Why Is Wage Growth So Low?

David Jacobs and Alexandra Rush*

Wage growth has declined markedly in Australia over the past few years. At the same time, stronger growth in labour productivity has worked to contain growth in labour costs. These developments reflect several factors, including spare capacity in the labour market, a decline in inflation expectations, a lower terms of trade and the need for the real exchange rate to adjust to improve international competitiveness. The size of the decline in wage growth has been larger than simple historical relationships would suggest, which might be explained by various characteristics of the current episode.
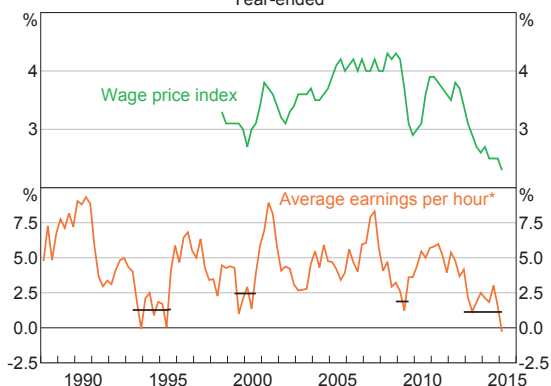
The Decline in Wage Growth

The rate of wage growth has important implications for the macroeconomy. Wages are the largest source of household income and the largest component of business costs, and so have significant implications for consumer price inflation. Wage growth has declined markedly in recent years to the lowest pace since at least the late 1990s, according to the wage price index (WPI) (Graph 1). Wage measures with a longer history suggest that this has been the longest period of low wage growth since the early 1990s recession.[1] Across these measures, the rate of annual wage growth has declined to around the pace of inflation, about 2–3 per cent.

The slowing in wage growth has occurred alongside faster growth in labour productivity. This has also helped to moderate growth in labour costs for firms, beyond the impact of lower wage growth. Accordingly, growth in the labour cost of producing a unit of output (unit labour costs, or ULCs) has also declined markedly since 2012 (Graph 2). Indeed, the level of ULCs has been little changed for more than

Graph 1
Wage Growth
Year-ended

* The black lines represent the average over the period
Sources: ABS; RBA

Graph 2
Contributions to Unit Labour Cost Growth
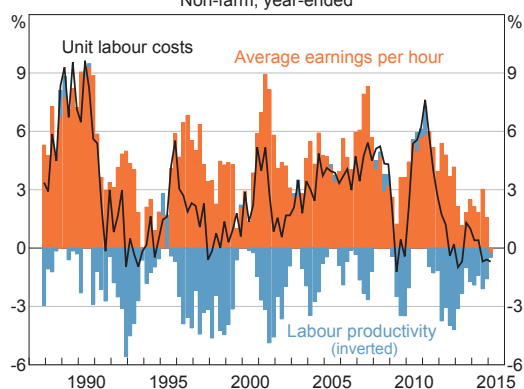Non-farm, year-ended

Sources: ABS; RBA

1 The WPI tends to be the smoothest measure of wage growth because it measures the change in wages for a fixed and representative basket of jobs (which is updated periodically). Other measures, including measures of average earnings from the national accounts (AENA), tend to be more volatile as they are affected by compositional change and quality improvements. The various measures of wages are useful in different circumstances. For further discussion, see RBA (2006).

three years – the longest such period since the early 1990s.

The recent low wage growth has not been unique to Australia. Internationally, wage growth has been lower than forecast for several developed economies in recent years, including some where labour markets have tightened considerably. Various factors have been proposed to explain this weakness, including secular trends that have been in place for some time and have also resulted in a general decline in the labour share of income (see, for example, Yellen (2014)).[2] However, the decline in wage growth in Australia stands out, with the extent of the forecast surprise for Australia particularly large in the context of OECD countries in recent years (Graph 3).

Several factors appear to explain much of the decline in Australian wage growth, and these are discussed in the remainder of this article. There has been an increase in spare capacity in the labour market, and expectations of future consumer price inflation have

Graph 3
Wage Growth Surprise*

*   2014 growth in compensation per employee (i.e. AENA per head),
     relative to 2013 OECD forecast
Sources: OECD; RBA

2   For example, an increase in the global supply of low-skilled labour over the past decade may have eroded the bargaining power of competing labour in developed economies. In addition, certain job types may have been more prone to automation (Borland 2011), and there has been a general decline in union density in many developed economies.
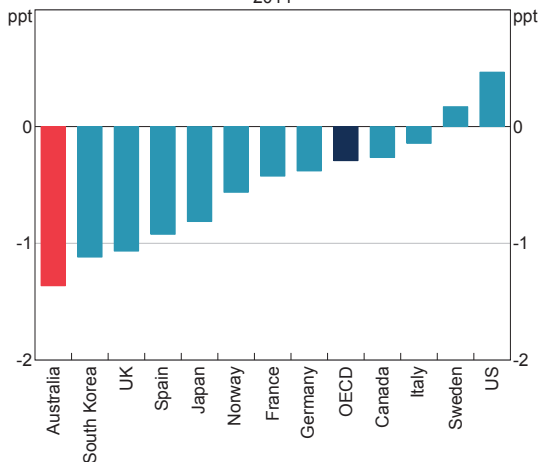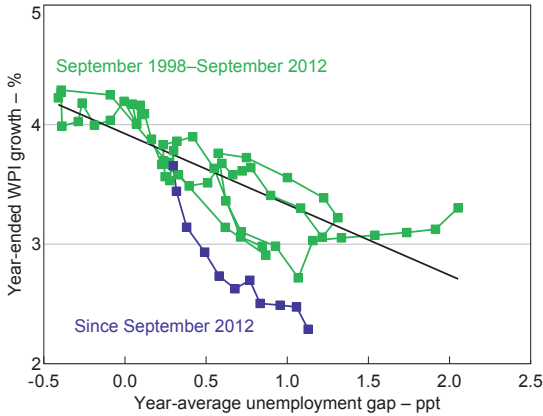
declined to be a bit below average. Inflation in output prices in recent years has been particularly subdued, in large part owing to the lower terms of trade. More generally, the decline in the terms of trade and fall in mining investment in recent years mean that the economy requires a lower 'real' exchange rate, which has been in part delivered by low wage growth. A statistical model indicates that these factors do not fully explain the extent of decline in wage growth, suggesting that other factors, such as an increase in the flexibility of wages to market conditions, may also have contributed.

Wage Growth and Unemployment

It has been widely observed that, in the short run, lower wage growth is associated with higher rates of unemployment (Phillips 1958; Fuhrer *et al* 2009). Firms experiencing subdued demand for their goods and services will seek to contain costs, including labour costs. Wages tend not to adjust quickly to lower growth in labour demand, so firms initially seek to contain their labour costs by laying workers off, reducing hours or reducing hiring.[3] As slack in the labour market rises, employees become more anxious about their job security and become willing to accept lower wage growth as there are fewer opportunities for alternative employment and more competition for any given job vacancy. As labour market conditions fluctuate over the business cycle, the economy moves along this so-called Phillips curve (Graph 4).[4]

The decline in wage growth since late 2012 appears to have been unusually large relative to the increase in the unemployment rate. Based on the estimated

3   There are various theoretical explanations for the slow adjustment in wages, including the use of contracts, imperfect information, the effect of wages on productivity (the 'efficiency wage' theory) and the absence of unemployed workers from wage bargaining ('insider-outsider' theory).

4   The unemployment gap is the difference between the unemployment rate and a statistical estimate of the non-accelerating inflation rate of unemployment (NAIRU). For a discussion, see Ballantyne, De Voss and Jacobs (2014). While one possible explanation for slow wage growth is a decline in the NAIRU, other evidence does not suggest that a marked reduction in the NAIRU has occurred.
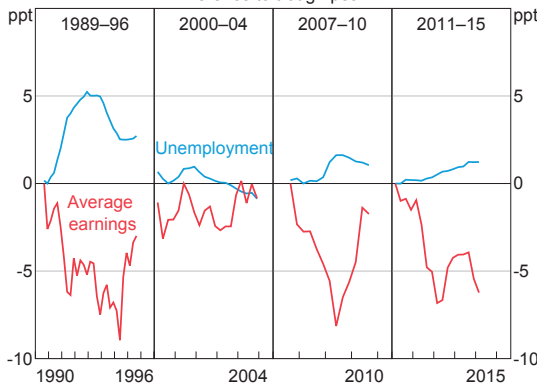
Graph 4
Wage Phillips Curve*
1998–2015

* The line of best fit for the 1998 to 2012 data is shown in black
Sources: ABS; RBA

relationship that held from 1998–2012, WPI growth has declined by more than twice as much as would have been expected. A longer-term analysis, based on the measure of average earnings from the national accounts (AENA), also suggests that the wage adjustment has been large given the change in unemployment (Graph 5). What stands out about the current episode is that wages have fallen as sharply as they did in some earlier episodes that had larger and sharper increases in the unemployment rate.

Graph 5
Unemployment and Wages in Downturns
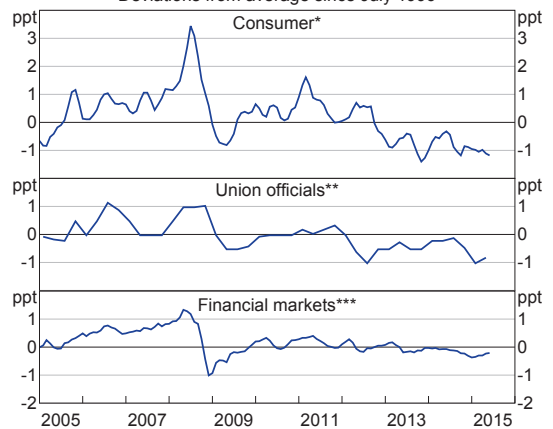Difference to trough/peak*

* Difference to trough of unemployment rate; peak of year-ended growth of average earnings per head
Sources: ABS; RBA

Inflation Expectations

The above results suggest that wage growth may be lower for a given rate of unemployment than in the past (i.e. the Phillips curve may have shifted inwards). Inflation expectations are one important factor that can shift the position of the Phillips curve. Employees are ultimately concerned with the purchasing power of their wage in terms of the goods and services it affords, rather than its monetary value (i.e. they are concerned about their real as opposed to nominal wage). Accordingly, lower wage growth might be partly explained by temporarily lower inflation expectations for consumer prices.

Surveys of households and unions indicate that expected consumer price inflation for the year ahead has been below average, while long-term financial market measures are also a little below average (Graph 6). Some liaison contacts also report that inflation benchmarks applied in wage negotiations are a little lower than in the past few years. Altogether, expectations of inflation of consumer prices, while generally well anchored, appear to have a cyclical component that might feed back into wage outcomes.

Graph 6
Consumer Price Inflation Expectations
Deviations from average since July 1996

* Three-month moving average of the trimmed mean of inflation expectations over the next year
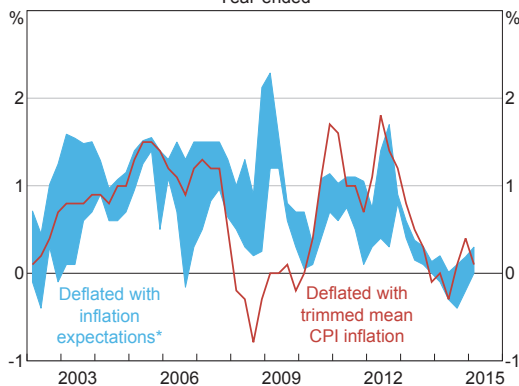** Median of union officials' expectations of inflation over the next year
*** Break-even 10-year inflation rate on indexed bonds; interpolation used to match exact maturity
Sources: Australian Council of Trade Unions; Employment Research Australia; Melbourne Institute of Applied Economic and Social Research; RBA; Workplace Research Centre; Yieldbroker

However, even accounting for temporarily lower inflation expectations, real wage growth from the perspective of consumers has declined markedly, to around zero (Graph 7). This suggests that inflation expectations account for only a small part of the overall decline. Moreover, inflation expectations tend to decline during most periods of rising unemployment, so it is unlikely to explain why the decline in wage growth has been unusually large in the recent episode.

Graph 7
Real Wage Price Index Growth*
Year-ended

* Inflation expectations obtained from bond yields, union surveys and market economist surveys (from 2005)
Sources: ABS; Australian Council of Trade Unions; Employment Research Australia; RBA; Workplace Research Centre; Yieldbroker

Output Prices and the Terms of Trade

Firms are also concerned with prices when considering the wages that they offer. Higher prices for a firm's output mean that it can afford to pay higher wages, and vice versa. Normally, output prices in the economy would be closely related to the prices that consumers pay for goods and services, so firms and households would have similar inflation expectations. But when there are changes in the terms of trade, the prices that firms receive and the prices that consumers pay can deviate substantially.

The rise in the terms of trade during the mining boom saw many firms' output prices increase by more than consumer prices. This was particularly true of mining prices, but also of prices in other industries that

service mining extraction and investment (such as business services and construction). For these firms, higher output prices meant that nominal wages could rise while also increasing profits. Facing higher prices and a relatively tight labour market, higher wages would also have served to attract scarce labour and increase output.
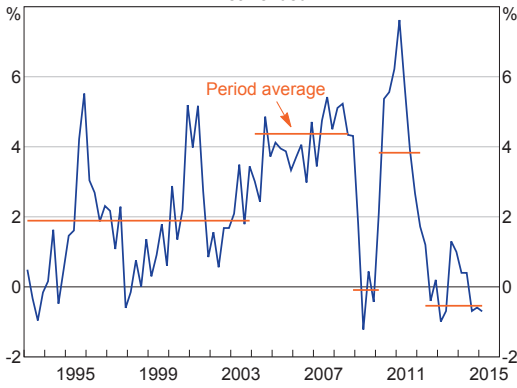
The result was that increases in wages benefited employees by more than they cost employers over much of the past decade. That is, real wages from the perspective of employers fell relative to real wages from the perspective of households (Graph 8). From 2002 to 2012, the real producer wage declined overall, while the real consumer wage increased by around 10 per cent. In recent years, this situation has reversed; since 2012, real consumer wages have seen little growth (as noted above) whereas real producer wages have increased sharply.

Graph 8
Real Wages
Deflated with inflation, June 2002 = 100

Sources: ABS; RBA

Strong growth in output prices up to 2012 meant that firms could afford higher unit labour costs. Over the period of the rising terms of trade and increased mining investment, ULC growth averaged close to 4 per cent a year, with the exception of a brief period following the financial crisis in 2008 (Graph 9). This pace was well above that recorded over the first decade of inflation targeting, when ULC growth averaged around 2 per cent.
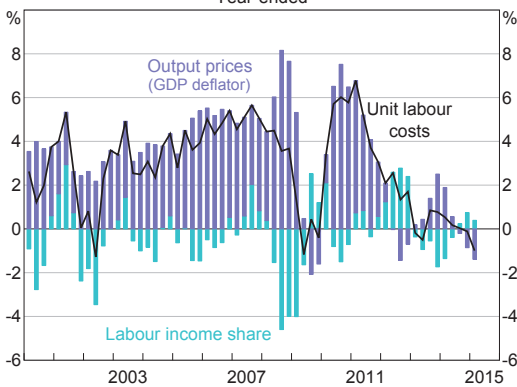
Graph 9
Unit Labour Cost Growth
Year-ended

Sources: ABS; RBA

Growth in unit labour costs can be broken down into growth in output prices and changes in the share of income being paid to labour (Graph 10). The strong growth in ULCs over much of the 2000s was fully explained by the faster pace of growth in output prices, while the labour share of income actually fell slightly.[5] Similarly, the recent period of slower growth in ULCs can be fully explained by the slower pace of growth in output prices, while the labour share of income has increased a little.

Graph 10
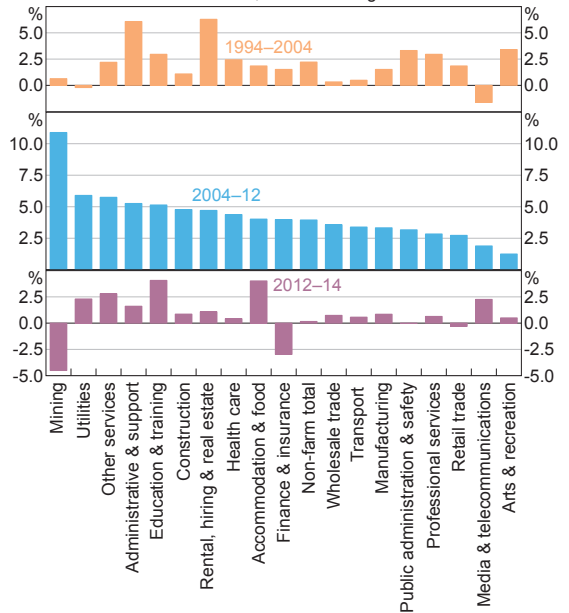## Unit Labour Cost Growth Decomposition*
Year-ended

* Composition does not sum precisely due to cross-product
Sources: ABS; RBA

5 That is, strong growth in unit labour costs was accompanied by even stronger growth in firms' margins. For a discussion of the labour income share over the resources boom, see Parham (2013).

While the rise and subsequent decline in ULC growth has been particularly pronounced in those industries more exposed to the resources boom, it has been relatively broad based. ULC growth between 2000 and 2012 was above the growth rates experienced in the 1990s for around three-quarters of industries, with many industries recording ULC growth in excess of 3 per cent. ULC growth in this period was fastest for mining and several industries that provide intermediate inputs to resource extraction and investment, including construction and business services (such as administrative and rental services) (Graph 11). Since 2012, a decline in ULC growth has been recorded across almost all industries, but again has been most pronounced in the mining industry.

Graph 11
Unit Labour Cost Growth
Non-farm, annual average

Sources: ABS; RBA

The Real Exchange Rate

The cycles in wage growth over the past decade have had consequences for the cost competitiveness of Australian producers, which has been an important part of the economy's adjustment over this period. This can be examined in the context of the 'real' exchange rate. The real exchange rate expresses

prices or costs relative to those of our trading partners in common currency terms, and provides one indication of an economy's competitiveness. Other things equal, an economy's competitiveness improves when the real exchange rate depreciates, either by way of a depreciation of the nominal exchange rate or a decline in that economy's relative prices or costs (and vice versa). One measure of the real exchange rate is based on relative ULCs.[6]
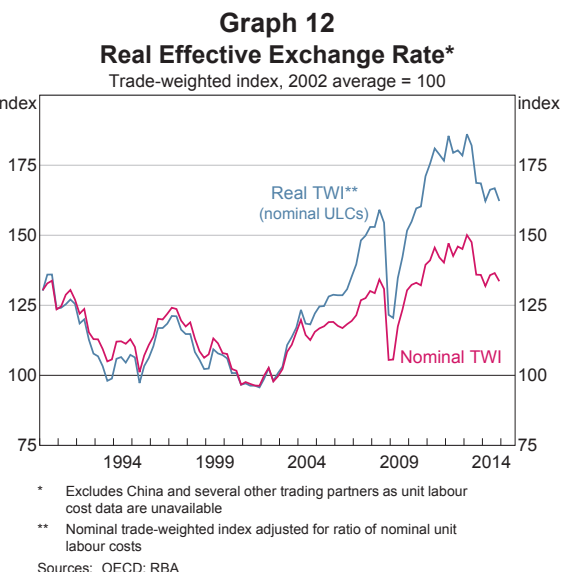
Over the decade to 2012, the ULC measure of the real exchange rate appreciated markedly (Graph 12). This reflected an appreciation of the nominal exchange rate of about 50 per cent and an increase in Australia's ULCs relative to our trading partners of almost 30 per cent. As has been widely discussed, the appreciation helped to ensure that the economy did not overheat in response to the large run-up in export prices and mining investment, by dampening non-mining activity (Plumb, Kent and Bishop 2013; Kent 2014).

More recently, the decline in ULC growth has assisted in improving the international cost competitiveness of Australian producers. The ULC measure of the real exchange rate has depreciated by around 12 per cent since 2012, due to both a lower nominal exchange rate and, to some extent, a decline in Australia's ULCs relative to our trading partners.[7] In turn, this has helped the economy to adjust to the headwinds posed by the lower terms of trade and falls in mining investment.[8] Nevertheless, the ULC measure of the real exchange rate remains about 20 per cent higher than when the terms of trade were at a similar level in 2006.

Graph 12
Real Effective Exchange Rate*
Trade-weighted index, 2002 average = 100

* Excludes China and several other trading partners as unit labour cost data are unavailable
** Nominal trade-weighted index adjusted for ratio of nominal unit labour costs
Sources: OECD; RBA

The pattern of rising and then falling relative ULCs has been broadly evident across trading partners. It has been most pronounced against highly industrialised economies such as Germany, Japan and Korea, and more modest against other commodity exporters such as New Zealand and Canada.

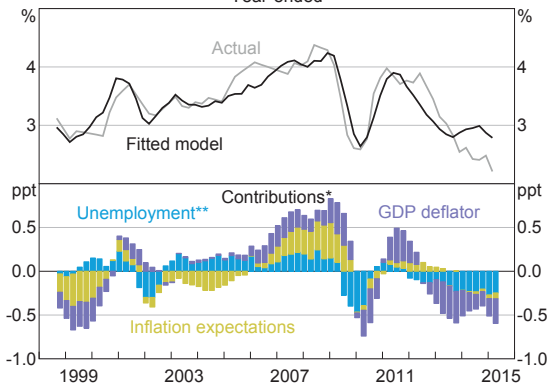## Estimating the Contributions: A Phillips Curve Model of Wages

A simple econometric model of private sector wage growth in Australia can be used to estimate the relative contribution of many of the factors outlined above. In particular, the model attempts to explain wage growth using the unemployment rate (both in level terms as a gap to the non-accelerating inflation rate of unemployment (NAIRU) and in changes), expectations of consumer price inflation, and inflation outcomes for firms (capturing movements in the terms of trade, and as a proxy for firm inflation expectations).[9] Of course, such a model captures only co-movements between different variables, which may not indicate causation. The model is estimated over 1997–2015 (the period for which WPI data are

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6   This measure of the real exchange rate gives a sense of international competitiveness from the perspective of labour costs, but it is not comprehensive. For example, it does not capture the effect of margins and non-labour costs on international competitiveness, and it is subject to various data limitations. A more commonly cited measure of the real exchange rate is based on consumer prices.

7   To some extent, nominal ULCs in Australia would be expected to trend higher relative to many developed economy trading partners over long periods, owing to Australia's slightly higher inflation target.

8   These developments in the real exchange rate stand in contrast to the decade to 2003, during which movements were driven largely by changes in the nominal exchange rate.

9   For more information on the NAIRU and how it is estimated, see Ballantyne *et al* (2014).

available). Full details of the model specification and results are set out in Appendix A.

Much of the recent decline in wage growth can be attributed to these explanatory variables (Graph 13). Historical relationships suggest that rising unemployment, lower inflation expectations and the decline in the terms of trade can together explain about two-thirds of the total decline in wage growth over the past few years. Wage growth has declined by somewhat more than historical relationships with these variables would suggest.[10]

Graph 13
Private Sector WPI Growth

* Contributions to fitted line relative to average since 1998
** This includes the effect of the change in the unemployment rate and NAIRU gap terms in the model
Sources: ABS; RBA

The econometric model simply summarises average historical relationships between wage growth and other variables. However, each episode has its own unique characteristics that may vary from that average experience. It is also possible for relationships to change over time. In particular, there is some statistical evidence that wages have become more sensitive to the unemployment rate in this episode (see Appendix A). Several factors may have, in theory, contributed to the extent of the decline and apparent sensitivity of wages more recently:

• The model does not account for the *level* of wages. Through the mid 2000s, wage growth

10 A similar result is found when estimating the model over the period to 2012, and then examining the out-of-sample error from 2012 to 2014.

tended to be higher than the model could explain (i.e. there were positive residuals both in and out of sample). The weakness in recent years might reflect a need for firms to adjust to a particular level of wages, in which case there may have been an element of 'payback' for this earlier period of strength.

• There may have been some shift in the bargaining power of labour. While this is difficult to observe directly, inflation expectations for unions have shifted by more than some other measures and union wage expectations are also at historic lows. Liaison reports indicate that secular influences from technology and competition from offshore labour may partly explain the weakness in wage growth in some sectors in recent years; however, the influence of such developments is subject to considerable debate.

• Low wage outcomes for public sector agreements in recent years may also have indirectly affected wage bargaining in the private sector, particularly as many firms benchmark their wages to industry-wide wages. This effect appears have been strongest in the health and education sectors.

• The rise in the unemployment rate may have understated the extent to which spare capacity has developed in the labour market. For example, greater labour market flexibility may be allowing firms to adjust hours rather than heads by more than usual. Alternatively, there may have been a larger-than-usual decline in labour force participation, potentially owing to the length of the episode.

• Wages may have become more flexible over time. It has been widely recognised that the system of wage bargaining in Australia has become more flexible over the course of the past few decades (Borland 2011), and there are reasons to think that flexibility may have been greater than usual in the current episode. To some degree, individual employment contracts are more prevalent in the industries most exposed to the declines in resource prices and investment,

such as mining and business services. Another factor is the relatively long span of the episode, at more than three years. As a result, a higher portion of employment contracts have been renegotiated during this period of subdued demand conditions. The typical length of an Enterprise Bargaining Agreement (EBA) is around three years, so virtually all outstanding EBAs have been renegotiated since mid 2011 and some agreements have been negotiated twice (Table 1). By comparison, over 2008–09 a lower proportion of agreements were renegotiated, covering fewer employees.
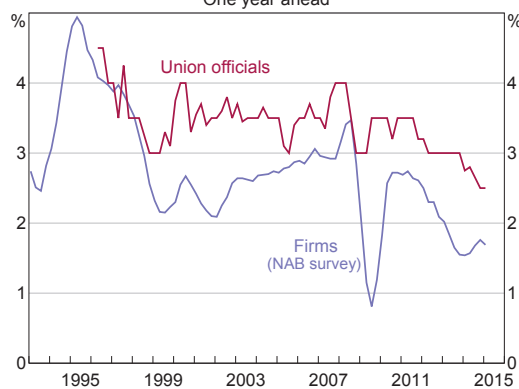
Assessment and Outlook

A range of related factors appear to explain much of the decline in wage growth in Australia in recent years. Below-average growth in economic activity has translated into subdued growth in labour demand, which has resulted in an increase in spare capacity in the labour market. At the same time, expectations for consumer price inflation have moderated to be below average. The decline in the terms of trade and falls in mining investment appear to have played a particularly important role, weighing on economic activity and placing pressure on firms to contain costs. This has partly unwound the relatively strong inflation in Australian unit labour costs over the period of the mining boom, which was part of the economy's adjustment to the domestic income boost from the higher terms of trade. Altogether, the result has been an adjustment in Australia's relative labour costs, improving cost competitiveness against other advanced economies. In effect, this

has assisted in bringing about some adjustment of the real exchange rate. Statistical estimates suggest that these factors explain much, but not all, of the episode, meaning there may also have been some other forces at play including an improvement in the flexibility of wages.

While a large wage adjustment has taken place, wage growth is widely expected to remain low (Graph 14). Evidence from the Bank's liaison with businesses, alongside surveys of firms and union officials, suggest that the general pace of wage growth is not expected to pick up over the year ahead.

One further factor that may continue to weigh on wage growth is a 'pent-up' adjustment. Reports through the Bank's business liaison in recent years have indicated that many firms and employees have been reluctant to bargain for wage growth below expected inflation of 2–3 per cent. Accordingly,

Graph 14
Expected Wage Growth
One year ahead

Sources: Australian Council of Trade Unions; Employment Research
           Australia; NAB; RBA; Workplace Research Centre

Table 1: Enterprise Bargaining Agreements
Per cent of total

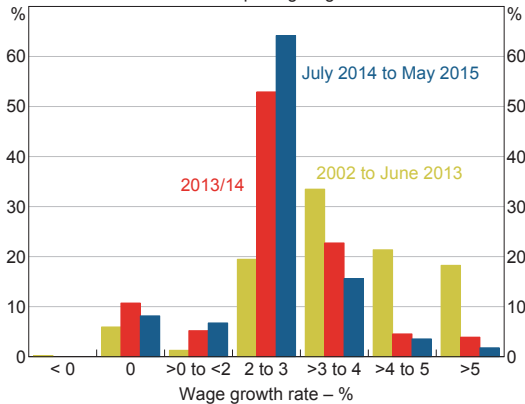|	Mar 2008–Sep 2009	Jun 2011–Dec 2014
Agreements replaced[a]	80	105
Employees covered under replaced agreements[b]	75	133

(a) Calculated as the number of non-greenfield agreements negotiated divided by the average number of agreements active during the period
(b) Calculated as the number of employees covered under non-greenfield agreements negotiated divided by the average number of employees covered by EBAs during the period
Sources: Department of Employment; RBA

wage outcomes of 2–3 per cent have been relatively common over the past couple of years among liaison contacts (Graph 15). Outcomes lower than this, which would imply a fall in real consumer wages, are generally seen to have a negative effect on worker morale and productivity, as well as on the retention of quality staff. So while the decline in wage growth has been large, it might have been larger still if not for this element of rigidity in real wage growth. Accordingly, a degree of 'pent-up' downward pressure on wage growth might remain for a time, even if labour market conditions more generally were to improve.

Graph 15
Distribution of Wage Growth Outcomes
As a share of firms reporting wage data in liaison

Source: RBA

In all, the decline in wage growth has been an important aspect of the adjustment of the economy to subdued growth in demand in recent years. Had wage growth not declined over this period, employment growth may have been more subdued than actually observed, and unemployment higher, which may have weighed yet further on aggregate demand. ✈

Appendix A: Wage Phillips Curve Model

The Phillips curve model of WPI growth is specified as follows:

$$\%\Delta WPI_t^{Private} = \alpha + \beta_1 NAIRUgap_{t-1} + \beta_2 NAIRUgap_{t-2}$$
$$+ \beta_3 \Delta UR_{t-1} + \beta_4 BondInfX_{t-1} + \beta_5 BondInfX_{t-2}$$
$$+ \beta_6 BondInfX_{t-3} + \beta_7 \%\Delta GDPdef_{t-1} + e_t$$

$$(A1)$$

Where:

- $WPI^{Private}$ is the private sector WPI

- $NAIRUgap$ is the difference between the quarter-average unemployment rate and the NAIRU, and enters the model with up to a two quarter lag

- ΔUR is the change in the quarter-average unemployment rate and captures the 'speed limit' effect – that a rapid decrease in unemployment could cause an increase in inflation and wages (and vice versa)

- $BondInfX$ is a measure of consumer price index (CPI) inflation expectations implied by 10-year indexed bonds and enters the model with up to a three quarter lag

- $\%\Delta GDPdef$ is the year-ended growth rate of the non-farm GDP deflator.

The estimation results indicate that, all else constant, a rise in the unemployment rate of 1 percentage point has been typically associated with a decline in WPI growth of around a third of a percentage point in the near term, on average, but somewhat less thereafter (Table A1). While the *NAIRUgap* and ΔUR variables do not appear to be significant in the models, these variables are jointly significant. The *BondInfX* variables are not jointly significant.

The Quandt-Andrews unknown break-point test suggests that breaks in the two NAIRU gap coefficients are significant at the 1 per cent level for the third quarter of 2012. When a dummy variable for observations after the third quarter of 2012 (inclusive) and interaction terms with the other explanatory variables are included in the model, there is a significant negative coefficient for

the NAIRU gap interaction term. The timing of the break-point, in the third quarter of 2012, coincides with the decline in the quarterly growth of the private sector WPI and thus seems plausible.

Table A1: Wage Phillips Curve Models

Variable	Coefficient[a]
Constant	0.44 ***
$NAIRUgap_{(t-1)}$ [b]	0.07
$NAIRUgap_{(t-2)}$ [b]	−0.11
$\Delta UR_{(t-1)}$	−0.39
$BondInfX_{(t-1)}$	0.10
$BondInfX_{(t-2)}$	−0.08
$BondInfX_{(t-3)}$	0.10
$\%\Delta GDPdef_{(t-1)}$	0.03 ***
R^2	0.57
Adjusted R^2	0.52

(a) *** denotes significance at the 1 per cent level
(b) Standard errors do not take into account that the NAIRU results from a previous estimation
Source: RBA

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