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Labour Cost Escalation: Choosing Between AWOTE and LPI

Report for
Envestra Limited

March 2012

1. Introduction

I have been commissioned by Envestra Ltd. to provide advice on: '...your opinion, as an expert, as to which measure, being either the LPI or the AWOTE measure, produces forecasts of labour prices for the purposes of real labour cost escalation over the access arrangement period, being 1 January 2013 to 31 December 2017, which are arrived at on a reasonable basis and represent the best forecast or estimate possible in the circumstances ("the test").' My terms of reference are attached to this report.

In March 2011 I was commissioned to provide advice to Envestra Ltd on whether AWOTE or the LPI should be used for the purpose of forecasting labour prices. This report (Borland, 2011) was included in submissions by Envestra Ltd to the Australian Energy Regulator (AER) in relation to access arrangements for Envestra Ltd's South Australian and Queensland networks. Subsequently, the AER commissioned Deloitte Access Economics (DAE) to respond to my report. DAE provided an initial response in April 2011 (DAE, 2011a) and then a later response in November 2011 (DAE, 2011b). In June 2011 the AER released its Final Decisions on access arrangements for Envestra Ltd.'s South Australian and Queensland Networks (AER, 2011a, 2011b).

In this report I respond to the commentaries by DAE on my initial report. This is the first opportunity I have had to make this response. As part of my response I also update some of the empirical evidence I cited in my original report, so as to reflect the most current available data.

An outline of my report is as follows:

- Section 2 describes my relevant experience and background;
- Section 3 lists the source materials I have drawn upon in preparing this report;
- Section 4 reviews the main arguments and analysis from my original report (Borland, 2011);
- Section 5 summarises what I interpret to be the main responses by DAE to my report (DAE, 2011a, 2011b); and
- Section 6 presents my considered responses to the DAE reports.

2. Relevant Experience and Background

My current position is Professor of Economics at University of Melbourne. I have worked at University of Melbourne since 1988, and have held the position of Professor since 2001. In 2010 I was visiting Professor of Australian Studies at Harvard University. I have also held visiting positions at University of Iowa, University of Wisconsin-Madison, and Australian National University. My main area of research expertise is on the operation of labour markets in Australia. I have published research papers on topics including wage determination, unemployment, earnings inequality, and trade unions. These publications have been in leading international and Australian journals such as

Industrial and Labor Relations Review, British Journal of Industrial Relations, Economica, Economic Record, Australian Economic Review and Journal of Economic Surveys. I am a Fellow of the Academy of Social Sciences in Australia (2002), and in 1997 was awarded the Medal for Excellence in Scholarship in the Social Sciences by the Academy. I have undertaken consulting projects for agencies including the OECD, IMF, Productivity Commission, ACCC, Commonwealth Grants Commission, and Commonwealth Department of Education, Employment and Workplace Relations.

3. Relevant Source Materials

In preparing this report I have read and drawn on the following source materials:

Australian Energy Regulator (2011a), 'Envestra Ltd – Access arrangement proposal for the SA gas network 1 July 2011 – 30 June 2016'.

Australian Energy Regulator (2011b), 'Envestra Ltd – Access arrangement proposal for the Queensland gas network 1 July 2011 – 30 June 2016'.

Australian Energy Regulator (2011c), Draft Decision: Envestra Ltd Access Arrangement Proposal for the Queensland Gas Network.

Australian Energy Regulator (2011d), Draft Decision: Envestra Ltd Access Arrangement Proposal for the South Australian Gas Network.

Borland, J. (2011), 'Labour cost escalation report for Envestra Limited'.

Deloitte Access Economics (2011a), 'Response to Professor Borland', Comment prepared for the AER, 15 April.

Deloitte Access Economics (2011b), 'Productivity measures to adjust LPI and AWOTE', Australian Energy Regulator, 8 November.

Deloitte Access Economics (2011c), 'Response to the BIS Shrapnel reports of March 2011', Australian Energy Regulator, 24 April.

Deloitte Access Economics (2011d), 'Response to the Economic Insight report of March 2011', Australian Energy Regulator, 24 April.

Deloitte Access Economics (2011e), 'Forecast growth in labour costs: Update of December 2010 report', Report prepared for the AER, 23 April.

Deloitte Access Economics (2011f), 'Forecast growth in labour costs: Queensland and Tasmania', Report prepared for the AER, 15 August.

BIS Shrapnel (2010), Real Cost Escalation Forecasts to 2015/16 – Queensland and South Australia (Report prepared for Envestra Ltd.), July.

BIS Shrapnel (2011), Real Cost Escalation Forecasts to 2017 – Victoria and New South Wales (Report prepared for Envestra Ltd., SPAusNet and MultiNet).

Access Economics (2010b), Forecast Growth in Labour Costs: Queensland and South Australia (Report prepared for the Australian Energy Regulator), 13 December.

Access Economics (2010a), Forecast Growth in Labour Costs: March 2010 Report (Report prepared for the Australian Energy Regulator), 16 March.

Access Economics (2009), Forecast Growth in Labour Costs (Report prepared for the Australian Energy Regulator), 16 September.

Australian Bureau of Statistics (2004), Labour Price Index: Concepts, Sources and Methods, catalogue no. 6351.0.55.001.

Australian Bureau of Statistics (2005), Australian Labour Market Statistics, October, catalogue no. 6105.0, pages 14-19.

4. Summary of Findings from My Report of 2011 (Borland, 2011)

In March 2011 I was commissioned by Envestra Ltd. to provide advice on:
'…your opinion, as an expert, as to which measure, being either the LPI or the AWOTE measure, best forecasts labour prices for the purposes of real labour cost escalation over the access arrangement period, being 1 July 2011 to 30 June 2016.'

Therefore in my original report the main question I considered was: What is the appropriate choice of wage measure for forecasting changes to labour costs where part of the process for calculating labour costs includes adjusting for labour productivity?

I responded to this question in two parts:

1. What does economic theory and empirical analysis of long-term changes in AWOTE and the LPI suggest is the appropriate wage measure?; and
2. What are the implications of the relative volatility of AWOTE and the LPI for the choice of the appropriate wage measure?

The main conclusion I came to in that report was that: **'…the best measure to use in forecasting a labour productivity-adjusted measure of changes to labour costs is AWOTE'** (refer point 6 in Borland, 2011).

I also considered the validity of the forecasts of labour productivity growth made by Access Economics in a series of reports to the AER (Access Economics, 2009, 2010a and 2010b).

4.1 What does economic theory and empirical analysis of long-term changes in AWOTE and the LPI suggest is the appropriate wage measure?

4.1.1 The main argument

The main argument I made in my original report was as follows:

The process for calculating changes to labour costs - used by Access Economics and accepted by the AER in its Draft Decisions regarding access arrangements for Envestra Ltd's South Australian and Queensland networks (AER, 2011c, 2011d) – involves taking a forecast of wage growth and then subtracting a forecast of labour productivity growth.

The main point I made with regard to the suitability of AWOTE and LPI for use in this process was that:

'AWOTE includes all the components of productivity improvement that will be included in the adjustment for labour productivity, but LPI does not. Hence, to use LPI as the earnings measure, and then adjust for changes to labour productivity, is to double-adjust for productivity changes. Because of the double-adjustment, the measure of the change in labour costs derived using LPI will under-estimate the true change in labour costs' (refer point 6 in Borland, 2011).

4.1.1.1 Supporting Explanation

Factors that change the average skill of the workforce – either changes in the skill composition of the workforce or changes in the skills of individual workers – will directly affect **both** wages paid to workers and labour productivity. For example, a worker with higher skills will be paid higher wages; and at the same time the worker will produce more output and hence has higher labour productivity. Thus, higher skills mean that a firm's wage costs rise, but the productivity of its workforce also rises commensurately.

In calculating the change in a firm's labour costs, it is therefore important to 'net out' the effect of productivity. A firm is made worse off by having to pay higher wages when its workforce has higher skills. But it is made better off to exactly the same extent by its workforce being more productive.

The critical point in netting out the effect of changes to labour productivity is that the wage measure being used to calculate labour costs must include the **same** effects of changes to labour productivity as the labour productivity measure that it used.

The LPI wage measure does not incorporate the effect on labour costs of changes in the skill composition of the workforce. But the labour productivity measure does incorporate the effect of changes in the skill composition of the workforce. Hence, subtracting the change in labour productivity from the change in LPI, involves using a measure of wage costs that incorporates **different** effects of labour productivity than the labour productivity measure being used. The measure of the change in productivity-adjusted

LPI therefore underestimates the change in labour costs by the amount that I labelled the 'Change in Composition productivity effect'.

Put in a different way, LPI does not incorporate the effects on productivity of changes to the skill composition of the workforce. But the labour productivity measure used to adjust LPI does include the effects of changes to the workforce skill composition. Hence, when the latter measure is subtracted from the former, changes to labour costs are under-estimated by however much changes in the skill composition of the workforce have affected labour productivity.

By contrast, the AWOTE measure incorporates exactly the **same** effects of changes to labour productivity as the measure of labour productivity. Hence, subtracting the latter from the former nets out exactly the productivity effect that is included in the wage measure; and thus gives a correct measure of the change in labour costs.

This can be seen more formally as follows:

Changes in AWOTE, LPI and Labour productivity can be described as follows (using terminology from point 4 in Borland, 2011):

> (i) Change in AWOTE = Change in Composition Productivity effect + Change in Worker productivity effect + Change in other factors
>
> (ii) Change in LPI = Change in Worker productivity effect + Change in other factors
>
> (iii) Change in Labour productivity = Change in Composition Productivity effect + Change in Worker productivity effect

Then suppose **changes in AWOTE adjusted for changes in labour productivity** are used as a measure of changes to labour costs:

Change in Labour costs:

= Change in AWOTE – Change in Labour productivity

= Change in Composition Productivity effect + Change in Worker productivity effect + Change in other factors - Change in Composition Productivity effect - Change in Worker productivity effect

= Change in other factors

Hence, a measure of the change in labour costs equal to the change in AWOTE minus the change in labour productivity exactly nets out the effect of labour productivity on labour costs. The change in labour costs then will only reflect other factors.

Alternatively, suppose that **changes in LPI adjusted for changes in labour productivity** are used as a measure of changes to labour costs:

Change in Labour costs:

= Change in LPI – Change in Labour productivity

= Change in Worker productivity effect + Change in other factors - Change in Composition Productivity effect - Change in Worker productivity effect

= Change in other factors – Change in Composition Productivity effect

Hence, a measure of the change in labour costs equal to the change in LPI minus the change in labour productivity does not exactly net out the effect of labour productivity on labour costs. Instead this approach to measuring the change in labour costs is equal to the effect of other factors minus the worker composition productivity effect. The firm's change in labour costs is therefore under-estimated by the size of the worker composition productivity effect.

4.1.1.2 Supporting empirical analysis

To confirm this explanation, I undertook empirical analysis of the average rates of changes to AWOTE, LPI, Labour productivity and CPI in Australia from 1997-98 to 2009-10 (point 24 in Borland, 2011).

By doing this I found that average annual rates of change were:

- Labour productivity: 1.55%
- LPI: 3.6%
- AWOTE: 4.55%
- CPI: 2.9%

Hence, I found that CPI + Labour productivity = 4.45%.

This corresponds much more closely to the AWOTE measure (4.55%) than the LPI measure (3.6%).

Therefore I concluded that AWOTE is a much better measure of changes to the fundamental drivers of wages – labour productivity and the CPI – than the LPI.

4.2 What are the implications of the relative volatility of AWOTE and the LPI for the choice of the appropriate wage measure?

4.2.1 The main issue

It was argued by Access Economics, and accepted by the AER in its Draft Decision on Envestra Ltd.'s South Australian and Queensland networks, that the greater volatility of the AWOTE than the LPI series made LPI the preferred measure for wage forecasting.

My response to this argument in my original report was that: 'As a basis for forecasting of changes to earnings, provided there is a sufficiently long time series of data available, there seems to be no difference between AWOTE and LPI that could be attributed to differences in short-term volatility of those series' (point 25 in Borland, 2011).

4.2.2 Supporting explanation:

I began by acknowledging that the AWOTE series exhibits greater quarter-to-quarter volatility than the LPI series. I then noted that this has implications for which series should be preferred as a measure of past quarter-to-quarter wage changes. The greater volatility of AWOTE implies that any two observations of wages will be less informative about the long-term trend in wages. However, I then went on to argue that I do not believe this has implications for forecasting: 'In forecasting it is not necessary to simply rely on two observations of earnings as is the case for measuring quarter-to-quarter past changes in earnings. Instead, it is possible to use a longer time series of data as the basis for forecasts' (point 25).

I also considered an example that had been used by Access Economics intended to demonstrate problems with the credibility of AWOTE data. Access Economics (2010b, pages 88-89) used the example of the growth in utilities earnings over the year to August 2010 being estimated by AWOTE to be 10.7% to illustrate what they argued to be the high volatility of AWOTE. They then described a counter-factual exercise in which 1% of workers are fired from the utilities workforce and a new group of the same size is hired. Earnings of the group that is fired are assumed to be one-half of average earnings of the remaining 99%, and it then follows that earnings of the group that is hired would need to be a multiple of 14 times average earnings in order to explain how average earnings could increase by 10.7%. In my original report I showed that this example relied on incorrect assumptions about the extent of labour turnover and changes to the size of employment in the utilities sector. I concluded that – with correct assumptions - 'the AWOTE data from August 2009 to 2010 can be justified with earnings for the new workers that are 1/28th of the amount that is suggested in the report of Access Economics' (point 27 in Borland, 2011).

4.3 DAE's forecasts of labour productivity

4.3.1 Review of AER forecasts

I examined forecasts of changes to labour productivity made by Access Economics in several reports to the AER (2009, 2010a, 2010b). From analysis of the changes in forecasts between these surveys I conclude (point 31 in Borland, 2011):

'...these must be regarded as substantial revisions. Where average growth in labour productivity in Australia is about 1.5% per annum, changes in forecasts of around 0.8% in Queensland and 0.5% in SA, are a large fraction of what are likely to be the actual rates of productivity growth'.

Importantly, these substantial revisions by DAE to its forecast labour productivity were made over a one year period.

I also noted the absence of justification of these changes between the reports (point 33 in Borland, 2011):

'In my opinion the substantial magnitude of the change in forecasts of labour productivity made by Access Economics would require a large change in underlying conditions or modelling assumptions to be justified. I have not been able to find any discussion of such changes to underlying conditions or modelling assumptions in the reports from Access Economics. In the absence of such large changes in underlying conditions or modelling assumptions it raises the possibility of non-robustness in the forecasting method.'

5. Responses by Deloitte Access Economics and the Australian Energy Regulator

Deloitte Access Economics (DAE) has responded to my arguments in two main reports (2011a and 2011b). Some discussion of the arguments is also included in other reports (2011c, 2011d, 2011e and 2011f). The arguments made by DAE then form the basis of the decisions made by the Australian Energy Regulator (2011a and 2011b).

This section outlines the DAE response to my earlier report. My considered response is then set out in section 6.

5.1- What do economic theory and empirical analysis of long-term changes in AWOTE and the LPI suggest is the appropriate wage measure?

DAE now appear to accept my argument regarding the need to choose a wage measure that is appropriate for the labour productivity measure being used.

I make this conclusion on the basis of their statement that (2011b, p.4):

'...the fact that the LPI does not account for compositional productivity has implications for the productivity adjustments which need to be made to estimates of changes in labour cost.
The AER requires estimates of labour cost growth less labour productivity growth – the result being an estimate of unit labour cost growth. If such productivity adjustments are made to a wage measure, then it is appropriate for the productivity adjustment to 'match' the wage measure to which it is being applied.
As the LPI excludes compositional effects, in theory the productivity measure used to adjust the LPI series should also exclude compositional effects. Quality adjusted labour productivity – which takes into account the rising skill and experience level of the

workforce over time, and could therefore be expected to grow at a slightly slower pace than unadjusted labour productivity is therefore, in theory, the appropriate measure to apply to the LPI. In contrast, as AWOTE includes compositional effects, the unadjusted (or traditional) labour productivity measure, which also includes compositional effects, should be applied'.

Hence DAE appear to be arguing that an appropriate measure of the change in labour costs is:

Change in Labour costs = Change in LPI – Change in **adjusted** labour productivity

Where:
Change in **adjusted** labour productivity = Change in worker productivity effect (that is, the Composition effect on productivity has been subtracted from the labour productivity measure).

Applying my formulae from above (4.1.1), it can be seen that:

Change in Labour costs

= Change in LPI – Change in adjusted labour productivity

= Change in Worker productivity effect + Change in other factors – Change in Worker productivity effect

= Change in other factors.

Using LPI and the adjusted labour productivity measure therefore in principle gives exactly the same measure of the change in labour costs as using AWOTE and unadjusted labour productivity, as also acknowledged by DAE (see 2.1.1 above).

Having accepted the principle of adjusting for the composition effect on labour productivity, DAE however then go on to argue that making this adjustment is not necessary.

They present empirical evidence that it is argued shows that the (2011b, pp. 5-7):

(i) Compositional change in the skill of the workforce has not had a significant impact on productivity in the utilities sector; and

(ii) Improvement in the average quality of individual workers has levelled off, and may be declining.

Then, despite having seemingly understood and accepted the point that LPI and AWOTE incorporate different components of the change in labour productivity (see for example the quote above from their report) DAE makes the argument that (2011b, p.9):

'...even if our valuation of this effect is wrong, that does not affect our projections for the productivity adjusted LPI, as that would involve offsetting adjustments to both the LPI and to the productivity measure applied to the LPI.'

The other argument against the AWOTE measure raised by DAE (2011b, p.2) is that it can be distorted by other factors such as '...compositional changes arising from the business cycle, changed educational levels, the pace of recruitment and retirement, changed relativities in the employment of men and women, and compositional changes arising from shifts in average hours...'.

The same arguments on LPI as the preferred wage measure to use in calculating labour costs are made in DAE (2011a); and in AER (2011a, pages 223-25, and 2011b, pages 210-12).

5.2 - What are the implications of the relative volatility of AWOTE and the LPI for the choice of the appropriate wage measure?

DAE maintain their argument that:

Compositional influences on AWOTE make it a more volatile measure than LPI. This effect is argued by DAE to be even more pronounced at the state/sector level than at the aggregate level. Hence it is concluded that AWOTE is (2011b, p.2) '...a poor base for undertaking wage forecasts for the utilities sector'.

DAE argue that I suggested de-trending AWOTE data. They therefore discuss problems with the process of de-trending:

(i) 'There is no guarantee that the trending process would successfully strip the AWOTE series down to useful information'; and
(ii) '...deciding to detrend the data still leaves the 'end point' problem. Trend estimates are best obtained with reference to values both before and after the period being considered. But for recent data there is no information on 'what happens next'...' (2011a, pages 4-5).

Similar arguments on problems with volatility in AWOTE are made in AER (2011a, pages 221-23; and 2011b, pages 208-10).

DAE also suggest (2011b, p.11) that it is problematic that the frequency of availability of AWOTE data will become bi-annual from May 2012.

5.3 - DAE's forecasts of labour productivity

DAE (2011a, page 5) respond to my analysis of the significant changes in their forecasts of labour productivity growth in their reports in 2009 and 2010 as follows:

'Professor Borland's report notes that Access Economics' productivity forecast rose over time.

The period Professor Borland refers to is one in which:

Access Economics' forecasts of global growth – and particularly emerging economy growth went up.

- our forecasts for industrial commodity prices and national income growth rose.
- our forecast of real business investment went up, and
- our forecasts for employment went up, but
- our forecasts for working age population went down.

Accordingly, the mix of revisions to Access Economics' forecasts across the time period to which Professor Borland refers was a potent recipe for upward revisions to the outlook for productivity.

Similarly, those productivity revisions could be expected to be more notable in sectors and States where the impetus in demand relative to supply would have the largest impact.'

This explanation is accepted by the AER (2011a, pages 226-27; and 2011b, pages 213-14).

6. My Considered Responses

This section responds to DAE's responses to my original report outlined in the previous section.

6.1 - What do economic theory and empirical analysis of long-term changes in AWOTE and the LPI suggest is the appropriate wage measure?

6.1.1 Adjusting for labour productivity

I agree with DAE's conclusion that in calculating changes in labour costs an appropriate labour productivity measure should be matched to the wage measure that is being used. Hence in principle it is necessary to use either:

(i) an adjusted measure of labour productivity with LPI; or
(ii) an unadjusted labour productivity with AWOTE.

As a practical matter, however, I would argue that it is best to use AWOTE and unadjusted labour productivity. This is a 'cleaner' approach in that it can be implemented without the need to adjust ABS data on labour productivity for worker composition and quality effects.

6.1.2 Empirical significance of the worker composition effect

I disagree with the argument made by DAE that the composition effect on labour productivity is empirically insignificant.
The empirical analysis of average rates of changes to AWOTE, LPI, Labour productivity and CPI in Australia that I undertook in my previous report (point 24) showed that over the 12 year period from 1997-98 to 2009-10:

(i) Changes in AWOTE in Australia are almost entirely explained by changes in the CPI and in Labour productivity. What I mean by this is that the sum of the average rate of change in the CPI and the average rate of change in labour productivity equal 4.45% which is very close to the average rate of change in AWOTE of 4.55%. This implies that other factors have only a minor influence on AWOTE (accounting for 0.1% out of 4.55%).

(ii) There is a large difference between changes in LPI and AWOTE (0.95%). Since the effect of CPI on both LPI and AWOTE is the same, and other factors have only minimal effect, therefore the difference must be explained by a larger effect of labour productivity on AWOTE than on LPI. From the definitions of AWOTE and LPI we can treat this difference in labour productivity effect as due to AWOTE incorporating a worker composition effect whereas LPI does not incorporate that effect.

(iii) Hence, we can infer that the average annual worker composition effect on labour productivity is equal to the difference in the average rate of change in AWOTE minus the average rate of change in LPI: 0.95% (equal to 4.55% minus 3.60%). The worker composition effect is therefore substantial.

In this report, I also update my analysis with the most recent data available for Australia for 2010/11. This allows the period of analysis to be expanded to June 1998 to June 2011 (using the same data sources and method as described in Appendix 2 of my original report). This analysis including the most recent data shows that the annual average rate of change between June 1998 and June 2011 in Australia has been:

- Labour productivity: 1.35%
- LPI: 3.6%
- AWOTE: 4.6%
- CPI: 3.05%

Hence, it remains the case that in Australia:
(i) The average annual change in AWOTE is approximately equal to the sum of the average annual changes in the CPI and labour productivity;
(ii) The average annual rate of change in the LPI differs materially from the sum of the average annual changes in the CPI and labour productivity; and

(iii) The annual growth in Labour productivity due to the Worker composition effect is large. It can be inferred to be 1.0 percent per year from the difference in the AWOTE and LPI rates of growth.

It is important to note that this analysis is for AWOTE, LPI, CPI and Labour productivity at the national-level in Australia. I choose this level of analysis because I believe that it is the clearest way to make the points that: (a) AWOTE (rather than LPI) is the appropriate wage measure to choose when an adjustment for Labour productivity is to be applied; and (b) Making the adjustment for Labour productivity using an inappropriate wage measure (that is, ignoring the Worker composition effect) introduces a substantial error into calculations of labour cost. Analysis at the national-level provides the clearest lesson on this point because the change in AWOTE at the national-level has been shown to mainly reflect just changes in Labour productivity and CPI – So it is straightforward to make inferences on the size of Labour productivity component included in AWOTE but excluded from LPI.

In general, however, a variety of other influences apart from CPI would enter into the 'Other factors' component of changes to AWOTE and LPI; especially when considering wage changes at the industry-level. For example, there might be a change to wages to adjust for changes in working conditions (such as in the mining industry where if new operations are in more remote locations than previously it might be necessary to pay workers higher wages to induce them to work in those locations); or changes in the relative demand for labour across industries will cause transitory adjustment to relative wages by industry where workers' skills are to some degree industry-specific so that there is not perfect mobility of workers between industries (for example, effects of the current mining boom on demand for labour and wages in mining-related industries).

It is important to note that where other factors cause an increase in AWOTE and LPI - such as payment of extra compensating differentials for working conditions or adjustments due to changes in demand for labour by industry – these sources: (i) Constitute an increase in the real cost of labour to firms; and (ii) Are not offset by increases in Labour productivity. Hence it is appropriate for these components of increases in AWOTE and LPI to be considered as extra costs of labour to a firm.

6.1.3 DAE's example of worker composition effects

I disagree with DAE's interpretation and use of the data on occupational shares of employment in the utilities sector from my original report (point 10 in Borland, 2011). They use these data to seek to demonstrate the unimportance of the Worker composition effect. They do this by taking the data I presented on occupational shares of employment in the utilities sector for November 2008, 2009 and 2010; and then combining these employment data with data on average earnings by occupation in November 2008 to calculate what they argue is a Worker composition effect. They conclude from this analysis that the Worker composition effect is 'opposite' to what it should be (DAE, 2011b, p.6).

I believe that DAE's use and interpretation of the data from my original report is flawed for several reasons.

First, DAE's example incorporates only the effect of skill upgrading on worker productivity that is due to changes in occupational composition of the workforce (and then only at the level of 1-digit occupations). But of course there can also be significant skill upgrading within occupations – for example, a business might switch from using lower productivity IT staff to higher productivity IT staff. This effect would not be captured in DAE's example. Hence, I believe DAE's example is so limited in the effects of skill-upgrading that it does incorporate as to invalidate any inferences on Worker composition effects on productivity.

Second, I believe that a correct application of DAE's example, does in fact confirm the importance of Worker composition effects on productivity. I use employment data from August 2008, 2009 and 2010, the same month as the earnings data used by DAE. This differs from DAE's example which uses earnings data for August and employment data for November. By making this change the effect of skill upgrading from changes to occupational composition is now calculated to be to increase average earnings in the utilities sector from 2008 to 2010 by 0.5 percent (rather than being in the opposite direction as argued by DAE).

6.1.4 The size of changes in labour quality

I disagree with DAE's argument that changes in average labour quality can be regarded as sufficiently small to be excluded from the analysis of changes to labour costs. I do accept that in recent times there has been slow growth in aggregate labour productivity. But this is not to say that this can be considered a permanent feature of the Australian labour market.

Considerable evidence exists of the positive effect of increases in educational attainment on average labour quality and productivity in Australia over long periods of time. For example, a study of the sources of economic growth in Australia between 1960 and 2000 found that about 40 per cent of growth that occurred in that period was attributable to increasing educational attainment (Yuan Chou, 2003, 'The Australian growth experience, 1960-2000: Human capital, R&D or steady-state growth', Australian Economic Review, 36, 397-414).

6.1.5 More on adjusting for labour productivity

I disagree with DAE's argument that (2011b, p.9):
'…even if our valuation of this effect is wrong, that does not affect our projections for the productivity adjusted LPI, as that would involve offsetting adjustments to both the LPI and to the productivity measure applied to the LPI.'

This contradicts DAE's previous acceptance (in the same report) of the principle that the productivity measure used should be appropriate for or matched to the wage measure

used. LPI does not incorporate the effect of changes to the skill composition of the workforce on earnings, as acknowledged by DAE. Hence it is invariant to changes in labour productivity from this source. There is no offsetting adjustment. This is the same issue as has already been addressed in my response in 6.1.1 in this report.

6.1.6 Other influences on AWOTE

I disagree with DAE's argument that 'other influences' distort AWOTE, and hence reduce its usefulness.

As I explained in my original report (point 18 in Borland, 2011), one category of influences listed by DAE will change AWOTE through the channel of changing labour productivity. Hence these influences will be netted out in the calculation of changes to labour costs when changes in labour productivity are adjusted for.

Examples of influences on AWOTE listed by DAE that will be controlled for by adjusting for changes in labour productivity are changes in the gender composition of employment and the effects of changes to rates of recruitment and retirement. Changes to AWOTE due to changes in the proportions of males and females in the workforce will reflect differences in wages paid to male and female workers – But those wage differences mainly reflect differences in Labour productivity between male and female workers. Differences in rates or retirement and recruitment will alter the age profile of the workforce. Because wages differ by age this can change AWOTE. But the wage differences by age are reflecting differences in labour productivity. Hence the change in AWOTE will again reflect changes to the average labour productivity of the workforce.

A second category of influences listed by DAE – such as changes to the full-time/part-time composition of the workforce or changes in average hours of work - are controlled for by choosing an appropriate wage measure. By using an AWOTE measure that is for full-time workers who worked ordinary hours it follows that there will be no effect from changes in the full-time/part-time workforce composition or due to changes in average hours of work.

A third category of factors described by DAE is business cycle influences. An example would be the effect of the mining boom on relative wages by industry that I discussed above (6.1.2). Wages may vary due to transitory changes in cyclical or structural influences that affect the demand for labour. The important point is that when wages change for this reason, it is a real cost to firms that is not offset by changes to labour productivity.

6.2 - What are the implications of the relative volatility of AWOTE and the LPI for the choice of the appropriate wage measure?

6.2.1 Benchmarking forecasts against outcomes

The best way to evaluate the effect of the relative volatility of LPI and AWOTE on the ability to forecast is to compare forecasts of LPI and AWOTE against actual outcomes. In the data below I use forecasts made by DAE and BIS Shrapnel for 2010-11 to do this:

	LPI	AWOTE
DAE forecasts		
September 2009	3.9	4.0
March 2010	3.7	3.7
December 2010	3.6	4.0
BIS Shrapnel forecast		
July 2010	3.7	4.4
Actual	3.8	4.4 (May to May)

Sources: DAE (2009, table 6.1, p.29; 2010a, table 2.5, p.18; 2010b, table ii, p.xvii); and BIS Shrapnel (2010, table 4.2, p.24).

In my judgement this comparison does not reveal a major difference in the capacity to forecast 1-year ahead LPI and AWOTE. Both DAE and BIS Shrapnel make predictions of LPI that are quite accurate. Hence, based on this experience of forecasting, I do not believe that the volatility in AWOTE can be considered a practical impediment to using it as a basis for forecasting changes in labour costs.

6.2.2 Frequency of the AWOTE survey

DAE has noted (2011b, p.11) that the ABS average weekly earnings survey (from which the AWOTE series is derived) will shift to bi-annual frequency from May 2012. I do not consider this to be an impediment to the use of AWOTE in forecasting future changes in labour costs. Given the very long period over which forecasts of wage growth must be made (5 years ahead) it does not seem a significant added source of forecast error that there would be on average an extra 3-month lag in availability of AWOTE data. It is certainly not a factor that offsets the other justifications for using AWOTE as the basis for forecasting future changes in labour costs.

Moreover, the issue of forecast error for the wage measure must be considered in the context of other sources of volatility in the process of forecasting labour costs. Primarily this is to do with volatility in forecasts of labour productivity.

For example, in its December 2010 report, DAE forecast labour productivity growth of 2.3 per cent for 2010-11 (see Table xiv, p.xvii in DAE, 2010b; subtract unit labour costs from LPI). We now know that labour productivity in the market sector declined by 0.3 per cent during this period. Hence the forecast error for labour productivity growth made by DAE far overwhelms that for LPI or AWOTE in 2010-11.

6.3 - DAE's forecasts of labour productivity

DAE claim that a variety of factors justify the changes made to their forecasts of labour productivity growth between September 2009 and December 2010.

I have two problems with their argument.

First, DAE claim that:

'our forecasts for…national income growth rose' and that 'our forecasts for employment went up'.

But when I examine the model forecasts from the DAE reports from the September 2009 report (Summary Table, p.xiv) and the December 2010 report (Table iii, p.xvii) for the 5 years from 2011-12 to 2015-16 (which is the time period for which I considered forecasts of changes to labour productivity in my original report) I find that cumulative forecast growth rates are:

	September 2009 report	December 2010 report
Employment	9.0	6.4
Output (GDP)	17.0	17.1

So there was very little difference in the forecasts of income growth, and the forecast rate of employment growth had in fact decreased between DAE's reports.

DAE's own forecasts of employment and output therefore do not move in the direction they claimed would occur in order to justify their revised estimates of labour productivity. On this basis, it is difficult to see how their claimed justification for the revised estimates of labour productivity is valid.

Second, DAE make no response on the very large size of changes made to their forecasts in a relatively short period of time, which was an issue I emphasised in my original report (point 31 in Borland, 2011). Moreover, their method for forecasting remains a 'black box'.

Given the commercial significance that the calculation of future changes to labour productivity has for decisions made on access arrangements by the AER, it seems important to adopt a greater degree of transparency in reporting how forecasts are arrived at – for example, providing details of the forecasting model; and reporting detailed summaries of the main contributions to forecast productivity growth and reasons for changes in forecasts of productivity between reports.

Finally, I note that analysis of the most recent DAE forecasting report available to me (2011f) shows that there continue to be relatively large changes in DAE's forecasts of changes to labour productivity. I consider forecasts of labour productivity over the 5-year period from 2011-12 to 2015-16 for Queensland. From the Access Economics Report from December 2010 (2010b; using Table 10.1 on pages 67-68) I calculate a cumulative forecast increase in labour productivity of 13.2% for all industries and 10.9%

for utilities for 2011-12 to 2015-16. I then do the same exercise using the more recent report (2011f; Table 10.1 on page 72) and calculate a cumulative forecast increase in labour productivity of 12.4% for all industries and 7.4% for utilities over the same period. Hence, between December 2010 and August 2011 there was not a substantial change in the forecast for all industries; but the forecast for the utilities sector changed by an average of 0.5% per annum. As I have noted before, this is a large amount viewed in the context of average rates of labour productivity growth of 1.5%. I was not able to find any discussion of an explanation for the change in forecasts of labour productivity in the August 2011 report (2011 f).

7. Summary

The AWOTE series remains, in my opinion, the best series to be used as the basis for forecasts of future labour costs.

First, theory and empirical evidence support this opinion. Taking the rate of change in AWOTE and subtracting the rate of change in labour productivity gives a measure of labour costs that appropriately adjusts for the effects of labour productivity on a firm's costs. By comparison, subtracting the rate of change in labour productivity from the rate of change in LPI does not appropriately make this adjustment. This is because the LPI measure does not incorporate Worker composition effects on Labour productivity. I again present data on average annual rates of change to AWOTE, LPI, CPI and Labour productivity at the national-level in Australia that:

> (i) Shows that the size of the Worker composition effect on Labour productivity is substantial; averaging 1.0 per cent per year from June 1998 to June 2011; and
> (ii) Shows that AWOTE does include this Worker composition effect, but that it it not included in LPI.

Second, for forecasting future earnings, and on the basis of the length of the time series of data available, I am not aware of practical problems with using AWOTE that would not also exist for other earnings series such as LPI. A comparison of experience in forecasting using AWOTE and LPI does not reveal any difference in the capacity to forecast these series.

Third, I do not believe that DAE have adequately responded to my concerns regarding the large changes made in relatively short periods of time to their forecasts of labour productivity. In particular, their explanations relating to GDP and employment for why changes were made to their forecasts of labour productivity between reports in 2009 and 2010 are inconsistent with the forecasts of GDP and employment in those very same reports.

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21 March 2012

Professor Jeff Borland
Department of Economics
The University of Melbourne
VIC 3010

Dear Professor Borland

Envestra – Victorian and Albury Access Arrangement Review

We act for Envestra Limited (**Envestra**) in relation to the AER's review of Envestra's Access Arrangements for Victoria and Albury.

Envestra wishes to engage you to prepare an expert report in connection with the AER's review of Envestra's Access Arrangements for Victoria and Albury.

This letter sets out the matters which Envestra wishes you to address in your report and the requirements with which the report must comply.

Terms of Reference

The terms and conditions upon which Envestra provides access to its network are subject to five yearly reviews by the AER.

The AER undertakes that review by considering the terms and conditions proposed by Envestra against criteria set out in the National Gas Law and National Gas Rules.

An issue which Envestra anticipates will arise in the review is which of the Labour Price Index (**LPI**) and the Average Weekly Ordinary Time Earnings (**AWOTE**) should be used to forecast labour prices for the purposes of real labour cost escalation over the access arrangement period, being 1 January 2013 to 31 December 2017.

Envestra seeks your opinion, as an expert, as to which of the LPI and AWOTE measures would produce a forecast which best meets the criteria in Rule 74(2) of the National Gas Rules.

Those criteria are that "*A forecast or estimate:*

(a) must be arrived at on a reasonable basis; and

(b) must represent the best forecast or estimate possible in the circumstances."

Use of Report

It is intended that your report will be included by Envestra in its access arrangement revision proposals for its Victorian and Albury networks for the access arrangement period from 1 January 2013 to 31 December 2017. The report may be provided by the AER to its own advisers. The report must be expressed so that it may be relied upon both by Envestra and by the AER.

The AER may ask queries in respect of the report and you will be required to assist Envestra in answering these queries. The AER may choose to interview you and if so, you will be required to participate in any such interviews.

The report will be reviewed by Envestra's legal advisers and will be used by them to provide legal advice to Envestra as to its rights and obligations under the National Gas Law and National Gas Rules. You will be required to work with these legal advisers and Envestra personnel to assist them to prepare Envestra's access arrangement revision proposals and submissions in response to the draft and final decisions made by the AER.

If Envestra chooses to challenge any decision made by the AER, that appeal will be made to the Australian Competition Tribunal and the report will be considered by the Tribunal. Envestra may also seek review by a court and the report would be subject to consideration by such court. You should therefore be conscious that the report may be used in the resolution of a dispute between the AER and Envestra as to the appropriate level of Envestra's distribution tariffs. Due to this, the report will need to comply with the Federal Court requirements for expert reports, which are outlined below.

You must ensure you are available to assist Envestra until such time as the Access Arrangement Review and any subsequent appeal is finalised.

Time Frame

Envestra's access arrangement revision proposals are due by 30 March 2012. We request that you provide your report to us or Envestra by 28 March 2012 so that we may finalise Envestra's submissions in advance of the due date.

Compliance with the Code of Conduct for Expert Witnesses

Attached is a copy of the Federal Court's Practice Note CM 7, entitled "Expert Witnesses in Proceedings in the Federal Court of Australia", which comprises the code of conduct for expert witnesses in the Federal Court of Australia (**the Code of Conduct**).

Please read and familiarise yourself with the Code of Conduct and comply with it at all times in the course of your engagement by Envestra.

In particular, your report prepared for Envestra should contain a statement at the beginning of the report to the effect that the author of the report has read, understood and complied with the Code of Conduct.

Your report must also:

1 contain particulars of the training, study or experience by which the expert has acquired specialised knowledge;

2 identify the questions that the expert has been asked to address;

3 set out separately each of the factual findings or assumptions on which the expert's opinion is based;

4 set out each of the expert's opinions separately from the factual findings or assumptions;

5 set out the reasons for each of the expert's opinions; and

6 otherwise comply with the Code of Conduct.

The expert is also required to state that each of the expert's opinions is wholly or substantially based on the expert's specialised knowledge.

It is also a requirement that the report be signed by the expert and include a declaration that *"[the expert] has made all the inquiries which [the expert] believes are desirable and appropriate and that no matters of significance which [the expert] regards as relevant have, to [the expert's] knowledge, been withheld from the report."*

Please also attach a copy of these terms of reference to the report.

Terms of Engagement

Your contract for the provision of the report will be directly with Envestra. You should forward to Envestra any terms you propose govern that contract as well as your fee proposal. Your invoices for the production of the report are to be addressed and sent to Envestra.

Envestra acknowledges that you will be undertaking preparation of the report in your personal capacity and not as a member of staff of the University of Melbourne. Envestra releases the University of Melbourne from any claim or liability of any kind in connection with your performance or non-performance of your engagement.

Contact Details

All enquiries to Envestra should be made to Craig de Laine on 08 8418 1129 or craig.delaine@envestra.com.au.

Please sign a counterpart of this letter and forward it to Envestra to confirm your acceptance of the engagement by Envestra.

Yours faithfully

Johnson Winter & Slattery

Enc: **Federal Court of Australia Practice Note CM 7, "Expert Witnesses in Proceedings in the Federal Court of Australia"**

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Signed and acknowledged by Professor Jeff Borland

Date 29/3/2012