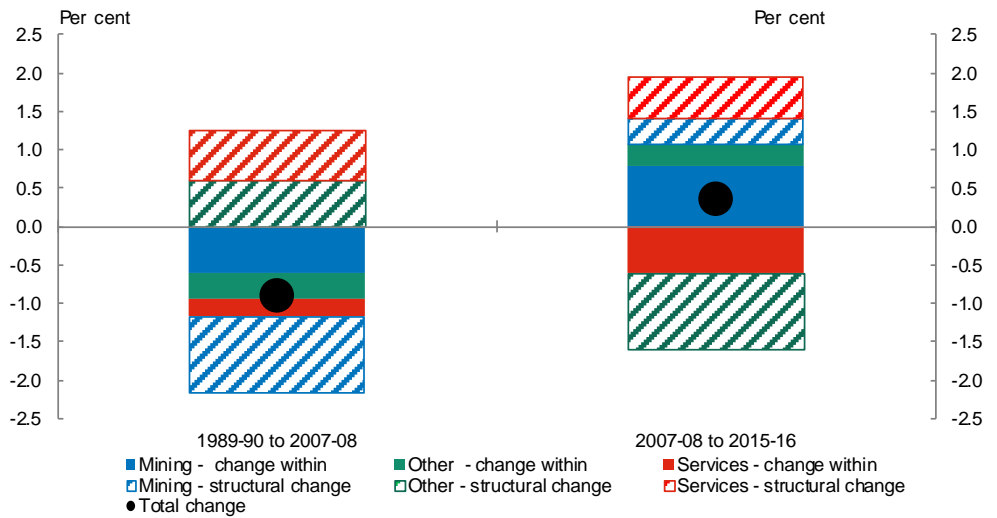
In recent decades, there has been a structural shift in output and employment from the traditional goods sectors, such as manufacturing, to a greater diversity of services industries — particularly household and business services.

The labour share of income is being influenced by this trend as services industries tend to be more labour-intensive than goods industries. However, these industries also tend to have lower productivity levels and lower wages, which provide a slight offsetting effect on the labour share of income.

Chart 4 decomposes the total change in the labour income share prior to and since the global financial crisis (GFC) into contributions resulting from within-industry changes in the labour share of income as opposed to movements in the share of output between industries.

<sup>32</sup> ‘Mining’ refers only to the mining industry in the Australian National Accounts. This may underestimate the effect of the mining industry on movements in the labour share of income due to potential National Accounts misclassification of some mining industry inputs and outputs (which may be reported as part of the construction industry).

**CHART 4**  
**Industry contributions to the change in the market sector labour income share (within and between industries, pre- and post- GFC)**



Source: ABS Cat. no. 5204.0 and Treasury.

In the services sector, the labour share of income within services fell across both periods while a sectoral shift towards services from other industries made a positive contribution to the total labour income share. This demonstrates the higher average labour income share of the services industries compared to other industries. In mining, the labour share of income fell in the period before the GFC as the terms of trade rose.

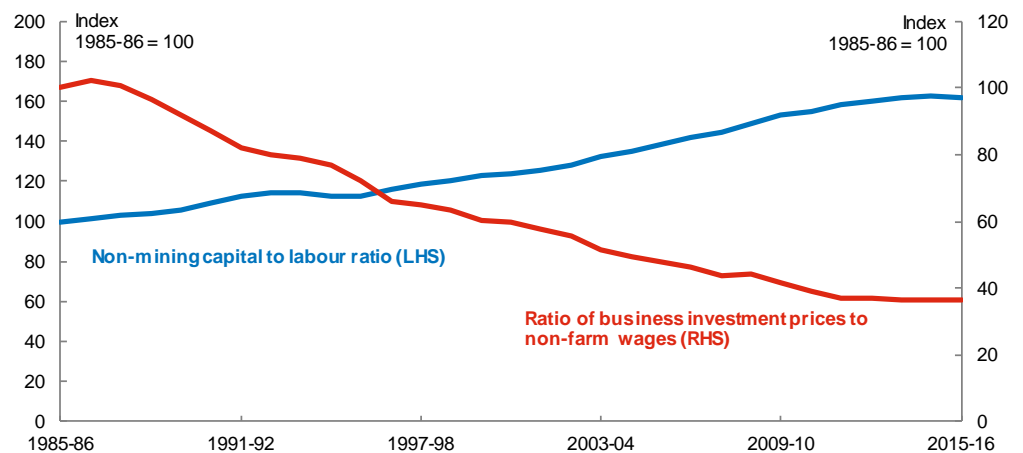
### Other factors may be placing downward pressure on the labour share of income

A range of other factors may be placing downward pressure on the labour share of income.

The relative price of business investment to wages has fallen over time due to large falls in the price of machinery and equipment and computer software.

This has provided an incentive for firms to substitute capital for labour, increasing the capital to labour ratio and labour productivity, and reducing the proportion of income that accrues to workers (Chart 5).

**CHART 5**  
**Change in investment prices and the capital-to-labour ratio**



Source: ABS Cat. no. 5204.0, 5206.0.

Research by the IMF suggests that this phenomenon is common across advanced economies, where information and communication technology makes up a larger proportion of capital investment.

This may also be related to the type of work an employee does, as some tasks are more easily complemented by or substituted for technology than others.

Since 2011, both the relative price of business investment to wages and the non-mining capital-to-labour ratio have been steadier. This could suggest that firms are more likely to employ workers whilst wage growth is low, particularly if the gains from falling investment prices are lower than they were previously, therefore placing upward pressure on the labour income share.

A further factor that may be placing downward pressure on the labour share of income is the rise of 'superstar' firms. Research in the US suggests that to the extent that a small number of firms account for the majority of an industry's sales, then the labour share of income will be lower in that industry.

The fall in the labour income share in these circumstances is considered to be mostly a result of workers moving to these firms. These 'superstar' firms are thought to have a lower labour income share due to their higher profit margins. However, it is unclear how relevant these factors are in Australia.

Finally, individuals are accruing a greater share of capital income through increased returns on housing compared to past decades. Meanwhile, the capital share of income excluding housing has remained relatively stable. As housing rises as a share of total factor income, this places downward pressure on the labour share of income via its effect of expanding the capital income share.

The majority of housing income has been going to owner-occupiers in the form of imputed rents, rather than market rent paid to landlords.

## CHAPTER 7<sup>33</sup>

# Wage growth by employee characteristics

An examination of wage growth by employee characteristics using the Household Income and Labour Dynamics in Australia (HILDA) survey and administrative taxation data suggests that recent low wage growth has been experienced by the majority of employees, regardless of income, educational level, age or occupation.

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<sup>33</sup> The views expressed in this chapter are those of The Treasury and do not necessarily reflect those of the Australian Government. This chapter was prepared by Angelia Grant, Danika Maxwell and Kahlia Vandyk in Macroeconomic Group and Mark Bott, Sarah Brown, Owen Hutchinson, Matthew Smith and Martin Stevenson in Revenue Group. Analysis in the note includes information available as at 8 September 2017.

## The HILDA 15 Report suggests weakness in wage growth

HILDA 15 shows real average weekly earnings have recently been subdued for both men and women.

The HILDA survey allows for the analysis of workers’ weekly earnings from work at a point in time. It also tracks individuals’ earnings over time.

The most recent HILDA report, which includes data from 2001 to 2015, presented a few key findings with regard to real earnings. In particular, real average weekly earnings of full-time employees increased by 21 per cent for males and 22 per cent for females over this period.

There has been very little growth in the real earnings of men since 2012, with median real weekly earnings falling between 2014 and 2015. For women, real weekly earnings were almost unchanged between 2009 and 2014, but there was stronger growth between 2014 and 2015.

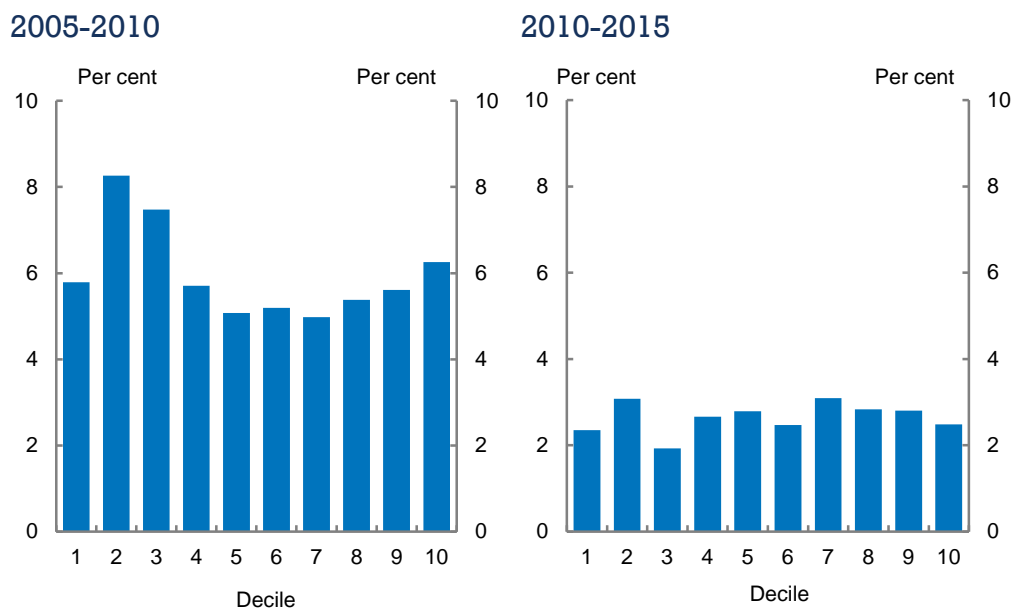
The HILDA survey also allows an analysis of nominal wage growth across a range of employee characteristics. This chapter examines nominal wage growth for employees aged 15 to 64 across the income distribution for a number of key employee characteristics: income level; education level; age; and employment tenure. It also examines nominal wage growth for different occupations using administrative taxation data rather than the HILDA survey.

## Wage growth is fairly uniform across the income distribution

After controlling for hours worked, wage growth has been broadly uniform across the employee income distribution since 2005.

An examination of wage growth by annual wage income decile shows that average annual growth in total wage income was slightly higher in the lower deciles from 2005 to 2015. There was faster average annual growth in all of the income deciles over the period 2005-2010 compared to 2010-2015.

**CHART 1**  
Average annualised growth in annual wage income of employees aged 15 to 64, by annual wage income decile



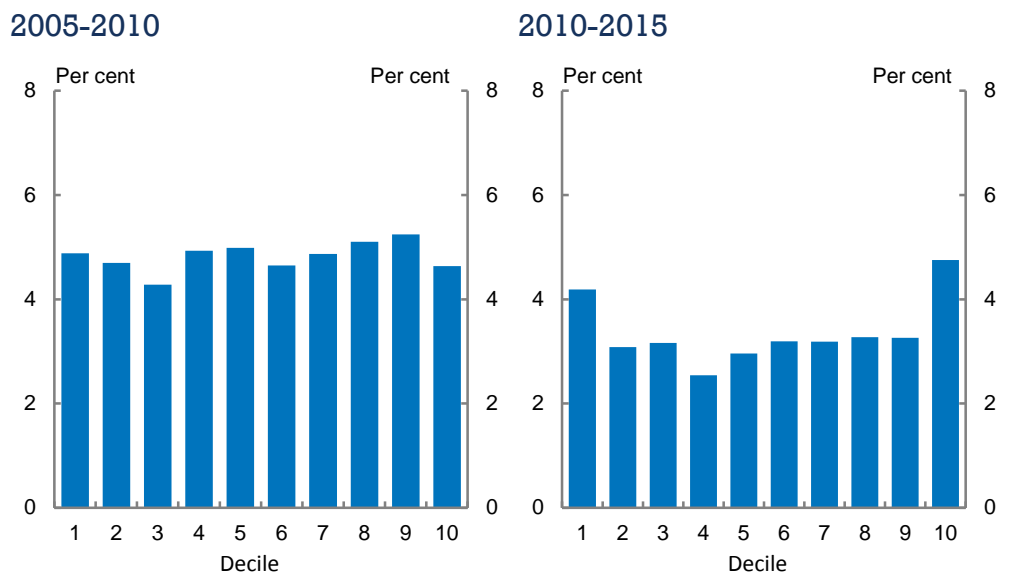
Note: Decile 1 is the lowest income decile, with decile 10 being the highest.  
Source: Treasury calculations on HILDA Survey data, waves 1 to 15.



These aggregate estimates reflect both changes in wage rates (remuneration per hour worked) and hours worked by employees. In addition to estimates of annual wages, the HILDA survey collects information on current weekly wages and hours worked. This allows these changes to be decomposed. After accounting for changes in hours worked, growth in wages appears to be broadly constant across the income distribution.

Chart 2 shows annualised growth in weekly wages of full-time employees. For full-time employees, annualised growth in weekly wages was broadly consistent across the income distribution during the period 2005-2010, while wage growth was lower across the distribution from 2010-2015. Employees in the highest and lowest income deciles experienced higher rates of wage growth than other employees over 2010-2015. The increases in the nominal growth rate of the minimum wage between 2010-2005 may explain some of the stronger relative growth in the lowest income decile.

**CHART 2**  
**Annualised growth in wage income of full-time employees, by weekly wage income decile of full-time employees aged 15 to 64**



Note: Decile 1 is the lowest income decile, with decile 10 being the highest.

Source: Treasury calculations on HILDA Survey data, waves 1 to 15.

Chart 3 shows annualised growth in wages of part-time employees, by hourly wage decile. As for full-time employees, wage growth across the income distribution has been relatively uniform for part-time employees. Over 2005-2010, hourly wages grew more quickly for both the highest and lowest wage employees. Additionally, weekly earnings of higher-wage part-time employees grew more quickly than their hourly remuneration, reflecting an increase in hours worked for these employees.

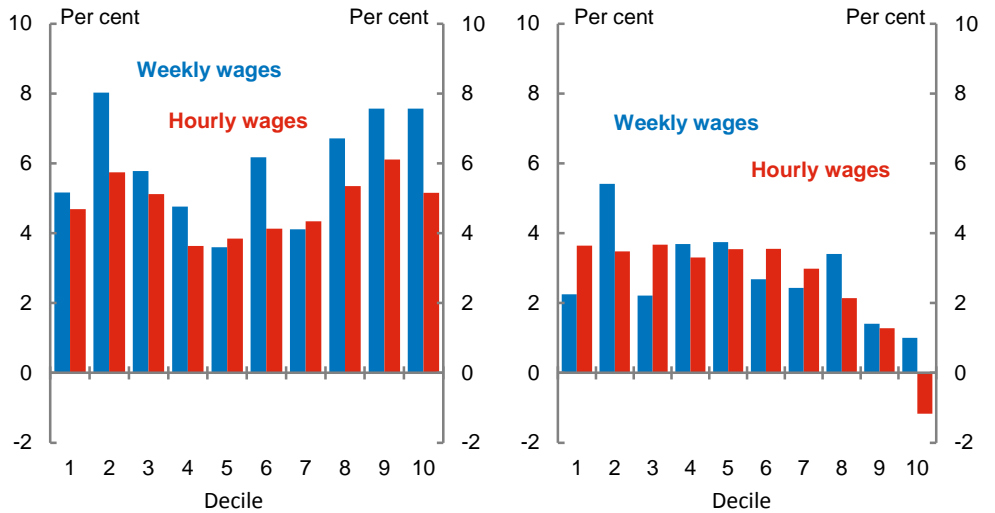
All part-time employees had weaker wage growth over the period 2010-2015 when compared to 2005-2010. This is especially the case for part-time employees with higher hourly wages. Nominal hourly wages fell for those in the highest wage decile.

**CHART 3**

Annualised growth in wage income of part-time employees, by hourly wage decile of part-time employees aged 15 to 64

2005-2010

2010-2015



Source: Treasury calculations on HILDA Survey data, waves 1 to 15.

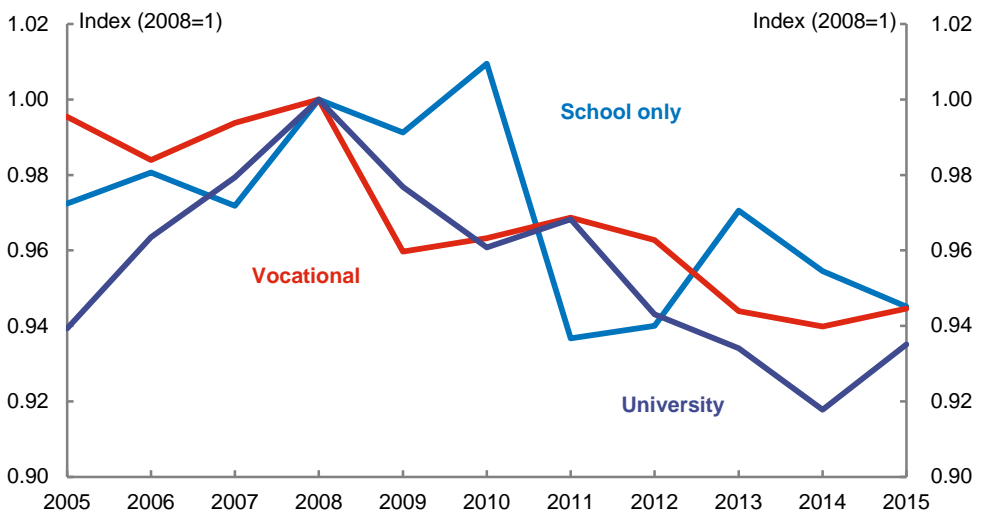
### University-educated employees are experiencing lower wage growth than previously

Employees with a university education have experienced lower wage growth than those with no post-school education over 2010–2015.

Since the global financial crisis, the shift towards part-time employment is evident for individuals of all levels of educational attainment (Chart 4). This shift has been stronger for individuals with a university education.

**CHART 4**

Change in the proportion of employees aged 15 to 64 working full-time

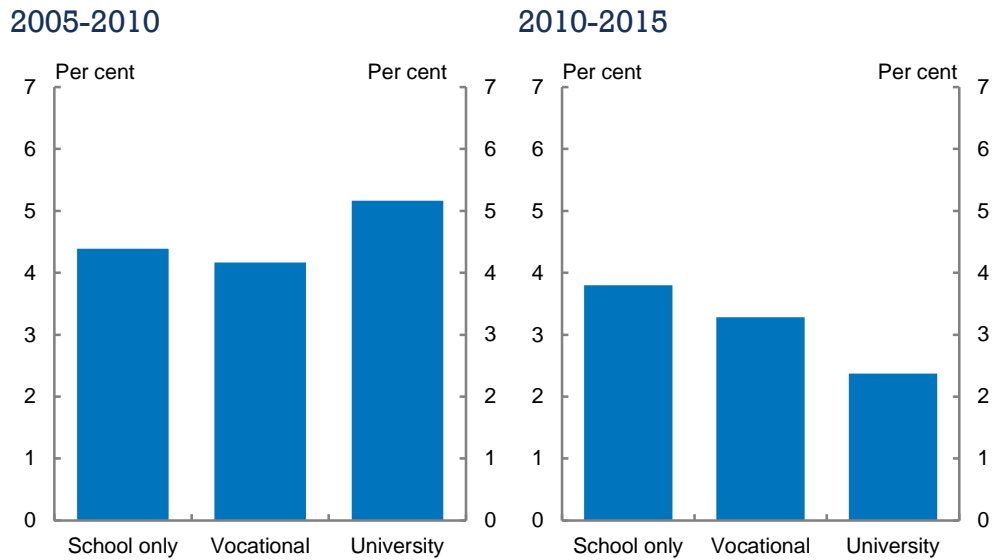


Source: Treasury calculations on HILDA Survey data, waves 1 to 15.

Chart 5 shows that full-time employees with a university education had higher wage growth than those without over the period 2005-2010, but have since experienced lower wage growth than individuals with no post-school education. For full-time employees,

individuals with a university education received higher wage growth than other employees over the period 2005-2010. However, this group experienced lower wage growth during the subsequent five year period.

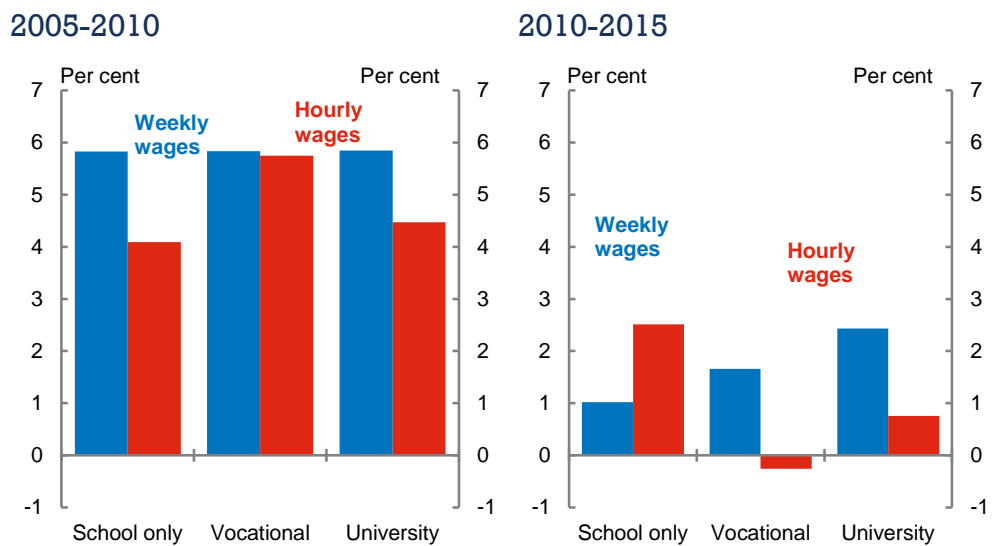
**CHART 5**  
Annualised growth in weekly wage income of full-time employees, by highest level of educational attainment



Source: Treasury calculations on HILDA Survey data, waves 1 to 15.

Chart 6 shows similar trends for part-time employees. However, over the period 2010-2015, more educated employees may have been able to compensate for lower growth in hourly wages by increasing their working hours, while those without a university education have worked fewer hours on average.

**CHART 6**  
Annualised growth in wage income of part-time employees, by highest level of educational attainment



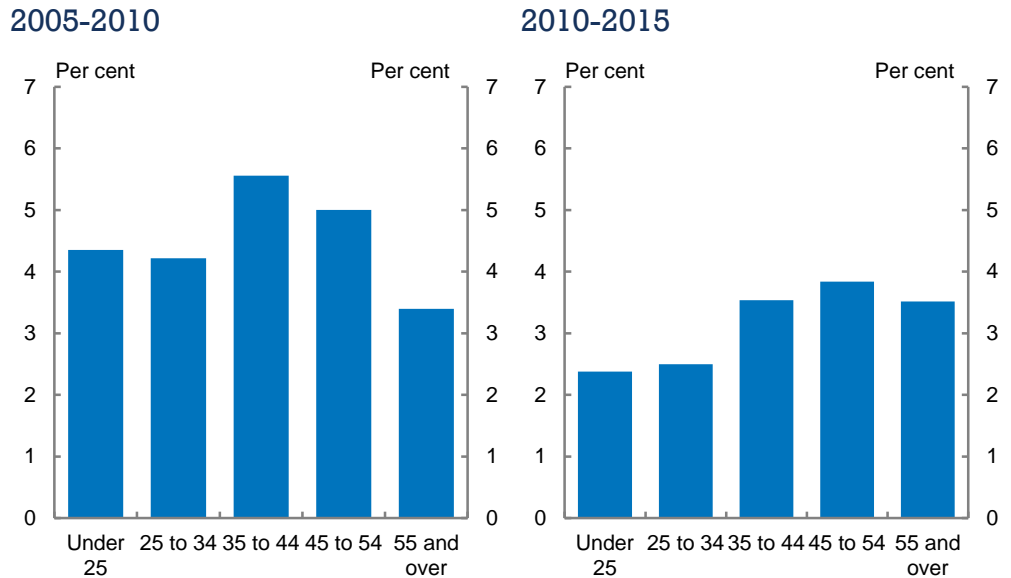
Source: Treasury calculations on HILDA Survey data, waves 1 to 15.

## Younger workers have had the largest decline in wage growth

Full-time employees younger than 35 had lower wage growth than other employees during 2010–2015.

For full-time employees under the age of 55, wage growth was weaker over the period 2010-2015 than over the preceding five years (Chart 7). Among full-time employees, wage growth has been weakest for those aged under 35.

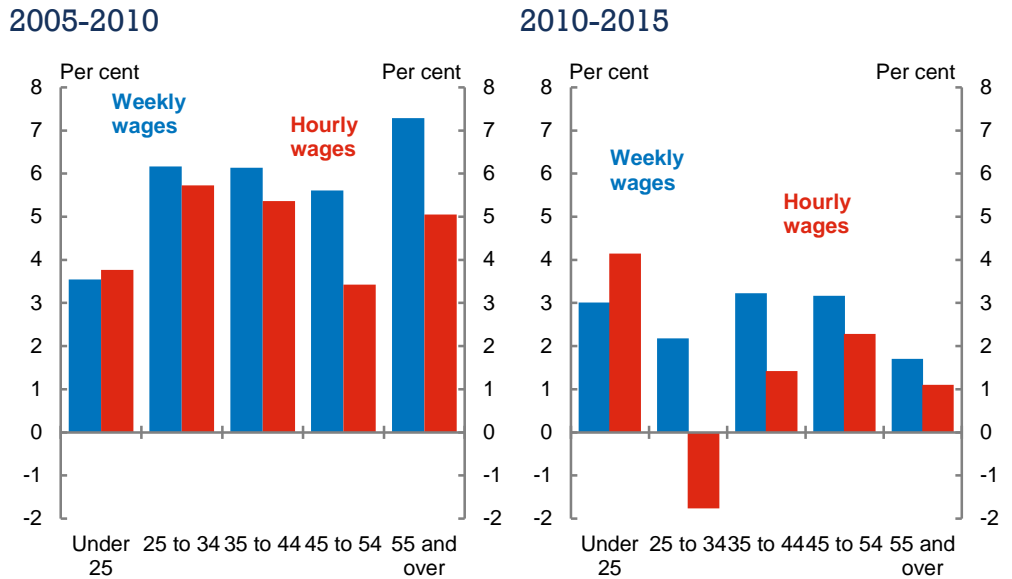
**CHART 7** Annualised growth in weekly wage income of full-time employees, by age groups



Source: Treasury calculations on HILDA Survey data, waves 1 to 15.

It is also the case that part-time employees across all age groups experienced weaker wage growth during 2010-2015 than 2005-2010 (Chart 8), with no clear strength or weakness for particular age groups. For those aged over 25, weekly earnings growth has declined by less than hourly wages growth, suggesting that part-time employees have increased their working hours to counter lower wage growth.

**CHART 8**  
Annualised growth in weekly wage income of part-time employees, by age groups



Source: Treasury calculations on HILDA Survey data, waves 1 to 15.

### In periods of economic strength, changing employers leads to higher wage growth

Employees who change jobs typically receive larger wage rises than those who stay in the same job, except when there is labour market slack.

The majority of job exits are by employees moving between employers.<sup>34</sup> Typically, employees who change jobs receive larger wage increases than those who remain in the same job (Chart 9).

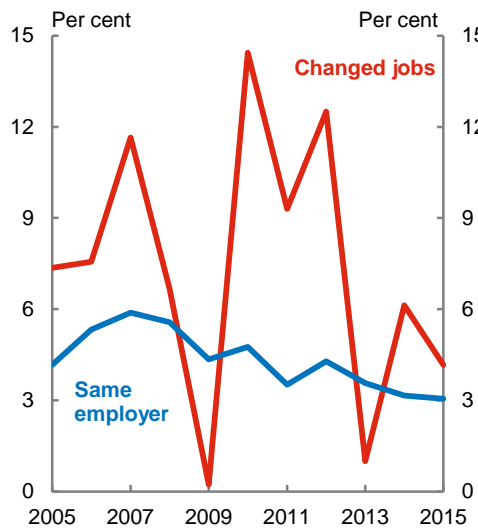
The exception to this has been during periods of labour market slack (both during the global financial crisis and more recently), when people changing employers have accepted lower wage increases than they did previously. This may reflect a fall in bargaining power, or a willingness to take a job with a lower wage rate, given the alternative may be unemployment.

For full-time employees, the labour market may have become less mobile in recent years, with the proportion of full-time employees moving between employers declining in the lead up to the global financial crisis, and not completely rebounding subsequently (Chart 10).

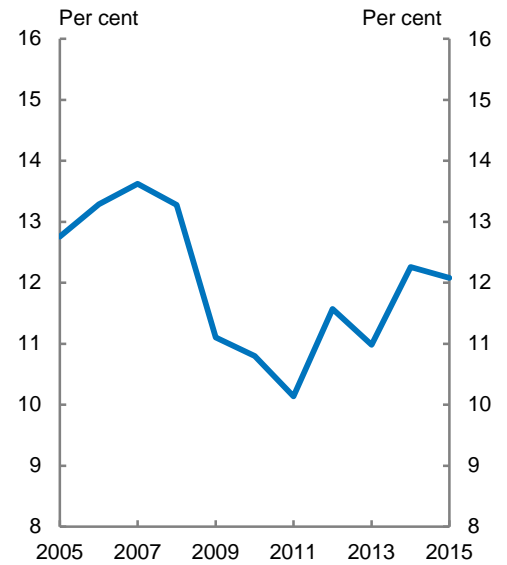
Beyond individuals moving between jobs, there seems to be no clear relationship between tenure with an employer and the level of wage growth an employee receives.

<sup>34</sup> For analysis on this, see Carroll, N and Poehl, J (2007), *Job mobility in Australia*, paper for the 2007 HILDA conference.

**CHART 9**  
**Median wage growth for full-time employees, by whether changed job from the previous year**



**CHART 10**  
**Proportion of full-time employees changing jobs from the previous year**



Source: Treasury calculations on HILDA Survey data, waves 1 to 15. Charts only include individuals who were employed full-time with a single employer in both the current and previous year.

**All occupations have seen a decline in average annual wage growth since 2004-05**

Tax data show that the decline in wage growth has occurred even in non-routine and cognitive occupations.

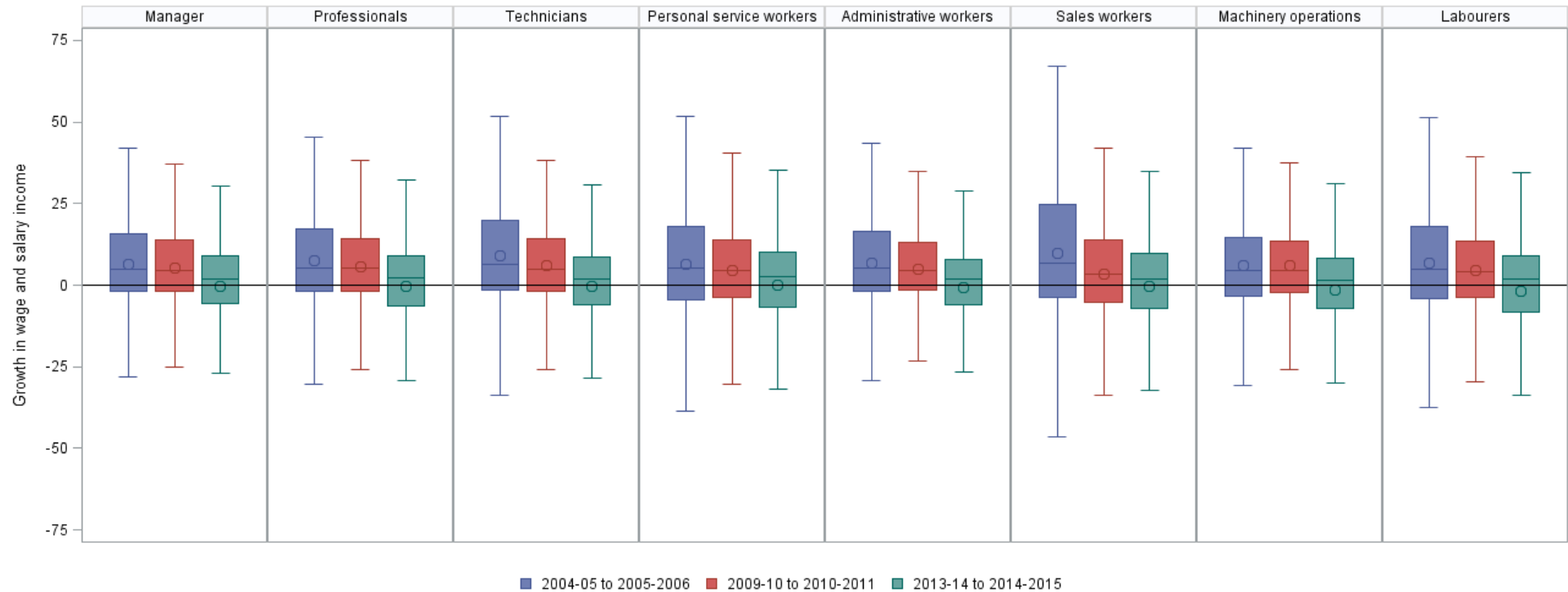
Administrative taxation data can be examined to show the distribution of annual growth in salary and wage income by occupation.

Chart 11 shows the distribution of annual growth in salary or wage income across occupations and over different time periods as box and whisker plots. In the charts, the median and average growth rates are depicted by the line and circle respectively, the box reflects the range of the middle 50 per cent of individuals' annual growth in salary or wage income and the whiskers represent individuals with more extreme salary or wage income growth. These extreme rates of growth may reflect large changes in hours worked (e.g. moving from part-time to full-time employment), changing employers, or changing positions within the same occupation.

Consistent with the findings on educational attainment in the HILDA data, occupations which often require higher education and could be described as non-routine and cognitive, such as managers and professionals, have experienced wage growth as low as more routine occupations, such as labourers and manufacturers. In addition to the lower average growth, the reduction in volatility is indicative of a less mobile labour market, with fewer people moving between jobs or changing their hours of work.

**CHART 11**  
Annual growth in salary or wage income selected years, by occupation

Median and average growth rates are depicted by the line and circle respectively, the box reflects the range of the middle 50 per cent of individuals' annual growth in salary or wage income and the whiskers represent individuals with salary or wage income growth furthest from the average.



Note: Annual growth is calculated as the growth in salary or wage income for an income year, as reported on tax returns. This measure of growth is affected by changes in remuneration per time worked; shifting hours worked, or movement in and out of employment, over the income year; and factors in the administration of the taxation system impacting on the amount of salary or wage income reported on tax returns (for example, the number of paydays within a year may over or understate actual salary or wage income).

Source: Unpublished 16 per cent sample of ATO tax return data, Treasury estimates. Occupation codes are set as the individual's occupation in the latter year. The sample of individuals submitting tax returns in the following charts has been restricted to those with annual growth in salary or wage income between -100 and 100 per cent.

## CHAPTER 8<sup>35</sup>

# Wages and business characteristics

An examination of wages by business characteristics using firm-level tax data from the Business Longitudinal Analysis Data Environment (BLADE) shows that businesses with higher labour productivity pay higher real wages. The relationship between real wages and labour productivity holds across all business characteristics examined: business size (measured in terms of turnover), export participation and foreign ownership status.

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35 The views expressed in this chapter are those of The Treasury and do not necessarily reflect those of the Australian Government. This chapter was prepared by Alexander Sibelle and Costa Georgeson in Macroeconomic Group. Analysis in the note includes information available as at 13 September 2017.

**Disclaimer:**

The results of these studies are based, in part, on ABR data supplied by the Registrar to the ABS under *A New Tax System (Australian Business Number) Act 1999* and tax data supplied by the ATO to the ABS under the *Taxation Administration Act 1953*. These require that such data is only used for the purpose of carrying out functions of the ABS. No individual information collected under the *Census and Statistics Act 1905* is provided back to the Registrar or ATO for administrative or regulatory purposes. Any discussion of data limitations or weaknesses is in the context of using the data for statistical purposes, and is not related to the ability of the data to support the ABR or ATO's core operational requirements. Legislative requirements to ensure privacy and secrecy of this data have been followed. Only people authorised under the *Australian Bureau of Statistics Act 1975* have been allowed to view data about any particular firm in conducting these analyses. In accordance with the *Census and Statistics Act 1905*, results have been confidentialised used to ensure that they are not likely to enable identification of a particular person or organisation.



## More productive businesses pay higher real wages

More productive businesses pay higher average real wages.

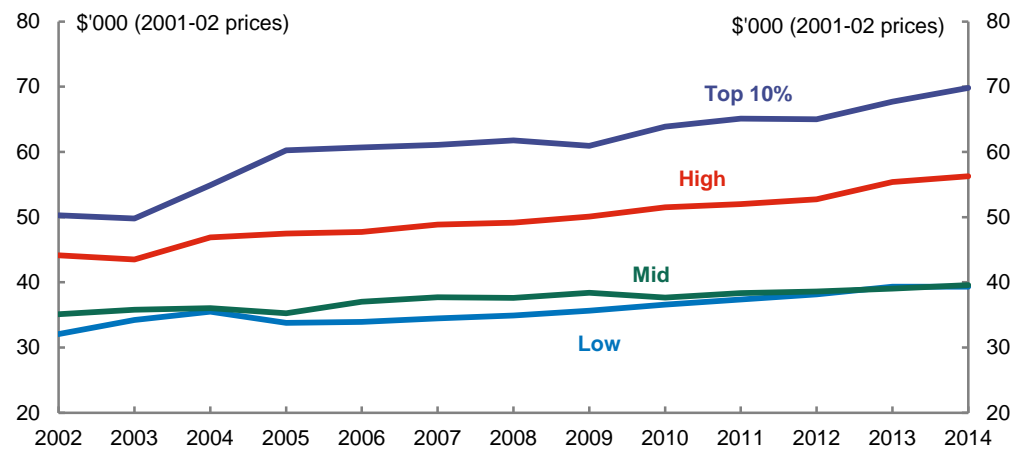
To examine the relationship between average real wages and labour productivity, businesses are evenly split into high, mid and low productivity categories in each industry per year (Chart 1).<sup>36</sup> Businesses in the market sector excluding agriculture and finance are considered. There is also a fourth category, the top 10 per cent of businesses, which is a subset of the high productivity category.

Average real wages are calculated by deflating a business’s wage bill by output prices and dividing by the number of full-time equivalent employees. This real wage reflects the real cost of labour to a business and is called the real producer wage.<sup>37</sup>

Chart 1 shows a strong positive relationship between average real wages and labour productivity. High labour productivity businesses — and the most productive 10 per cent of businesses in particular — pay markedly higher average real wages (in *level* terms). On average over 2001-02 to 2013-14, the high productivity category paid average real wages 1.4 times as high as the low productivity category and 1.3 times as high as the mid productivity category. There is a relatively small difference between average real wages paid by the mid and low productivity categories. This could be driven by regulated minimum wages or awards.

Wage growth has also been strongest for the top 10 per cent and high productivity categories with the gap in average real wages between these businesses and low and mid productivity businesses having widened over the period. From 2001-02 to 2013-14, the top 10 per cent productive businesses had annual real wage growth of 2.8 per cent compared with annual real wage growth of 1.7 per cent for the low productivity category.

**CHART 1**  
Average real wages by labour productivity category



Source: Treasury calculations using BLADE.

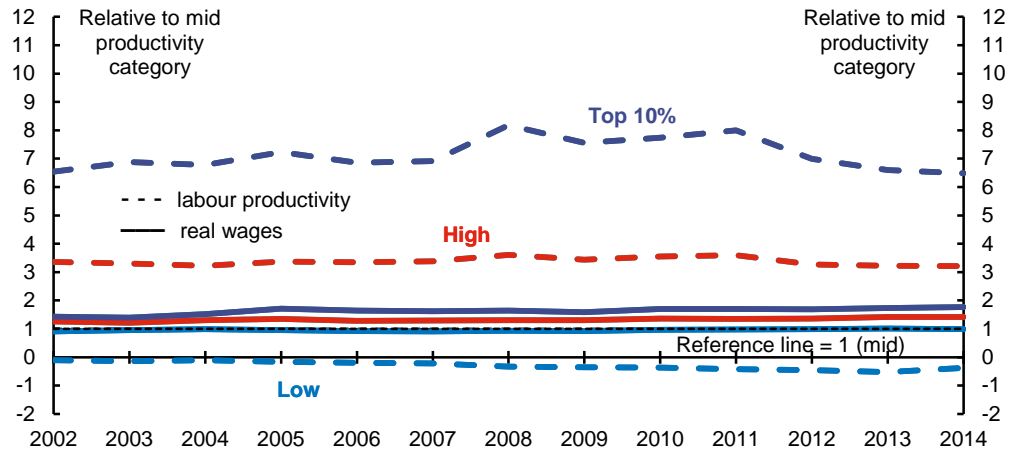
<sup>36</sup> Labour productivity is a business’s annual value-added, expressed in 2001 prices, divided by the number of full-time equivalents (FTE). Value-added is calculated as the sales of goods and services from Business Activity Statement (BAS) forms excluding GST, less non-capital purchases, also excluding GST (BAS). FTE is a derived measure from PAYG statements. In order to calculate real value-added, Gross output and intermediates are deflated separately, using output and input deflators. Retail and wholesale trade are exceptions — for these industries the value-added deflator is used. This is due to the inclusion of cost of goods sold in output and input data from BAS forms. The deflators represent 2001-02 prices at the two-digit ANZSIC industry classification and are derived from the Supply Use tables. Breaking businesses into productivity categories by industry ensures the high category does not only reflect high productivity industries. The market sector includes mining, manufacturing, electricity, gas, water and waste services, construction, wholesale trade, retail trade, accommodation and food Services, transport, postal and warehousing, information media and telecommunications, rental, hiring and real estate services, professional scientific and technical services, administrative and support services, arts and recreation services, and other services. Finance is excluded because recorded output in BLADE differs from the definition of output in the National Accounts, whilst for agriculture the wage data in BLADE is unreliable due to the prevalence of owner-operators. Results presented also hold for the market sector excluding the mining industry.

<sup>37</sup> Real wages can also be calculated from a consumer perspective by deflating the wage bill using the household consumption deflator. The results presented throughout this note hold regardless of the choice of deflation.

Chart 2 shows labour productivity and real wages of the top 10 per cent, high and low productivity categories relative to the mid productivity category. This shows the extent to which differences in wages reflect differences in labour productivity.

Although high productivity businesses pay higher average real wages they do not pay real wages in proportion to their high relative productivity. While on average over 2001-02 to 2013-14 businesses in the top 10 per cent category were 7.1 times as productive as businesses in the mid category, they paid only 1.6 times as much in average real wages.

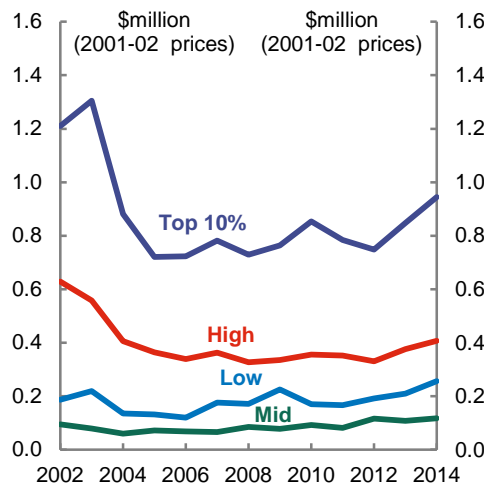
**CHART 2**  
Relative productivity and real wages by productivity class



Source: Treasury calculations using BLADE.

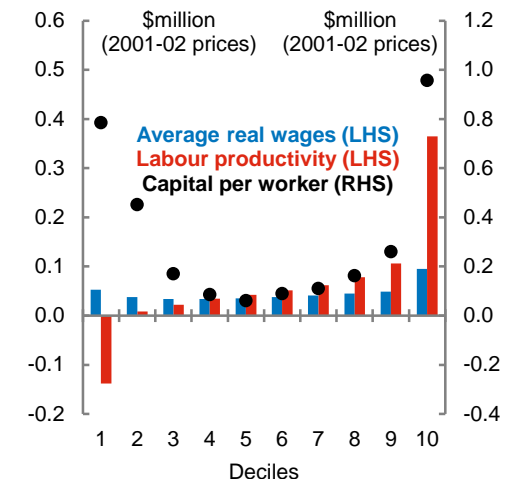
Chart 3 shows more productive businesses have more capital per worker.<sup>38</sup> Over 2001-02 to 2013-14 the top 10 per cent had 4.9, 10.4 and 2.2 times as much capital per worker than the low, mid and high categories respectively.

**CHART 3**  
Capital per worker by labour productivity category



Source: Treasury calculations using BLADE.

**CHART 4**  
Real wages, labour productivity and capital per worker by productivity deciles, 2001-02 to 2013-14



Source: Treasury calculations using BLADE.

<sup>38</sup> Capital per worker is measured by taking the book value of capital stock from business income tax (BIT) forms, deflating by output prices and dividing by FTE.

Capital may in part explain the *level* difference between relative labour productivity and relative real wages for the top 10 per cent and high productivity categories shown in Chart 2. Surprisingly; however, the low productivity category has higher average capital per worker than the mid productivity category. The reason for this is not clear: it may be that businesses that have recently undertaken significant capital investment suffer low productivity in the short-term until the new capital becomes productive. Alternatively, mid productivity businesses may be more reliant on human capital than physical capital.

Chart 4 shows the average real wages, labour productivity and capital per worker for each labour productivity decile during the period 2001-02 to 2013-14.

For the top five deciles, capital per worker and average real wages increase with productivity; however, capital per worker increases substantially faster than average real wages. This suggests that capital deepening at the business-level – increasing the amount of capital per worker – increases average real wages, but at a decreasing rate. This also implies the labour income share decreases, moving up the productivity deciles.

The results for the bottom three deciles are not behaving as expected. Wages increase with capital, but have an inverse relationship with productivity. As stated above, it may be due to a lag between capital investment and output or to variations in human capital. However, given both the low productivity category in Chart 3 and the lowest percentile in Chart 4 have negative labour productivity, a key driver of this pattern may be measurement error.<sup>39</sup>

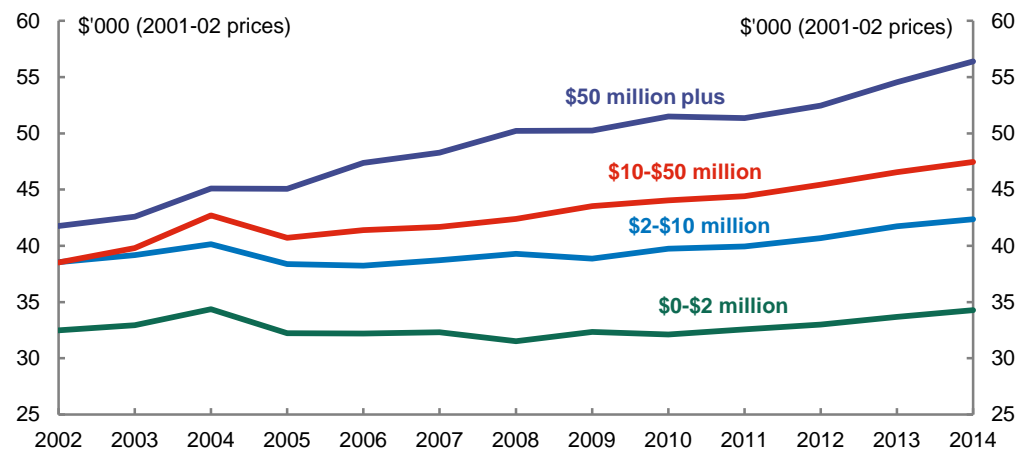
### Larger businesses pay higher average real wages

Larger businesses are more productive and also pay higher real wages.

Businesses are separated into four size categories based on their reported turnover: \$0-\$2 million, \$2-\$10 million, \$10-\$50 million and more than \$50 million (Chart 5).

Larger businesses paid higher average real wages and had higher real wage growth. On average over 2001-02 to 2013-14, businesses with more than \$50 million turnover paid average real wages 1.5, 1.2 and 1.1 times as much as the \$0-\$2 million, \$2-\$10 million and \$10-\$50 million categories respectively. In addition, over 2001-02 to 2013-14 businesses with more than \$50 million turnover had annual real wage growth of 2.5 per cent compared with annual real wage growth of only 0.5 per cent for businesses in the \$0-\$2 million category.

**CHART 5**  
Average real wages by business size class



Source: Treasury calculations using BLADE.

<sup>39</sup> BAS (Business Activity Statement) tax data does not have information on inventories and hence it is not possible to adjust gross output for change in inventories. Further, intermediate inputs are recorded in the financial year they are purchased, not necessarily used in production. However negative value-added may simply represent struggling businesses. Over time it is expected these businesses improve or exit the market.

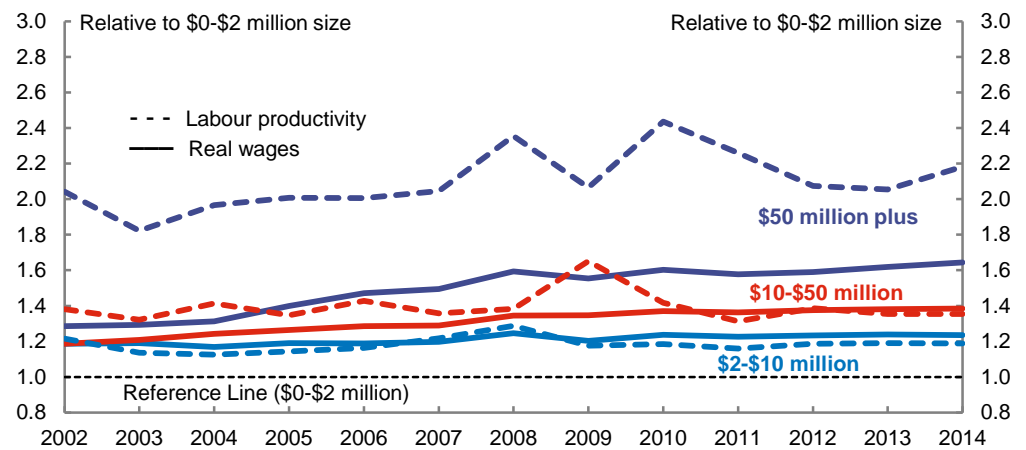
This size-wage effect may be driven by productivity gains resulting from economies of scale or that more productive businesses are more likely to capture a larger market share. Additionally, large businesses may be able to attract highly skilled or productive workers who then command a higher wage.

Chart 6 presents real wages and labour productivity relative to the \$0-\$2 million size category. This highlights the importance of labour productivity, as the pattern in average real wages is largely reflected in the patterns in relative labour productivities.

Businesses with more than \$50 million in turnover had the highest average real wages while also having the highest labour productivity. Similarly, the \$0-\$2 million businesses have the lowest average real wage and lowest labour productivity.

However, while the relative labour productivity and relative real wages of the \$2-\$10 million and \$10-\$50 million size class follow each other closely (blue and red lines), there is a disconnect between labour productivity and real wages for the largest size class (grey lines). On average through the period, the more than \$50 million turnover category was 2.1 times as productive as the \$0-\$2 million category, but paid average real wages only 1.5 times as much.

**CHART 6**  
Relative productivity and real wages by business size class



Source: Treasury calculations using BLADE.

The gap between relative productivity and relative wages of the \$50 million plus turnover category is again partly driven by capital per worker, with large businesses having much more capital per worker than the smaller size classes. Over 2001-02 to 2013-14, the more than \$50 million turnover businesses had, on average, 7.1, 6.8 and 3.8 times as much capital per worker compared to the \$0-\$2 million, \$2-\$10 million and \$10-\$50 million categories, respectively.

## Exporters and foreign owned businesses pay higher real wages

Exporters and foreign owned businesses have higher real wages and are more productive. The differences are partly attributable to size.

Exporting businesses paid higher average real wages than non-exporting businesses (Chart 7).<sup>40</sup> Exporters paid their employees, on average, 1.3 times as much as non-exporters over 2001-02 to 2013-14.

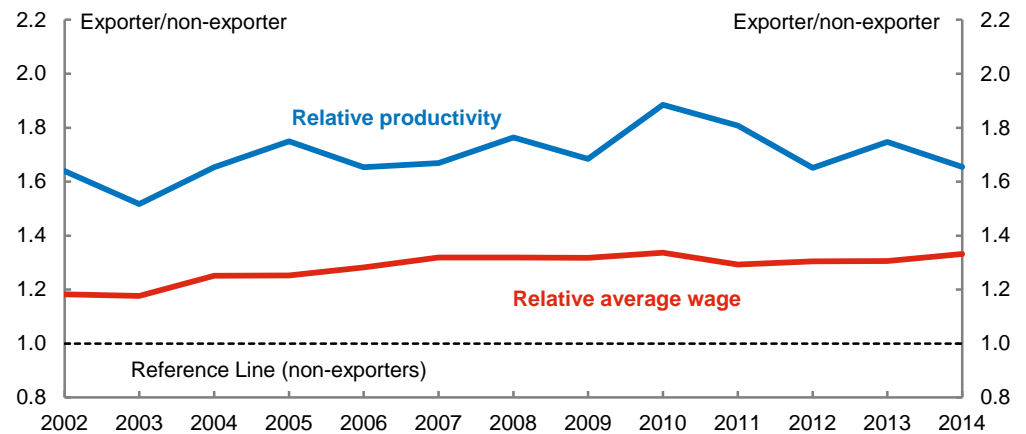
Exporting businesses have also exhibited higher real wage growth relative to non-exporting businesses. Over the 2001-02 to 2013-14 period, exporting businesses had real wage growth of 2.4 per cent compared to 1.4 per cent for non-exporting businesses.

As with previously discussed characteristics, the labour productivity differential is not fully reflected in higher average real wages, with exporting businesses being 1.7 times as productive on average over the period. This difference is correlated with capital per worker. Exporters had on average 2.8 times as much capital per worker than non-exporters over 2001-02 to 2013-14.

There may be a number of reasons why exporting businesses pay higher real wages. It may be as a result of benefits from exporting, such as access to larger markets, economies of scale and knowledge and technology diffusion benefits.<sup>41</sup> Alternatively, it may be because more productive businesses are more likely to be able to compete on the international stage (and hence export).

Department of Industry, Innovation and Science analysis using BLADE, suggests that productivity gains occur prior to exporting and the benefits of exporting accrue to continuous rather than intermittent exporters. The research also found that exporters are around 13.4 per cent more productive and pay 11.5 per cent higher wages compared to non-exporters, after controlling for characteristics such as age, size and industry.<sup>42</sup>

**CHART 7**  
Average real wage – exporters relative to non-exporters



Source: Treasury calculations using BLADE.

Businesses with foreign shareholders also paid higher average real wages than businesses without foreign shareholders (Chart 8).<sup>43</sup> From 2001-02 to 2013-14, businesses with foreign shareholders had average real wages 1.3 times as high as businesses as those without.

<sup>40</sup> Exporting businesses are businesses that export at least \$2,000 worth of goods in a given year.

<sup>41</sup> Giles J, and Williams, C (2000), *Export-Led Growth: A Survey of the Empirical Literature and Some Non-causality Results. Part I*, Journal of International Trade and Economic Development, 9(3), 261-337.

<sup>42</sup> Tuhin R and Swanepoel A (2016) *Export behaviour and business performance: evidence from Australian microdata*, Department of Industry, Innovation and Science: Office of the Chief Economist, Research Paper 7/2016.

<sup>43</sup> A business with foreign shareholders is defined as one where the foreign shareholders in the business’s top 10 shareholders own at least 10 per cent of the business. Businesses that do not satisfy this are not required to report percentage of foreign shareholders and therefore cannot be identified within BLADE.

Businesses with foreign shareholders also had higher real wage growth. From 2001-02 to 2013-14, businesses with foreign shareholders had annual real wage growth of 2.6 per cent compared to 1.5 per cent for businesses without foreign shareholders.

This difference partly exists because foreign owned businesses will typically be larger than businesses without foreign ownership. When looking at businesses with more than \$50 million turnover, the difference in real wage levels between foreign owned and domestic owned businesses persists while the difference in real wage growth disappears.<sup>44</sup> Over 2001-02 to 2013-14 businesses with foreign shareholders with more than \$50 million turnover had annual real wage growth of 2.6 per cent compared with 2.5 per cent for businesses without foreign shareholders in the same turnover category.

As with the previously discussed characteristics, average real wages do not increase in proportion with labour productivity, with businesses with foreign shareholders being 1.9 times as productive on average over 2001-02 to 2013-14.

**CHART 8**  
**Relative productivity and average real wages – foreign shareholders relative to no foreign shareholders**



Source: Treasury calculations using BLADE.

Businesses with no foreign shareholders had 3.7 times as much capital per worker over the period 2001-02 to 2013-14. However, much of this difference is attributable to size. When considering businesses with \$50 million plus turnover, foreign owned businesses had 1.7 times as much capital per worker over the period 2001-02 to 2013-14.

<sup>44</sup> The level gap may still be due to difference in size between businesses with and without foreign shareholders, as the \$50 million plus size class of foreign owned businesses is larger, on average, than the \$50 million plus size class of domestic owned businesses.

## CHAPTER 9<sup>45</sup>

# Trends in methods of pay setting

Wage growth is subdued across all methods of pay setting. In recent years, increases in award wages have generally been larger than the overall increase in the Wage Price Index (WPI). Wage growth in federal enterprise agreements is also above WPI – wages have increased by 3.1 per cent per year on average over the life of agreements, as at March 2017. At the same time, award reliance has increased in some industries, while the coverage of collective agreements has fallen.

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<sup>45</sup> The views expressed in this chapter are those of The Treasury and do not necessarily reflect those of the Australian Government. This chapter was prepared by Angelia Grant and Danika Maxwell in Macroeconomic Group. Analysis in the note includes information available as at 30 September 2017.

## Australia has a unique set of institutional arrangements

Collective agreements became the dominant method of pay setting during the 2000s.

For nearly a century, the Australian industrial relations system was based on compulsory conciliation and arbitration of disputes by state and federal tribunals. The resulting ‘award’ wages and conditions applied to all workers in a particular industry or occupation.

In the 1990s, a series of court decisions and legislative changes encouraged collective bargaining between employers and employees at the level of the individual business, or ‘enterprise’. These changes also restricted sector wide bargaining. Awards became more of a safety net rather than the dominant method of setting pay and conditions.

Enterprise agreements can bargain award pay and conditions as long as workers are better off overall. Under the current framework, there are a set of National Employment Standards that enterprise agreements cannot undercut. Enterprise agreements can also not provide less than the base rate of pay set out in modern awards, or the national minimum wage for employees who are not covered by awards.

As a result, collective agreements became the largest single method of pay setting during the 2000s, covering over 40 per cent of employees, while awards covered less than 20 per cent of employees.<sup>46</sup> The remaining workers were on individual arrangements or self-employed owner managers of incorporated enterprises (OMIEs).

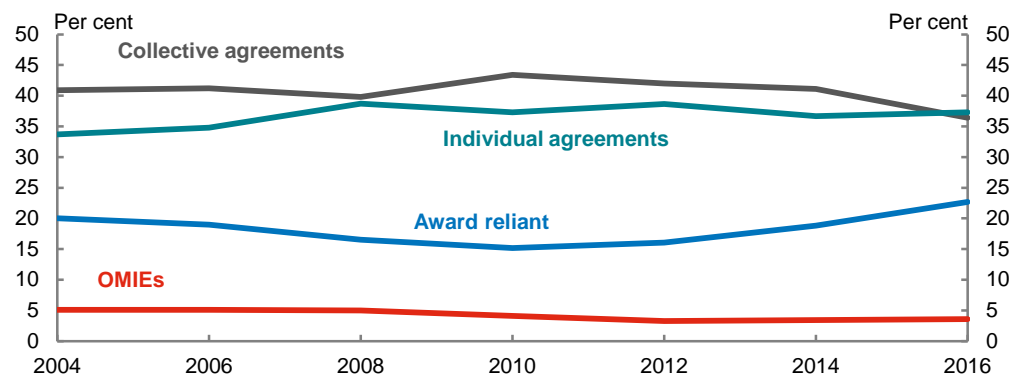
Today, individual common law contracts must give at least award pay and conditions, where applicable. They cannot make trade-offs the way enterprise bargaining does. The *Fair Work Act 2009* does, however, provide for individual flexibility arrangements to be made, which may vary certain award or enterprise agreement conditions.

## Recent trends in methods of pay setting suggest award reliance has increased

In recent years, award reliance has increased and the coverage of collective agreements has fallen.

Since 2004 there has been some fluctuation in the coverage of collective agreements and awards, with collective agreements peaking in 2010 at the same time as a trough in award reliance (Chart 1). Reclassification of teachers explains a share of the recent uptick in award prevalence. Award use is most prevalent among small business (less than 20 employees), but some larger businesses have shifted from collective agreements to awards.

**CHART 1**  
Method of setting pay, percentage of all employees



Source: ABS Cat. no. 6306.0.

<sup>46</sup> Not all collective agreements are enterprise (federally registered) agreements. There are also State registered and unregistered collective agreements. As noted above, over a quarter of employees were covered by enterprise agreements at their peak.

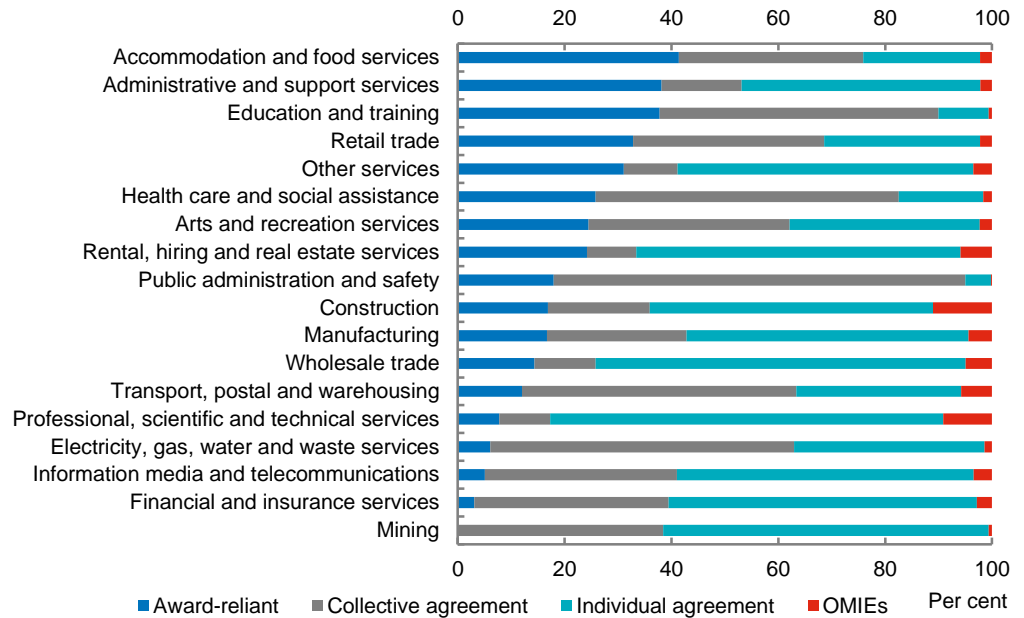


## There are industry differences in methods of pay setting

The increase in the share of employees covered by awards has been significant in the education, health care and social assistance and retail trade industries.

The dominant method of pay setting differs significantly across industries (Chart 2).

**CHART 2**  
Share of employees covered by each method of setting pay, 2016

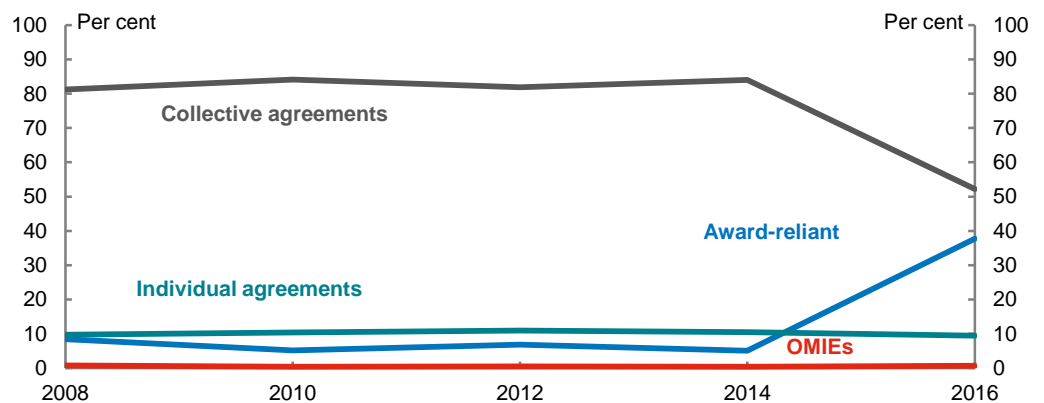


Source: ABS Cat. no. 6306.0.

Generally, the share of workers covered by awards has increased across most industries since 2010. Due to the changes in ANZSIC industry classifications, from ANZSIC 1993 to ANZSIC 2006, consistent industry data is only available from 2008.

In education and training there has been a reclassification of some teachers to ‘award reliant’ who were previously considered to be under collective agreements (Chart 3). This may explain some of the increase of employees covered by awards, as seen in Chart 1.

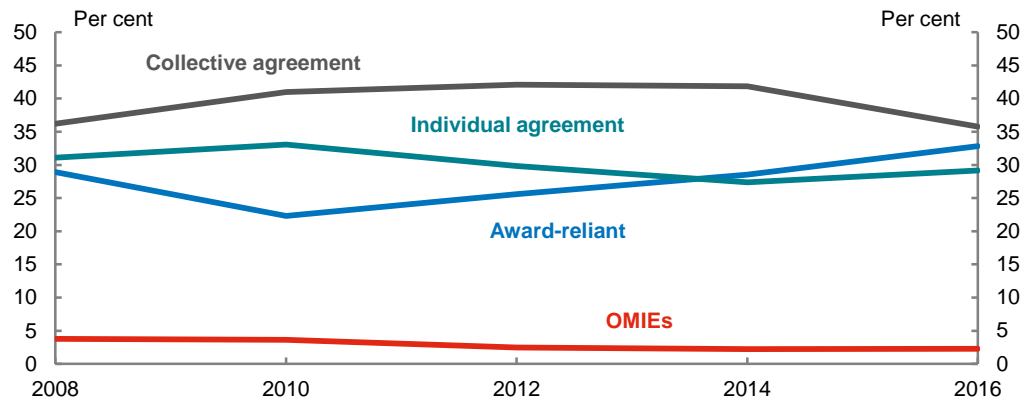
**CHART 3**  
Shares of education employees by method of pay setting



Source: ABS Cat no. 6306.0 and confidentialised unit record files.

Aside from the reclassification, some services industries, such as retail trade and health care and social assistance (Charts 4 and 5) have seen a noticeable increase in the share of employees covered by awards.

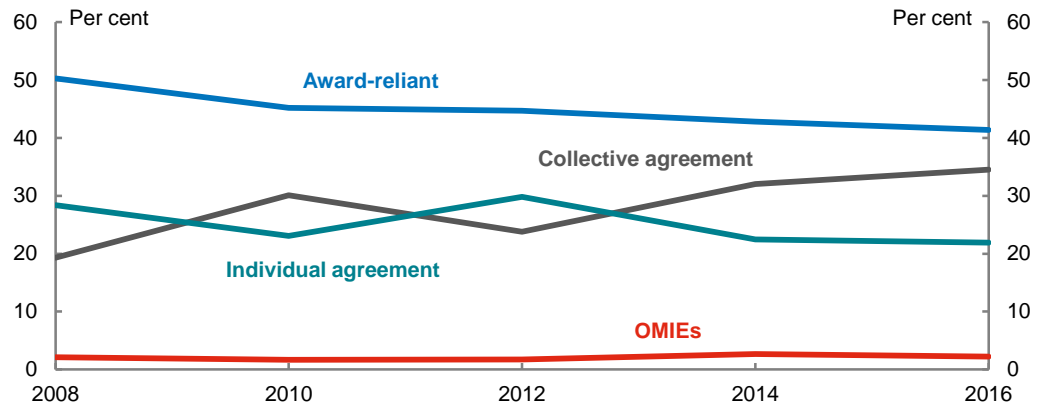
**CHART 4**  
Shares of retail trade employees by method of pay setting



Source: ABS Cat. no. 6306.0 and confidentialised unit record files.

The increase in the share of accommodation and food services employees having their pay set by collective agreements from 2012 can generally be attributed to the large numbers of employees (mainly in large fast food businesses) who moved from enterprise awards to enterprise agreements following the 2010 award modernisation process (Chart 5).

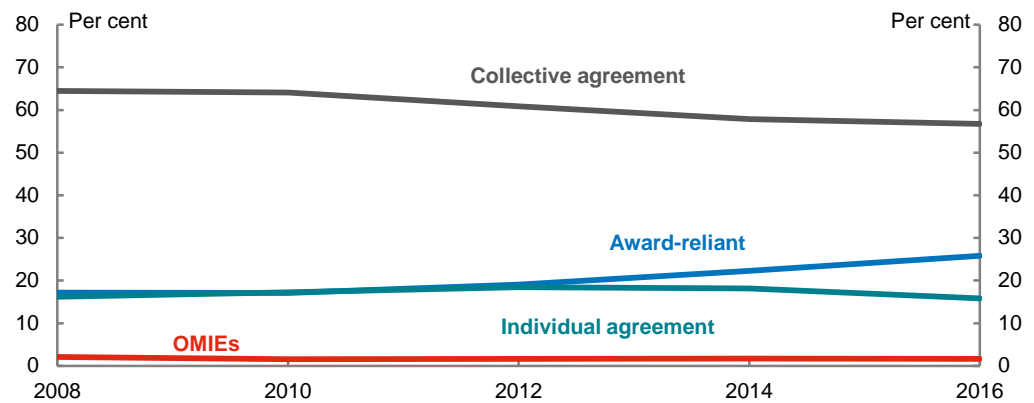
**CHART 5**  
Shares of accommodation and food services employees by method of pay setting



Source: ABS Cat. no. 6306.0 and confidentialised unit record files.

The decline in the share of employees on collective agreements in the health care and social assistance sector is likely driven by a decline in child care agreement coverage. Some of this may be offset by sustained growth in agreement coverage in the aged care industry (Chart 6).

**CHART 6**  
Share of health care and social assistance employees by method of pay setting



Source: ABS cat no. 6306.0 and confidentialised unit record files.

### The changing nature of collective agreements

In recent years, there has also been an increase in the number of lapsed, but still operational, collective agreements.

While no data source can provide an exact estimate of the number of lapsed agreements, the discrepancy between the number of employees covered by federally registered collective agreements according to the Employee Earnings and Hours (EEH) survey and the number of employees covered by current enterprise agreements in the Workplace Agreements Database (WAD) has widened since 2010. In 2016, the difference was approximately 1.6 million employees, or over 40 per cent of the 3.7 million employees in the EEH survey. This suggests that lapsed, but still operational, agreements are prevalent. Some of the discrepancy can be explained by employees in the state system, which is not captured by the WAD.

The typical length of an enterprise agreement is three years, with the maximum length being four years. This means that a majority of enterprise agreements will have come up for renegotiation within the last three to five years, which has been a period of somewhat subdued conditions in the labour market.

Of those collective agreements which are active and have been negotiated, there is a significant share of agreements with non-quantifiable wage increases. There are several reasons why agreements may be deemed to have non-quantifiable wage increases. Wage changes may be linked to employee performance, company performance, the Consumer Price Index, the minimum wage order or “other reasons”.

The WAD demonstrates that the recent increase has been driven primarily by agreements whose non-quantifiable reason is best classified as “other reason”. These include:

- internal annual wage reviews or at the company’s discretion;
- increases are dependent upon funding;
- mechanism for wage increases is ambiguous or multi-factored; and
- the agreement does not mention wage increases.

The share of employees on current agreements linked to the CPI or the minimum wage was approximately 18 per cent at the end of 2015.

## Impact on wage growth

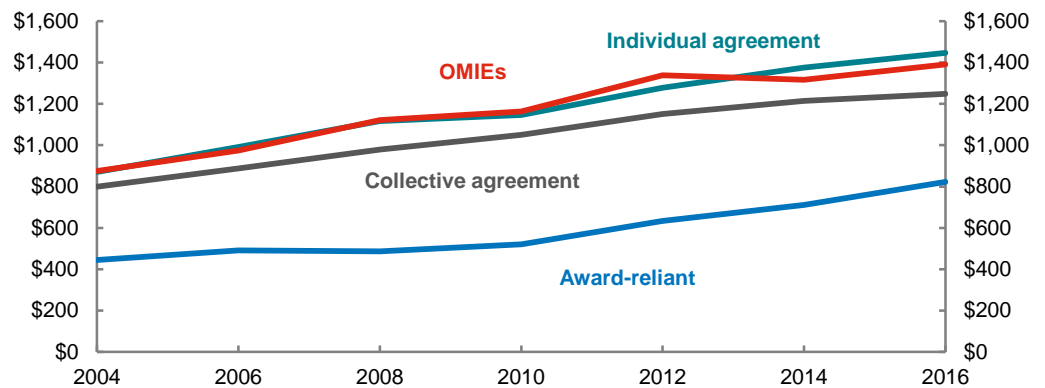
Wage growth is low across all methods of pay setting, although growth in award wages and wages in federal enterprise agreements has been above WPI.

Weekly earnings have grown for all methods of setting pay since 2004, and the relativities between different pay setting arrangements have remained fairly stable (Chart 7). Increases in award wages have generally been greater than the overall increase in the Wage Price Index (WPI), as have increases in wages in federal enterprise agreements – 3.1 per cent per year on average over the life of agreements, as at March 2017.

In 2004, weekly earnings for award-reliant workers were 51 per cent of individual arrangement earnings – similar to the figure in 2014. The 2016 data show a rise in relative earnings for award-reliant employees, but this is likely in part a result of the redefinition of some public sector school teachers to be ‘award-reliant’.

In 2016, the highest weekly pay (across all employees) is for those on individual arrangements (\$1,447 per week), with OMIEs and collective agreements close behind. The lowest weekly pay is for award-reliant employees (\$822 per week).

**CHART 7**  
Weekly earnings by method of setting pay, all employees



Source: ABS Cat. no. 6306.0.

Note: This chart includes both full-time and part-time employees.

If average wage relativities were constant, an increase in the share of employees on awards would tend to lower wage growth in the period in which it occurred. But there is no reason to assume this will generally be the case. As noted above, the reclassification of teachers tended to raise average award earnings even as it increased award coverage. In recent years, increases in award wages have generally been larger than the overall increase in the WPI, so greater reliance on award wages could have supported stronger wage growth.

Awards also influence other employment contracts, as wages and conditions (such as required hours and penalty rates) are derived from them. Awards also set the regulatory benchmark against which to test whether an employee contract disadvantages employees.

The RBA estimates that pay outcomes for a further 10 to 15 per cent of employees’ rates of pay are indirectly influenced by awards, covered by either an enterprise agreement or individual contract.

The Fair Work Commission has compiled data that suggests, across all industries in 2014, over 35 per cent of organisations had an enterprise agreement that either replicated the award wage or sat just above the award wage rates. In the retail trade sector this percentage was as

high as 58 per cent and in health care and social assistance it was 65 per cent.

Conversely, Connolly (2016)<sup>47</sup> estimated that a lower share of employees covered by collective and registered individual workplace agreements (which is largely the mirror image of an increasing prevalence of award coverage) was associated with a lower average wage in both the short- and long-run, other things being equal. This is because those types of agreements are estimated to have a positive effect on labour productivity.

Overall, the relationship between methods of setting pay and wage growth is complex, with causality potentially running in both directions, and no clear overall effect.

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<sup>47</sup> Connolly, G. (2016), *The Effects of Excess Labour Supply and Excess Labour Demand on Australian Wages*, Revised version of a Contributed Paper for the 45th Australian Conference of Economists, Flinders University of South Australia, Adelaide, 11-13 July 2016; prepared to support a seminar at ABS House, Belconnen, on 2 August 2016.