Deloitte Access Economics

Response to issues raised in the Powerlink regulatory proposal

Australian Energy Regulator

2 March 2012

Deloitte.

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2 March 2012

Dear Toby,

Responses to issues raised in Powerlink's January 2012 submission

The Australian Energy Regulator (AER) has asked Deloitte Access Economics to provide detailed responses to a range of issues raised by Powerlink in their January 2012 submission to the AER.

This report discusses the appropriate method for measuring and forecasting escalation in the price of labour in the utilities sector.

Deloitte Access Economics has previously responded to a range of similar arguments put by other regulated entities, and many of those responses remain relevant here.

This response also covers a range of new matters.

Yours sincerely,

Chris Richardson
Director
Deloitte Access Economics Pty Ltd

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ABS	Australian Bureau of Statistics
AER	Australian Energy Regulator
AWOTE	Average weekly ordinary time earnings
EBA	Enterprise Bargaining Agreement
LPI	Labour Price Index

1 Background

The Australian Energy Regulator (AER) requested that Deloitte Access Economics comment on criticisms of Deloitte Access Economics' wage forecasting model and modelling approach raised in Powerlink Queensland's revised revenue proposal (2013-17). The criticisms are raised in response to Deloitte Access Economics' report *Forecast growth in labour costs: Queensland and Tasmania* (15 August 2011) to the AER.

The main criticisms are contained in three appendices to the revised revenue proposal:

- Appendix E: Synergies Economic Consulting, *Review of Labour Cost Escalation Issues under National Electricity Rules* ('the Synergies report');
- Appendix F: BIS Shrapnel, *Labour Cost Escalation Forecasts to 2016-17 – Australia and Queensland* ('the BIS Shrapnel report'); and,
- Appendix G: Professor John Mangan, *Labour Cost Escalators in the Australian Energy Regulator's Powerlink Draft Decision (November 2011)* ('the Professor Mangan report').

This document responds to a number of issues raised in those reports, including:

- Deloitte Access Economics' past forecasting performance;
- Deloitte Access Economics' labour cost forecasting methodology and approach; and,
- Deloitte Access Economics' labour productivity forecasts.

We also comment on the choice between the Labour Price Index (LPI) and Average Weekly Ordinary Time Earnings (AWOTE) as the appropriate wage measure to be considered in the AER's determinations.

2 The best wage measure

This chapter discusses the appropriateness of using the LPI rather than AWOTE for wage forecasting purposes. A number of issues raised in the Synergies report, the BIS Shrapnel report, and the Professor Mangan report are addressed.

2.1 The Deloitte Access Economics view

Deloitte Access Economics' view on the choice between LPI and AWOTE has been covered in numerous reports to the AER, including in our report to the AER of 15 August 2011.

In brief, the LPI is not a perfect measure – some of the criticisms of it are reasonable. But the LPI is a rather better measure than AWOTE, and that gap is set to grow as the ABS drops back to only publishing AWOTE on a six monthly basis in the second half of 2012.

Our view is consistent with that of the Australian Bureau of Statistics (ABS), which noted in the October 2005 issue of *Australian Labour Market Statistics* (catalogue 6105.0):

> *"Information on changes in the price of labour is available from the quarterly Labour Price Index (LPI). The LPI is compiled from information collected from businesses on changes in wage and non-wage costs. Information collected on wages is used to produce a Wage Price Index (WPI).*
>
> *The WPI was first compiled for the September quarter 1997 and is the main ABS measure of changes in wages. The WPI measures quarterly changes over time in the cost to an employer of employing labour, and is unaffected by changes in the quality or quantity of work performed."*

As the above discussion from the ABS suggests, they see the LPI as their preferred measure for "changes in the price of labour".

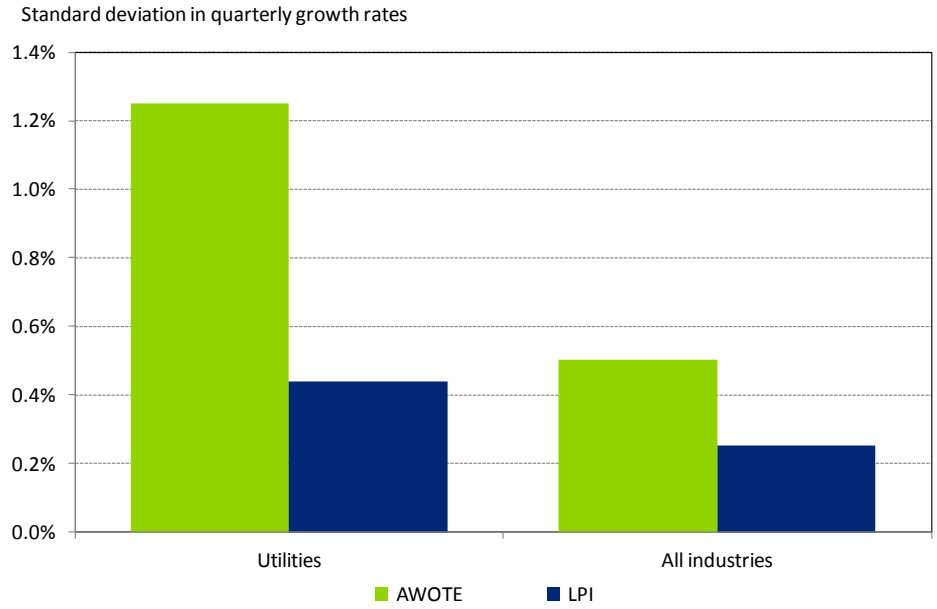
That is the task at hand here, and hence the LPI (excluding bonuses) is Deloitte Access Economics' preferred measure for this type of analysis.

Indeed, the LPI was originally developed because of the shortcomings of existing wage measures for this type of analysis. For example, AWOTE is affected by shifts in the composition of employment. As such, if a sector employs relatively more high paid full time workers over time (as has happened, for example, in the manufacturing sector as low skilled jobs have been lost to competitors in developing Asia), then that will tend to raise measured AWOTE even if the wage levels for a given level of skill have not changed at all.

Those compositional effects tend to make AWOTE far more volatile than the LPI. Chart 2.1 shows the standard deviation in quarterly growth for AWOTE and LPI in the utilities sector and across all industries over the past decade. The chart shows that AWOTE has been notably more volatile than the LPI over that period.

These volatility problems become more pronounced at greater levels of disaggregation, with the difference in volatility more pronounced in the utilities sector than across all industries as a whole (quarter-to-quarter changes are some three times more volatile for the AWOTE measure than the LPI measure).

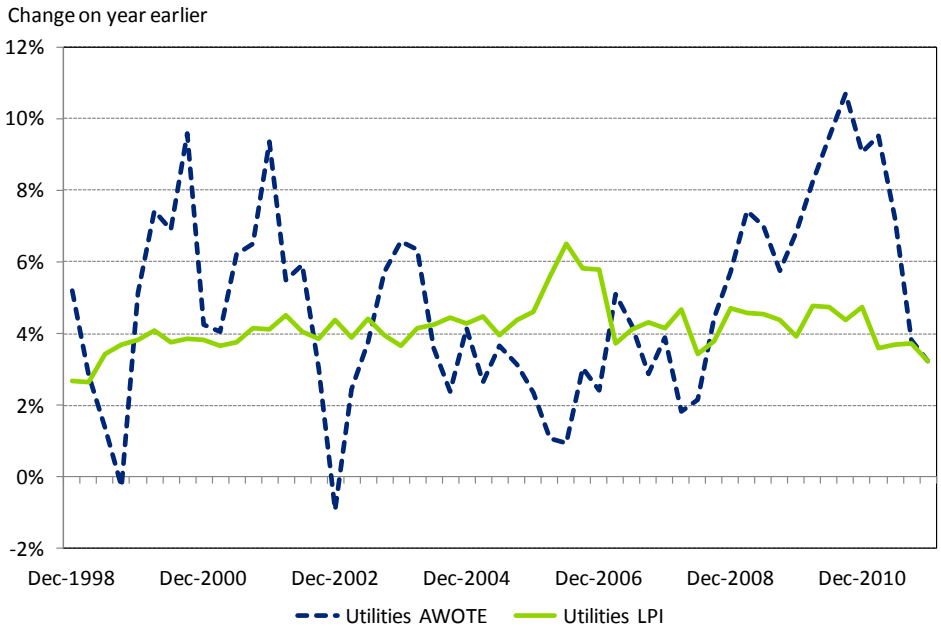
Chart 2.1: Standard deviation in quarterly wage growth, ten years to December 2011



Source: ABS, Deloitte Access Economics

As the analysis at issue here is not merely at the sectoral level, but at the sectoral by State level, these volatility problems rapidly compound.

Chart 2.2: Growth in AWOTE and LPI, Australian utilities sector



Source: ABS, Deloitte Access Economics

These compositional effects and the resultant volatility make AWOTE a poor base for undertaking wage forecasts for the utilities sector. The volatility in the series does not accurately reflect wage outcomes for utilities employees, and can result in important starting point (or "jumping off") problems at the beginning of the forecast period.

The latter point is highlighted by Chart 2.2 above. It shows year-to growth in AWOTE and LPI for the utilities sector.

The greater volatility in the AWOTE series compared to the LPI series is clear. As the chart shows, utilities wages grew by more than 10% over the year to September 2010 according to the AWOTE measure – more than twice the pace recorded by the LPI series. More recently, growth in AWOTE has moderated sharply and was in line with LPI growth over the year to December 2011.

More broadly, compositional changes arising from the business cycle, changed educational levels, the pace of recruitment and retirement, the degree of outsourcing, changed relativities in the employment of men and women and compositional changes arising from shifts in average hours worked can all distort AWOTE as a proxy for "changes in the price of labour".

That said, 'best measure' is not the same as 'perfect measure', and there are also drawbacks to using the LPI.

First, the LPI is published by State and by sector separately, but not by State and by sector. That is, the LPI for NSW is published, and the mining sector LPI is also published, however the NSW mining sector LPI is not. The latter data is only available by special request and, in the case of small sample sizes, the ABS does not release their estimates. In contrast, more series at the 'by State and by sector' level are available for AWOTE from the ABS 6302.0 release.

(Note that, not surprisingly, the ABS is reducing over time the range of sectoral level AWE data which it is willing to release. This phase will eliminate one of the remaining arguments in favour of using AWOTE or AWE over the LPI measures.)

However, it is possible to 'back out' reasonable estimates of LPI at the 'by State and by sector' level. Appendix E of our 15 August 2011 report discusses how Deloitte Access Economics does that. The resultant series are rather less volatile than the matching ABS AWOTE series.

Second, it is sometimes relevant that the composition of the workforce is changing. That is particularly true in analysing the implications of wage developments for the Australian economy as a whole.

As the LPI has only existed since 1997, and Australia's long economic expansion began in 1992, there is an argument that the LPI has understated true 'like-for-like' wage gains across most of the time it has been in existence. However, that bias is unlikely to have been large, and must be measured against the rather more significant types of problems with AWOTE measures discussed above (and highlighted even at the national level in Chart 2.1 and Chart 2.2).

A more detailed response to issues regarding the appropriateness of the LPI follows.

2.2 Data availability

The issue of availability of LPI data at the 'by State by sector' level was raised in both the Synergies report and the BIS Shrapnel report.

As noted in those reports, at the State level LPI data is only available for the utilities sector for New South Wales and Victoria. As a result, Deloitte Access Economics derived estimates of the historical utilities LPI data for Queensland and Tasmania on which to base the forecasts in our 15 August 2011 report.

For Queensland, LPI data is available for 15 of the 18 industries, as well as for the State as a whole. The industries for which data is not available are electricity, gas, water and waste services (utilities), rental, hiring and real estate services, and information media and telecommunications.

Deloitte Access Economics' approach to estimating the data where it is unavailable is to incorporate known data. This approach relies on the use of AWOTE information, which is available at the 'by State by sector' level, as well as drawing on information from relevant enterprise bargaining agreements (EBAs).

The construction and definition of the AWOTE series, and the volatility of the data, means that it is not consistent with LPI. As a result, and as described in our 15 August 2011 report, rather than using the raw AWOTE data to obtain a State by sector LPI, we have used the deviations in AWOTE growth.

For example, if the Queensland utilities sector AWOTE measure is rising faster than the overall Queensland AWOTE measure, then we allow the Queensland utilities sector LPI measure to rise faster than Queensland's overall LPI over the previous two quarters.

Because AWOTE data is far more volatile than LPI data, we limit the deviations that this might imply by comparing the variations in published AWOTE and LPI measures within each State and adjust the unknown deviations accordingly. That is, we take into account the deviations in the following series to derive a consistent and reliable estimate of State by sector LPI relative to State by sector AWOTE:

- State by sector AWOTE and State AWOTE;
- State by sector LPI and State LPI (for known LPI industries);
- State utilities AWOTE and national utilities AWOTE;
- State utilities LPI and national utilities LPI (where known);
- State AWOTE and national AWOTE; and,
- State LPI and national LPI.

This methodology does not directly make use of growth in the AWOTE data. Rather, it compares the relative growth in each of these sets of data in order to inform expected relativities between State by sector AWOTE data and the unavailable State by sector LPI data.

State by sector enterprise bargaining agreement (EBA) data has been made available from the Department of Education, Employment and Workplace Relations (DEEWR) for the

period since June 2010. Deloitte Access Economics also assesses this information in deriving a final estimate of unavailable historical State by sector LPI movements.

It is true, as noted in the Synergies report (page 16), that the unavailability of data from the ABS makes it difficult to assess Deloitte Access Economics' forecast performance with respect to the Queensland utilities LPI.

Deloitte Access Economics' report of 15 August 2011 (and numerous previous reports over a period of some five years) did, however, also include LPI forecasts for Australia, the Australian utilities sector, and Queensland, all of which can be assessed against actual data published by the ABS.[1]

A separate issue regarding data availability is the impending change to biannual rather than quarterly AWOTE data from the ABS. The Synergies report (at page 16) notes:

> *"In our view, the move to six monthly reporting has no implications for the quality of the AWOTE series produced, merely that it is somewhat less timely. This may make wage forecasting a little more difficult because less up-to-date data will be available when a forecast is being prepared."*

Deloitte Access Economics agrees that the shift to biannual data will make wage forecasting based on AWOTE data more difficult. The principal reason is that AWOTE will be less successful at picking up 'turning points' (or the timing of changes in wage movements). Just as biannual data is more useful than annual data, and annual data is more useful than biennial data, quarterly data is more useful than biannual data in terms of providing an informed view of wage movements.

As such, while there may be no change in the statistical quality of the information being released by the ABS, the usefulness of the data for the purposes of examining and forecasting wage movements will be diminished following the shift to biannual releases in the second half of 2012.

2.3 Data volatility

A further issue raised in both the Synergies report (at pages 17-18) and the Professor Mangan report (at pages 26-28) is that of data volatility.

Both the Synergies report and the Professor Mangan report acknowledge the greater level of volatility in the AWOTE data compared to LPI data. Deloitte Access Economics agrees. AWOTE data does exhibit a greater level of volatility compared to the LPI (see Chart 2.1 and Chart 2.2 above).

Deloitte Access Economics maintains that the greater level of volatility in the AWOTE data makes it a less reliable base for wage forecasting. As discussed in Section 2.1, the reason the volatility makes AWOTE less reliable is that it does not accurately reflect wage

[1] Some of these comparisons are made in the Synergies report and the BIS Shrapnel report. See Chapter 4 for our response to these comparisons.

outcomes for utilities employees, and can result in "jumping off" problems at the beginning of the forecast period.

The Synergies report (pages 17) makes the claim that these arguments are undermined because "it appears that DAE makes use of changes in (smoothed) AWOTE data to escalate its LPI data."

Deloitte Access Economics does not use forecast growth in AWOTE to inform our LPI forecasts.

We assume that this comment is directed towards our use of AWOTE data to inform our estimates of historical State by sector LPI data where it is unavailable from the ABS. As discussed in Section 2.2, Deloitte Access Economics does not directly use growth in AWOTE in this process, but rather compares the relative growth in two series to inform the relative growth in the State by sector LPI.

Rather than being a "second order concern", as described in the Synergies report (page 17), short term volatility and jumping off problems raise considerable difficulties in forecasting for two reasons. First, because the swings between very strong and very weak wage growth evident in the AWOTE data would be difficult for a forecaster of any calibre to accurately predict, and second, because the latest data points do have some bearing on the subsequent forecasts (particularly in the short term).

The Professor Mangan report (page 28) states the following:

> *"[G]reater quarter to quarter stability, while in general a desirable characteristic in a statistical series, does not necessarily indicate that the series is a better predictor of actual events, better able to be applied to specific industries or within localised labour markets with distinctive features or better as an input into econometric wage models."*

The LPI and AWOTE series are different wage measures. Separate from the definition and coverage of these series (and the implications for which better reflects wage movements for the purposes of AER deliberations), Deloitte Access Economics' view is that the reliability and accuracy of the underlying series does have an influence on the accuracy of forecast models.

Overall, both the Synergies report and the Professor Mangan report appear to generally conclude that (a) the AWOTE data is more volatile that the LPI data, and (b) this volatility is not important in the choice of wage measure.

Deloitte Access Economics disagrees with this second point. As outlined in this report, there are a number of reasons why the LPI should be the preferred wage measure used by the AER. The volatility and relative unreliability of the AWOTE data is one such reason.

It is worth noting that the unreliability of the AWOTE data is sufficient enough that the ABS is currently reviewing its production of AWE and AWOTE measures at the State by sector level (that is, AWOTE for the utilities sector in Queensland). This information was communicated to subscribers at the time of the ABS' release of December quarter 2010 data.

One of the reasons for this change is the high standard error of the estimates for these series. In the case of the AWE/AWOTE publication, sample selection is stratified across States and across industries, but not both. That means that as the businesses in the sample change from quarter to quarter (and about 8% of the 5,000 do each time) there is no guarantee that the State by industry samples can be readily compared.

This problem obviously leads to questionable comparability of detailed AWE/AWOTE results from quarter to quarter as the changes may be driven by changes in the sample, rather than changes in wages.

The LPI, by contrast, suffers as little as possible from this problem because their sample follows specific "jobs" over an extended period (at least five years). This limits the rotation problems that the AWE/AWOTE series is suffering from.

Accordingly, Deloitte Access Economics remains comfortable with its conclusion that the considerable volatility displayed by AWOTE is an important drawback to arguments supporting its use as a base by the AER in its determinations.

2.4 Definition, coverage and compositional change

Both the Synergies report and the BIS Shrapnel report argue that AWOTE rather than the LPI should be used by the AER because of the definition and coverage of the series.

The Synergies report (page 15) argues that AWOTE is:

> *"a more comprehensive index for assessing shifts in real labour costs and, as a result, is more likely to provide a realistic expectation of the actual labour input costs faced by a [transmission network service provider] over time. This is because in addition to base rates of pay, the series includes penalty rates, bonuses and incentive payments amongst other things. It will also reflect situations where promotions are given to employees in order to achieve a higher salary, which is likely to be important in tight labour markets."*

The BIS Shrapnel report makes similar arguments at page 23:

> *"The LPI also does not reliably measure the changes in total labour costs which a particular enterprise or organisation incurs, because the LPI does not reflect the changes in the skill levels of employees within an enterprise or industry. As skills are acquired, employees will be promoted to a higher grade or job classification, and with this promotion will move onto a higher base pay. So the change in the cost of labour over, say a year, includes increases in the base pay rates (which the LPI measures) and the higher average base pay level. The AWOTE captures both these elements, while the LPI only captures the first element. Basically, promoting employees to a higher occupation does not necessarily show up in the LPI, but the employer's total wages bill (and average unit labour costs) is higher, as is AWOTE. The AWOTE measure here also includes bonuses, incentives, penalty rates and other allowances, which are also part of an enterprises total wage bill."*

There are two broad arguments put here. The first is that the LPI is not sufficient because it does not include bonuses, incentive payments and other allowances. The second is that the LPI is insufficient because it does not capture the impact of promotions (or a changing workforce structure).

A few points are worth making on the issue of bonuses, incentive payments and other allowances. An initial, albeit small, point is that Deloitte Access Economics uses the LPI series 'total hourly rates of pay excluding bonuses' rather than the 'ordinary time hourly rates of pay excluding bonuses' in our analysis and forecasts. The sole difference between these series is overtime (which is included in the measure used by Deloitte Access Economics). Deloitte Access Economics agrees that the LPI does not include bonuses, incentive payments and other allowances.

Deloitte Access Economics' view is that the issue of bonuses, incentive payments and other allowances in the AWOTE wage measure is irrelevant. The AER makes determinations based on *growth* in labour costs. In contrast, the inclusion of bonuses, incentive payments and other allowances will affect the *level* of the AWOTE series. The size (or level) of the wage bill is of rather less concern. Rather, it is the growth in wages which are more relevant.

Bonuses, incentive payments and other allowances will not have a noticeable impact on growth in the AWOTE series because, as noted in the BIS Shrapnel report (page 35), to be included in AWOTE the payments must be a "normal" part of an employee's earnings. AWOTE is, after all, a measure of 'ordinary time earnings'.

More specifically, in the case of bonuses only those that are paid regularly and frequently are included in the AWOTE data, with one-off or infrequent payments excluded.[2] As noted above, while regular and frequent payments are legitimately included in AWOTE, Deloitte Access Economics expects that these would affect the level of wages, not the growth.

Deloitte Access Economics disagrees with the argument that AWOTE is a superior measure because it includes bonuses and similar payments.

We agree with the following quote from Frank Gelber, Chief Economist and Director of BIS Shrapnel, which is drawn from evidence given before the Industrial Relations Commission of New South Wales (IRC 2011/325 – Crown Employees (Police Officers – 2009) Award) on 10 November 2011:

> *WALTON J, V-P: ...[I]n terms of measuring movements in wages of public sector employees across the nation over a period of time, how useful would the Labour Price Index be in estimating the movement in those wages?*
>
> *WITNESS GELBER: Pretty good. We would prefer to use the Labour Price Index most of the time. It is only when we wanted to have a look at other things like an amount of overtime or work changes in composition that we use the others. We used to only have AWOTE but now that we have the Labour Price Index we have good data on it by sector, by private versus public sector and by industry*

[2] The ABS National Statistical Service Statistical Clearing House contains more information regarding the coverage of AWOTE, including the questionnaire used by the ABS. See www.nss.gov.au.

> *sector and by State and so if you wanted average earnings in the public sector over a period of time you have a Labour Price Index for that, or you could take it down to a specific industry and the Police would probably fall under, I think what is it, Public Administration and Safety. If you wanted to look at that for New South Wales that is not ordinarily published and so if – you could ask the Australian Bureau of Statistics for a special run, which we have done at different times, and for some of the industry categories they will give you the state data and others maybe not. You just have you to ask them this or we could ask them. we have not done that for this because there wasn't time, but you can actually get quite good data on that for effectively a basket of labour.*

The Synergies report, BIS Shrapnel report and Professor Mangan report also argue that AWOTE is a superior measure to LPI for reasons of compositional change in the labour market. Indeed, the second point raised relates to the coverage of the LPI with respect to not capturing the impact of promotions (or changes in workforce structure more generally).

For example, the Synergies report (page 19) notes that:

> *"[W]here tight labour market conditions exist, a TNSP may be required to promote staff more rapidly as part of a skilled labour retention strategy. In addition, over time, a TNSP may need a more highly skilled labour force because of the need to maintain increased reliability standards. These are clearly decisions that the TNSP has control over but the prevailing and expected labour market conditions may be the primary driver of the decisions. It is not clear to us then why the preferred wages series for forecasting purposes should exclude the impact of these factors."*

Deloitte Access Economics agrees that compositional change in skill mix is a business choice. If the business chooses to pay for a skill mix with a higher (or lower) average wage, then it also gets the associated productivity benefit (loss) of that decision.

If these compositional changes are taking place, then they should be having an impact on the productivity of the firm's workforce. That is, the higher skills should mean higher productivity – meaning that if the firm is choosing to have a higher skilled workforce then, other things equal, that higher skilled workforce should be able to achieve the same output than would otherwise be achieved with more (lesser skilled) workers.

The reason why the preferred wage series for forecasting purposes should exclude the impact of these factors is that the firm already benefits from the shift to a more skilled workforce. Were this to be compensated by the AER, the firm would benefit twice (once through an increase in productivity from the higher skilled workforce, and once through the AER determination).

The Synergies report (page 19) further states that:

> *"Moreover, the AER's presumption that the higher associated costs of a more skilled workforce are fully offset by labour productivity improvements in every situation (and so there is no impact on unit labour costs) reflects a theoretical rather than practical approach to economic regulation for the electricity network sector, where output is difficult to measure and the AER has not specified what it is in this case."*

Deloitte Access Economics disagrees with the general view of this statement. The decision to shift to a higher skilled workforce will reflect the increased productivity of that workforce. Indeed, there is no incentive for a firm to shift to a higher skilled workforce without an increase in productivity, and any move to do so would ultimately be detrimental to the ongoing operation of the firm.

The BIS Shrapnel report (at page 23, quoted above) notes that as individuals acquire skills they are promoted, and therefore move to a higher base level of pay. The LPI captures the increase in pay for a specific job, and does not capture the change in an individual's base level of pay when promoted.

Deloitte Access Economics does not believe the impact of this type of compositional change is significant. Promotions within a firm do not generally affect the firm's organisational structure over the medium to long term. It is not the case, for example, that over the long term a firm's workforce would consist entirely of managerial staff.

Individuals are indeed promoted, and more junior (less skilled) individuals are hired to fill their place. A number of promotions will be made to fill vacancies at more senior levels created through turnover. Where the promotion is not for a vacancy, but is rather an addition to the number of more senior (highly skilled) staff, it is logical that this would be the result of growth in the firm more generally, and would therefore be accompanied by an increase in less skilled staff as well.

The Professor Mangan report (from page 29) attempts to calculate the impact of compositional change on the wage bill of Powerlink. It uses the following formula to disaggregate the total wage bill into an employment effect, a nominal wage effect, and a compositional effect across eight categories of labour:

$$\Delta \text{ Total Wage Bill} = [(E_{j2}-E_{j1})*aw_{j2}[i])] + \Sigma\, e_{ij1}\,(aw_{ij2}-aw_{ji1}) + \Sigma(e_{ij2}*\, aw_{ij2}) - [E_{J2}/E_{j1} * (e_{ij1}*aw_{ij1})]$$

Where:

- E_{j2} refers to total employment in period 2 (2010/11);
- E_{j1} refers to total employment in period 1 (2008/09);
- e_{ij2} = number of employees in category i in period j_2;
- e_{ij1}= number of employees in category i in period j_1;
- aw_{ij2} = average earnings of employees in category i in period j_2; and,
- aw_{ij1} average earnings of employees in category i in period j_1.

And where:

- $[(E_{j2}-E_{j1})*aw_{j2}[i])]$ is the employment effect;
- $\Sigma\, e_{ij1}\,(aw_{ij2}-aw_{ji1})$ is the nominal wage effect; and,
- $\Sigma(e_{ij2}*\, aw_{ij2}) - [E_{J2}/E_{j1} * (e_{ij1}*aw_{ij1})]$ is the compositional effect.

Deloitte Access Economics would make a number of points in relation to this analysis.

The first is that the formula itself is not correct. It also suffers from a lack of description of all components. In particular, with respect to the employment effect ($[(E_{j2}-E_{j1})*aw_{j2}[i])]$) the $aw_{j2}[i]$ term is not defined. We assume that it is a weighted-average wage measure across

all labour categories. Even then, the employment effect should relate to wages in the original period (j1, not j2). This may be a typographical error.

More troubling is that even after these adjustments have been made, the equation still does not hold. The sum of the three terms of the right hand side of the equation does not equal the change in the total wage bill (except in the case where the nominal wage effect is zero).

Further, the formula also does not correctly measure compositional change. For instance, take an example where employment in each category of labour is unchanged between the two periods (that is, e_{ij2} is equal to e_{ij1}, and E_{J2} is equal to E_{j1}). In that instance, the impact of compositional change should be zero (as no compositional change in the workforce has occurred). However, as described, the compositional change effect would be non-zero (and would equal, and therefore double-count, the nominal wage effect).

Abstracting from those technical points (that is, assuming that the results are correct), the analysis is also conducted over a relatively short period (two years). Deloitte Access Economics does not believe this is period is long enough to adequately assess whether compositional change is occurring within the firm, particularly as the results to not concord with other available data. As Deloitte Access Economics has previously noted in reports to the AER, ABS data shows that the impact on average wages of compositional effects in the utilities sector has been negative (that is, the opposite to that shown in the Professor Mangan report).

Finally, assuming that compositional change toward a more highly skilled (and therefore more highly paid) workforce had been occurring at Powerlink over time, the firm would be benefiting from the higher productivity associated with that shift. This is likely to particularly be the case where the proportion of individual agreements is increasing, as the Professor Mangan report states (at page 32) is the case with Powerlink.

2.5 Adjusting for labour productivity

The BIS Shrapnel report contends that it is incorrect for the AER to adjust the LPI for productivity growth. Page 39 of the BIS Shrapnel report notes that:

> *We believe productivity adjustments cannot be applied to the LPI. As discussed previously, the LPI is an underlying measure of wage inflation and does not incorporate effects of changes to skill levels (ie compositional effects), while the AWOTE measure does. Accordingly, changes to skill levels should be reflected in productivity changes per worker. The LPI does not incorporate any changes for skill levels and improved productivity. Hence, productivity cannot be omitted from this wage measure to give a productivity adjusted wage measure. As such, the AER is effectively twice adjusting for productivity. This, in turn, is producing a downward biased measure of labour costs to the firm.*

Deloitte Access Economics disagrees with this assessment of the definition of the LPI series. The ABS publication describing the definition and construction of the LPI notes the following (ABS 2004, page 11):

> *"[W]hen considering price movements for jobs, no adjustment is made for productivity changes within the production process that arise from factors such as capital investment, technological change, more efficient organisational arrangements, and entrepreneurial activities."*

As the ABS notes, this labour productivity is derived from factors such as changes in the capital-labour ratio, technological advancement and organisational efficiencies. It is distinct from labour productivity derived from an increase in the skill level of individual workers, which contributes to the compositional change of a workforce and is therefore excluded from the LPI. Further information on this point is covered by Borland (2011).

This form of labour productivity is included in the LPI. Deloitte Access Economics also argues that the impact of productivity derived from compositional change is zero (see Section 5). Deloitte Access Economics' view therefore is that it is legitimate for the AER to deduct productivity growth in assessing labour costs in its deliberations.

3 The DAE modelling approach

This chapter responds to criticisms of Deloitte Access Economics' modelling approach raised in the Synergies and Professor Mangan reports.

3.1 Response to criticisms raised by Synergies

A number of criticisms of Deloitte Access Economics' modelling approach were raised in the Synergies report.

Page 22 of the Synergies report states that:

> *"DAE analyses the [Electricity, Gas, Water and Waste Services] sector as a whole for Queensland rather than considering the specific circumstances facing Powerlink. While this is partly a function of data limitations and understandable up to a point, the use of the aggregated EGWWS sector does not necessarily provide a good guide to the labour market position of electricity sector workers in isolation."*

Further, at page 23, Synergies states:

> *"...the apparent failure to adequately distinguish between electricity workers and other workers in the EGWWS group raises significant doubts about the robustness of DAE's forecasts in regards to the electricity supply industry in Queensland and Powerlink specifically."*

Deloitte Access Economics undertakes LPI forecasts for the utilities (EGWWS) industry as a whole because historical LPI data at a more detailed level does not exist. We agree that forecasts of the LPI for the electricity supply sector (a component of the utilities industry) would more closely reflect the labour market conditions in which electricity generators and distributors operate. However such a forecast is simply not possible given available data.

This is a reflection on the availability of data rather than modelling approach or methodology, and we note that the relevant forecasts of other consultancies, including BIS Shrapnel, are also undertaken at the utilities industry level.

The Synergies report suggests an alternative would be the construction of a 'composite LPI' (essentially a weighted average of the mining, construction and utilities LPI forecasts). Deloitte Access Economics was not instructed to provide such an index by the AER.

The Synergies report (page 23) also states that there is a lack of transparency around Deloitte Access Economics' model:

> *"In particular, the accompanying report only contains a relatively high level discussion of the structure of the model with limited information on the estimation procedures used.*

> *This approach provides little scope to evaluate and understand the econometric procedures used in the model or the crucial econometric assumptions that underpin it."*

Deloitte Access Economics' 15 August 2011 report contains information on the modelling approach and methodology. Further information is also contained in Section 3.2 below. From a commercial viewpoint, we would add that there are reasonable limits on the extent to which an economic forecaster can be expected to outline the detailed equations (econometric or otherwise) used in producing forecasts. This would be akin to placing our models (which represent confidential intellectual property) into the public domain. We note that other forecasters such as BIS Shrapnel also do not provide this information in reports describing their forecasts.

There are still, however, procedures available to assess Deloitte Access Economics' wage forecasting model. Perhaps the best way to evaluate the model is to undertake an assessment of previous forecasts relative to actual ABS data. Indeed, the Synergies report (at pages 24-25) attempts to do exactly that. Section 4.2 of this report discusses the errors made by Synergies in undertaking this assessment and corrects the forecast comparison.

At page 26, the Synergies report claims that Deloitte Access Economics' LPI forecasts inadequately recognise the impact of institutional labour market factors:

> *"...it would appear that the strong institutional influences on wage rates, in particular, Enterprise Bargaining Agreements (EBAs), that could mitigate and slow the cyclical impact have not been reflected in DAE's real wage forecasts for the Queensland EGWWS sector."*

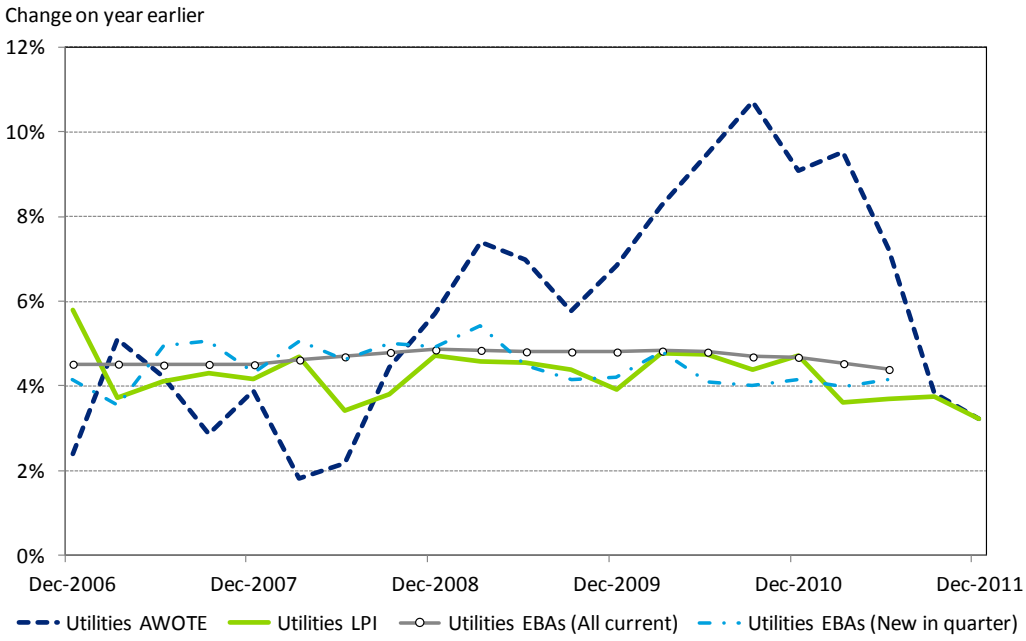
Deloitte Access Economics understands the influence of EBAs on wage outcomes. As we note at page 59 of our 15 August 2011 report to the AER:

> *In general, growth in new utilities sector EBAs is a solid predictor of the level and trend in the LPI in the immediately following quarters, while the AWOTE movements have been almost unrelated to the EBA results over this time:*
>
> - *Growth in EBA wage rates seen in newly submitted agreements has moved between 4% and 5% per year, as has the increase in the sectoral LPI.*
>
> - *The trends across 2009 suggested that a moderation in utilities sector wages pressures was underway – with new agreements seeing implied wage rises at the lower end of that range.*
>
> *The current rate of growth (4.7% per annum for all agreements operating at the end of December 2010, slightly down on the early 2010 results) will have an impact on wage growth over the medium term – only around one in every ten agreements are re-negotiated in any given quarter, meaning a typical agreement lasts just over three years.*

Indeed, we understand that growth in EBAs is relatively stable, and growth in the LPI tracks growth in EBAs relatively closely. Chart 3.1 reproduces and updates Chart 8.10 from our 15 August 2011 report. It shows that wage growth for all utilities EBAs has declined in

recent quarters, and that wage growth for new utilities EBAs has been less than wage growth for all EBAs over the past two years.

Chart 3.1: Measures of utilities sector wage growth



Source: ABS, Department of Education, Employment and Workplace Relations

We would heartily recommend a close look at the above chart. It serves as a summary reminder of the case against the AER using AWOTE as a base in its determinations.

We would also note the inherent contradiction in two of the themes in the criticisms raised of our work for AER: the 'AWOTE is better' arguments and the 'EBAs are better' arguments. We have more sympathy for the latter, but they indirectly reject the former.

Deloitte Access Economics does not forecast EBA wage growth. We note, however, that we would expect wage growth for all EBAs in the utilities sector to moderate in the short term given that wage growth for new agreements has been lower than for current agreements for an extended period.[3]

Deloitte Access Economics does use recent EBA wage outcomes to inform judgemental adjustments to our short term forecasts. As page 100 of our 15 August 2011 report notes:

> *"In addition to these three 'mechanical' factors, there is often the need to use judgement to determine movements in wages..."*

These types of judgemental adjustments are used by all forecasters to ensure that published forecasts are not simply the mechanistic outcome of wage equations. We would also note, however, that the purpose of our wage model is not to forecast EBA outcomes.

[3] A similar trend is also evident in the Queensland utilities industry. However wage growth for new agreements was above wage growth for current agreements in the latest data (June 2011), the first time this had occurred in the past five quarters (the period for which the data is available at a 'by State by sector' level).

Rather, it is to forecast the LPI. Those two wage measures are related, but growth in the LPI has typically been lower than EBA wage growth over time.

At pages 28-29, the Synergies report disputes the plausibility of Deloitte Access Economics' forecasts, describing the forecast growth in the Queensland utilities industry as "relatively low."

Deloitte Access Economics' forecasts of Queensland utilities LPI shows growth in excess of 5.0% per annum through 2012 and in excess of 3.5% per annum through to the end of 2014. We do not consider the forecasts to be "relatively low." Rather, we believe they are an accurate reflection of expected labour market developments in Queensland over the forecast period.

Deloitte Access Economics expects that skill shortages will place upward pressure on wages in the short term, but reiterate our view that wage differentials between States and between industries do not (and will not) persist indefinitely.

Deloitte Access Economics does believe that in general, and subject to the stickiness and inefficiencies evident in many markets, labour markets clear with respect to labour supply and labour demand. As we noted in our 2011 report for the Queensland Resources Council[4] in relation to skill shortages in the State:

> *"Action is needed in the short rather than medium-term to deliver solutions to expand the available labour force. If this does not occur, a lack of skilled labour is likely to be a major impediment to the expansion of Queensland's resources sector."*

The Queensland Resources Council report therefore makes the point that a lack of skilled labour may result in the restricted or delayed expansion of the Queensland resources sector, as projects will not go ahead if labour is not available. The report also states that:

> *"...a number of specific skill sets that will be in short supply unless there is increased private and public sector action to train, attract and retain new workers for Queensland."*

Deloitte Access Economics expects that this action will occur and that the supply of labour in Queensland will increase over the years ahead.

From page 30, the Synergies report discusses a number of issues around Deloitte Access Economics' labour productivity estimates.

To clarify, Deloitte Access Economics derives an estimate of labour productivity based on a measure of 'output per worker'. At the industry level (such as, for example, the utilities industry), output is defined to be Gross Value Added, as published by the ABS in the national accounts. For estimates of productivity at the national and State level, output is measured by Gross Domestic Product and Gross State Product respectively. The number of workers is measured by total employment, as published by the ABS.

[4] See Deloitte Access Economics (2011), *Queensland Resource Sector State Growth Outlook Study*, November. Available: www.qrc.org.au

Forecasts of output and total employment at the national, State and industry level are derived using Deloitte Access Economics' macroeconomic model. These forecasts are used to construction labour productivity estimates ('output per worker').

At the 'by State by sector' level (for example, the Queensland utilities sector), Deloitte Access Economics believes that the labour productivity estimates (derived using the above measure of 'output per worker') are too volatile to use with confidence.

In effect, the small samples underlying ABS estimates of sectoral output and employment at the State level mean that productivity estimates drawn solely from the ABS data will represent statistical volatility rather more than genuine productivity trends.

Accordingly, our forecasts of labour productivity at this level are constructed using the State and industry productivity estimates described above. Specifically, the labour productivity estimates at the 'by State by sector' level are a weighted average of the labour productivity estimates for the relevant State as a whole and the relevant industry at the national level.

A further point raised in the Synergies report (from page 32) is what is described as "*DAE's changing labour productivity outlook*." Indeed, pages 32-33 of the Synergies report states that:

> *"DAE's labour productivity assumptions for the EGWWS sector appear to have changed fundamentally between 2007 and 2011. In 2007, at Powerlink's last regulatory reset, DAE's forecast was that labour productivity growth would remain negative until 2015-16. In 2011, DAE is now forecasting that labour productivity for the EGWWS sector will turn positive from 2011-12 and remain so until the end of the forecasting horizon in 2018-19 (forecasts for 2016-17 onwards were not made in 2007). The swings from negative to positive growth are generally very large, which raises doubts in our mind about the robustness of the model outputs."*

The statement is accompanied by a chart on page 33 of the Synergies report which claims to compare Deloitte Access Economics' 2007 forecasts of labour productivity for the Queensland utilities sector with our 2011 forecasts. By '2007 forecasts', we assume that Synergies is referring the labour productivity forecasts implicitly included in our 12 April 2007 report to the AER which is also referenced elsewhere in the Synergies report.[5]

The 2007 labour productivity 'forecasts' contained in the Synergies report show labour productivity growth becoming steadily more negative over the period 2009-10 to 2015-16. This culminates in a 'forecast' for labour productivity in the Queensland utilities sector in 2015-16 of close to -4.0%.

The data presented in the Synergies report and claimed to represent our 2007 forecasts for labour productivity in the Queensland utilities sector is incorrect.

[5] See Access Economics (2007), *Labour Cost Indices for the energy sector*, 12 April. Available: www.aer.gov.au.

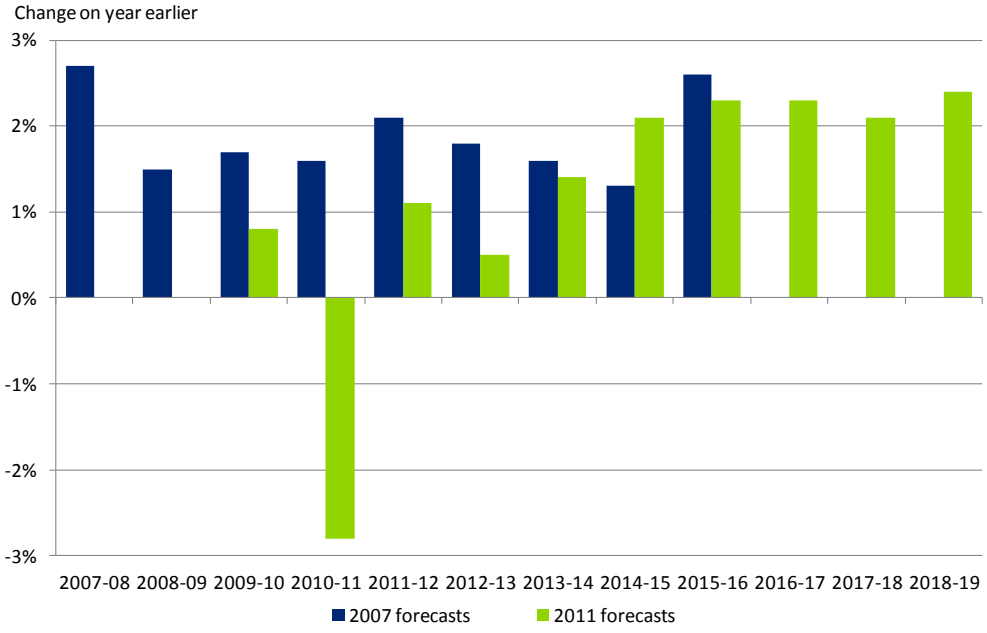
Deloitte Access Economics is at a loss to explain how the 2007 labour productivity 'forecasts' attributed to us in the Synergies report have been calculated. They do not appear to resemble our forecasts from our 12 April 2007 report to the AER.

For example, page 66 of that report shows that, at the time, we expected nominal LPI growth in the Queensland utilities sector in 2015-16 to be 3.8%. If we had forecast labour productivity growth at around -3.8% (as is presented in the Synergies report), the corresponding forecast for nominal LPI excluding labour productivity would be in the order of 7.6%.

Yet page 70 of the report clearly shows a forecast for growth in nominal LPI excluding productivity growth of 1.2%.

A corrected comparison of our labour productivity forecasts for the Queensland utilities sector from our 2007 (12 April) and 2011 (15 August) reports to the AER is shown in Chart 3.2 below. We have calculated the numbers in this chart (simply the difference between 'nominal LPI' and 'nominal LPI excluding productivity') directly from the 2007 and 2011 reports available on the AER website and have not referred to any of our earlier models or any other information that would not be available to Synergies.

Chart 3.2: DAE labour productivity forecasts for Queensland utilities, 2007 and 2011



Source: Deloitte Access Economics

The time between these forecasts is some four years. Far from "*raising doubts...about the robustness of the model outputs*", as is claimed in the Synergies report (page 33), Deloitte Access Economics views the two sets of labour productivity forecasts as generally consistent.

The Synergies report (at page 33) also questions the negative labour productivity growth shown in 2010-11 in our 2011 report. Deloitte Access Economics' report was submitted to

the AER in August 2011. Quite clearly the 2010-11 result is influenced by historical rather than forecast data.

Further information regarding Deloitte Access Economics' productivity forecasts, including our view on the appropriateness of adjusting LPI for labour productivity, is contained in Section 2.5 and Section 5 of this report.

3.2 Response to criticisms raised by Professor Mangan

A number of criticisms of Deloitte Access Economics' modelling approach were also raised in the Professor Mangan report (pages 34-40).

After noting that earlier criticism of Deloitte Access Economics modelling methodology with respect to how much it took account of State and localised labour markets and conditions in specific industries had partly been addressed, the Professor Mangan report (at page 35) states that:

> *"Unfortunately, the major criticism of their approach, being that is it is too focussed on national rather than regional factors and pays too little attention to embedded institutional and spatial factors, remains."*

Further, at page 39, the Professor Mangan report states that:

> *"The driving mechanism in the AEM model is the assumption that due to an easing in supply constraints, real wage increases will adjust downwards to a lower rate."*

It is perhaps most useful to respond to this criticism by expanding upon the methodology discussion included in our 15 August 2011 report. That report (at pages 99-100) notes:

> *The wage forecasting methodology adopted in this report involves estimation of the deviations between industry – and State-specific wage measures and the broadest measures of wages in the Australian economy. In other words, the AEM model has provided an overall picture for how the LPI will move, and the remainder of the modelling determines which industry, State and industries within States will see their LPI measures grow faster or slower than this value.*
>
> ***Industry and State Labour Price Indices***
>
> *Modelling of specific labour price indices (LPIs) begins with the movements in the total Australian LPI – taken from the Deloitte Access Economics Macroeconomic model. This measure serves as an anchor to overall wage rates in every part of the economy, in part because it provides a measure of the wage rises that other employees are receiving, making it a common starting point for negotiations.*
>
> *From this initial index, the model adds in deviations from the average. Three key factors will drive these wage differentials:*

- ***Business cycle factors**. Deviations in industry (or State) performance from the national average. Faster growing industries and States will tend to see faster growth in wages and vice versa. In this model, the key factor is how fast the industry (or State) is growing relative both to the national average, as well as to historical averages. So, while manufacturing growth in the future may be below the national average, if the gap is relatively less that has been seen in recent years, this is view as an out-performance by the sector and would see some upward pressure on wages. In this model the methodology is forward-looking, with forecast growth across the next six months (as well as the past twelve) used to determine the current performance of an industry.*

- ***Productivity factors**. The model assumes that industries with faster growth in productivity will see faster growth in wages – workers across an industry being rewarded for increasing the average amount of output per employee faster than the national average. As these factors take some time to become evident (and due to the inherent volatility in productivity measures at the State and industry level) an average productivity trend across the past two years is used.*

- ***Competition (relative wage) factors**. Depending on the nature of the industry, workers will have skills that are relatively more or less transferable to other sectors where wages may be rising faster than in their own. Indeed, many workers will be performing effectively the same task (or same occupation – effectively their job description) across different industries (as their industry classification is determined by what their employer produces, rather than what they do). This will tend to limit the ability of wage rates to diverge. As wage rates in (say) mining rise higher, companies in (say) the construction sector will be forced to pay higher wages to keep their staff. Similar factors operate across States – although they are likely to be less significant (and react only to relatively larger discrepancies in wages). The modelling here will see wages in competitor industries tend to move more closely together – with industries that are benefiting from the two previous factors tending to be drawn back towards the average, and wages in otherwise slow growing industries boosted.*

In addition to these three 'mechanical' factors, there is often the need to use judgement to determine movements in wages – particularly when other data is volatile (which employment data currently is) and when factors not relevant to wage determination are having effects on broader output and employment measures.

To be clear, Deloitte Access Economics uses a macro-econometric model of the Australian economy (AEM) to derive quarterly forecasts for a broad range of economic variables. These include variables relating to domestic production, prices and wages, financial variables (such as interest rates and exchange rates) and the labour market.

The labour market variables include employment, unemployment and the participation rate, and the price and wage variables include the Consumer Price Index, a central wage

measure (average quarterly earnings) and other wage measures (including average weekly earnings, average weekly ordinary time earnings, and the Labour Price Index).

The AEM model is used to produce forecasts at the national level. Separate (but linked and related) models are then used to produce State and industry forecasts.

A further separate (but linked and related) wage model is then used by Deloitte Access Economics to derive forecasts of the LPI by State, by industry, and 'by State by industry'.

Deloitte Access Economics' modelling methodology is not "too focused" at the national level. By definition, the national LPI is a weighted average of the various State LPIs. It is also a weighted average of the various industry LPIs. To the extent that a specific State or industry LPI differs from the national average, Deloitte Access Economics' methodology captures that deviation within the three factors described above (business cycle factors, productivity factors and competition factors). These factors are all separately defined for each State and industry.

Our methodology therefore takes into account regional- and industry-specific influences on wages, as is outlined in Appendix C of our 15 August 2011 report.

The claim in the Professor Mangan report (page 39) that the "*driving mechanism in the AEM model is the assumption that due to an easing in supply constraints, real wage increases will adjust downwards to a lower rate*" is not correct.

As noted above, the AEM model is used to produce forecasts at the national (Australia) level. An equation in the AEM model for the central wage measure (average quarterly earnings) is estimated econometrically and is principally driven by inflation and productivity (the core building blocks of wage growth).

Deloitte Access Economics' forecasts for LPI growth at the national level are presented in various charts throughout our 15 August 2011 report, including in Chart 6.12 on page 41. As that chart shows, our projection showed an increase in wage growth at the national level in the short term, with year-to growth forecast to be in excess of 4.5% throughout 2012-13. Growth was also expected to be in excess of 4.0% until the end of 2014. Over the period from 2011 to 2020, growth was forecast to exceed the average annual LPI growth of the previous decade (3.7%).

A further criticism raised by Professor Mangan (pages 35-36) is the fact that Deloitte Access Economics uses LPI growth in the utilities industry as a proxy for LPI growth in the electricity supply sector. The Professor Mangan report, at page 35, states that:

> *"DAE continue to use the Utilities sector as a whole as the vehicle for analysing the labour market conditions relevant to Powerlink. There is no reason to do this except for convenience in data gathering."*

While Deloitte Access Economics agrees with Professor Mangan's point that the utilities industry contains a number of other sectors other than electricity supply (and we make this same point on page 19 of our 15 August 2011 report to the AER), we disagree that there is little reason for this approach.

Deloitte Access Economics forecasts the utilities LPI as that is the data available from the ABS. Indeed, contrary to Professor Mangan's claim, there is a very good reason to undertake the analysis at the utilities industry level – LPI data at a more detailed level does not exist. If an LPI for the electricity supply sector were available, we would use that data in our modelling.

An obvious corollary of modelling the LPI at the utilities industry level is that the analysis of labour market conditions is also undertaken at that level.

A third point raised in the Professor Mangan report appears to criticise Deloitte Access Economics' view that skill shortages will eventually ease. Our 15 August 2011 report to the AER notes (at pages 31-33):

> *"The most recent data suggests mining pressures have lifted wage growth in that sector once again, and Deloitte Access Economics' short term projections foresee further relative gains in the mining sector, though these do not persist in the longer run*
>
> *There is always a risk of building in a 'future wage growth will be faster-than-average in a given sector because it always has been' effect into forecasts. In effect this would assume not only that skill shortages will rapidly re-emerge (which does appear likely), but that they will also persist indefinitely.*
>
> *In contrast, Deloitte Access Economics attributes the relative out-performance of wages in the mining and construction sectors through the last decade to the length, strength and composition of the long expansion in the Australian economy through to late 2008. Moreover, we see a further burst of similar demand side factors in the short term.*
>
> *...It is possible that some sort of structural change in the sector (such as the replacement of lower-paid workers with machinery) could have a permanent level change effect on the results – though in theory at least the calculation of more detailed components of the LPI is meant to be cognisant of such structural shifts.*
>
> *However, even such structural developments will not drive a continuous divergence in growth rates."*
>
> *That is because **skill shortages are temporary – they don't drive permanent wedges in wage relativities**. The higher wages on offer as a result of skill shortages lead, over time, to reactions on both the demand and supply side of labour markets to whittle those shortages away. To fail to forecast an eventual end to skill shortages – and to use them to justify further widening in wage relativities – sits strangely as a view on the longer term outcomes from labour markets.*

We confirm that this is our view – skill shortages will not persist indefinitely.

That does not imply that labour shortages in the short term are not relevant to wage outcomes. Deloitte Access Economics notes at various points throughout our 15 August

2011 report (including in the above quote) that we believe skill shortages will affect wages in the short term. For example, at page 10:

> *"With demand growth for skills high but their supply growth low, there will be costs to corporates and the wider nation:*
>
> - *Skill shortages are about to proliferate.*
> - *Rates of labour turnover will rise, meaning that firms will lose the specific skills that employees have learned by being at their particular organisation.*
> - *Wage growth will rise, and that will be a key channel by which the shortfall in skills can be expected to pressure the Reserve Bank into raising interest rates.*
> - *In turn, those higher-than-necessary interest rates will add to the exchange rate. "*

Further, at page 23:

> *"Accordingly, that enormous demand is likely to run into some of the same supply side constraints evident in recent years – only more so. Deloitte Access Economics has consistently stressed the coming crunch in skill shortages in these forecasts."*

And, at page 39:

> *"[T]he 'two speed screws' can be expected to continue to tighten, while the skill shortages evident today are likely to be only a small down payment on those to be evident down the track. Accordingly, wage growth is expected to lift further in the next few years."*

The criticism in the Professor Mangan report appears to confuse these points – that skill shortages are recognised in the short term, but that they will not persist forever. This recognition is reflected in the relatively strong year-to LPI growth forecast in the Australian economy generally of 4.5% throughout 2012-13. LPI growth is also expected to be in excess of 4.0% until the end of 2014.

How long the shortages will persist for is unknown. However Deloitte Access Economics reiterates our view that labour market adjustment means that skill shortages will eventually be resolved.

4 Past forecasting performance

This chapter responds to the analysis and criticism of Deloitte Access Economics' previous forecasting performance contained in the BIS Shrapnel and Synergies reports.

4.1 Response to criticisms raised by BIS Shrapnel

The BIS Shrapnel report (at pages 49-54) includes an assessment of Deloitte Access Economics' forecasting performance. The main conclusions drawn by BIS Shrapnel (detailed on page 49 of the BIS Shrapnel report) are:

- *Over the medium-to-long term (ie beyond the first two years of the forecast period), DAE has consistently forecast — in each of its successive projections provided to the AER — that utilities wages growth will ease back and its growth will fall below the 'All Industries' average. This easing has not been borne out in actual growth as utilities wages growth has consistently remained above (or equal to) the 'All Industries' average.*

- *DAEs utilities wages forecasts are too pessimistic, particularly in relation to the All Industries average.*

A number of points in relation to the first issue are relevant. In previous reports for the AER, Deloitte Access Economics' forecasts of LPI growth in the utilities sector have typically been lower than our forecasts for LPI growth across all industries over the latter stages of the forecast horizon.

This profile is consistent with a realistic view of industry wage growth over the medium to long term. Indeed, Deloitte Access Economics does not expect wage growth in any industry to grow faster than the all industries average in perpetuity.

The BIS Shrapnel report appears to argue that the current economic environment suggests that the utilities LPI will not grow more slowly than the all industries average. In fact the latest (December 2011) data from the ABS shows exactly that, with the Australian utilities LPI growing by 3.2% over the year to December 2011 compared to growth across all industries of 3.7%. The result also confirms a lower result across calendar year 2012, with utilities growing by 3.6% compared to 3.7% growth across all industries.

That said, Deloitte Access Economics agrees that, compared to our forecasts of the all industries LPI, forecasts for the utilities LPI have generally underestimated actual growth. In contrast, forecasts by BIS Shrapnel have overestimated utilities LPI relative to all industries LPI.

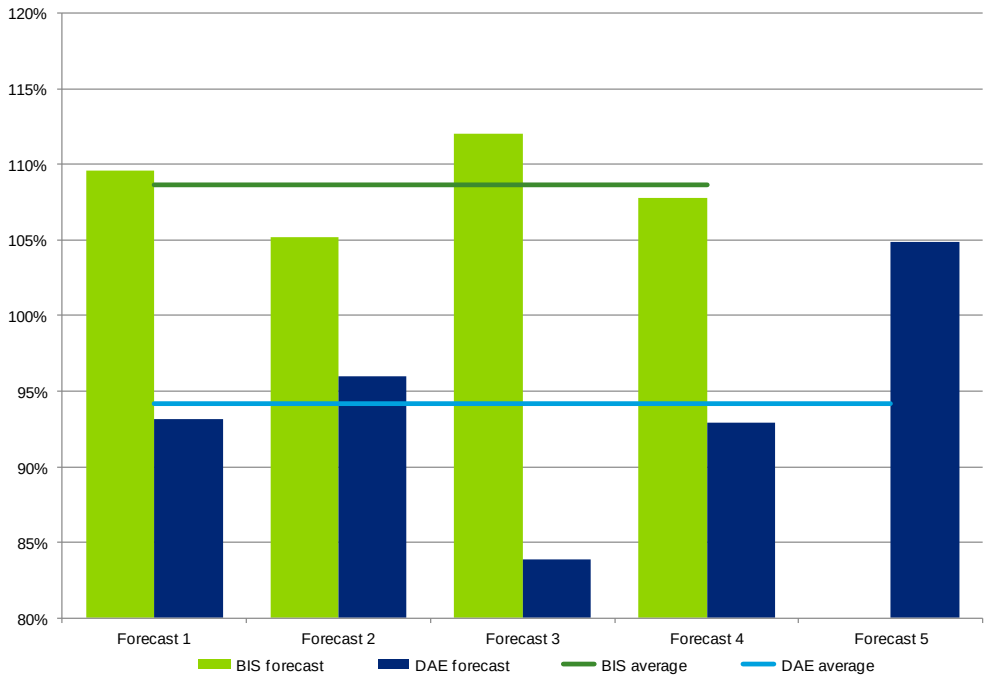
That comparison can be made by comparing the ratio of utilities LPI growth to all industries LPI growth (as forecast by Deloitte Access Economics and BIS Shrapnel) to the actual ratio of utilities LPI growth to all industries LPI growth (as published by the ABS).

Chart 4.1 below shows this comparison. Each column represents the average annual forecast for utilities LPI relative to the average annual forecast for the all industries LPI, as a

ratio to the ABS actual relativities. In effect, the chart shows the BIS Shrapnel and Deloitte Access Economics forecast performance for the utilities LPI relative to all industries LPI. The data is also shown in the final column of Table 4.1.

An accurate forecast of the relativities between the utilities LPI and the all industries LPI would result in a value of 100% in the chart.

Chart 4.1: Comparison of BIS Shrapnel and DAE forecasts



Source: The BIS Shrapnel report, Deloitte Access Economics

The chart shows that, as noted in the BIS Shrapnel report, Deloitte Access Economics' utilities LPI forecasts have, on average, been too pessimistic in relation to the all industries average. However the chart also shows that, on average, the BIS Shrapnel utilities LPI forecasts have been too optimistic – and by a more notable margin – in relation to the all industries average.

With the benefit of hindsight, the undershooting in our forecasts arose in part because we underestimated the strength of the recovery in China and other emerging economies in the aftermath of the global financial crisis, and the flow on impact that had to sectoral wages in Australia (including effects on wages in the utilities given developments in competitor sectors).

A more relevant exercise for determining the accuracy of utilities LPI forecasts is simply to compare them to actual ABS data. The table below is reproduced from page 54 of the BIS Shrapnel report.[6] It compares a range of BIS Shrapnel and Deloitte Access Economics forecasts over time.

[6] Deloitte Access Economics has added the final column in the table below which was not published in the BIS Shrapnel report. Some 'annual average difference' numbers in Table 4.1 differ from those presented in the BIS Shrapnel report due to rounding.

Table 4.1: Comparison of BIS Shrapnel and DAE forecasts

Labour Price Index for Australia			2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	Annual average difference	Ratio between utilities and all industries
March 2007	BIS Forecasts	Utilities		5.8	5.8	5.2	4.5	4.7		127%
Forecast 1		All industries		4.2	4.5	3.8	3.7	4.2		
	Actual	Utilities		5.0	4.1	4.5	4.3	4.2		116%
		All industries		3.9	4.1	4.1	3.1	3.8		
	Difference	Utilities		0.8	1.7	0.7	0.2	0.5	0.8	110%
		All industries		0.3	0.4	-0.3	0.6	0.4	0.3	
October 2007	BIS Forecasts	Utilities			5.0	5.2	4.8	4.9		119%
Forecast 2		All industries			4.3	4.2	3.9	4.3		
	Actual	Utilities			4.1	4.5	4.3	4.2		113%
		All industries			4.1	4.1	3.1	3.8		
	Difference	Utilities			0.9	0.7	0.5	0.7	0.7	105%
		All industries			0.2	0.1	0.8	0.5	0.4	
April 2009	BIS Forecasts	Utilities				4.8	4.7	4.4		132%
Forecast 3		All industries				4.1	3.3	3.1		
	Actual	Utilities				4.5	4.3	4.2		118%
		All industries				4.1	3.1	3.8		
	Difference	Utilities				0.3	0.4	0.2	0.3	112%
		All industries				0.0	0.2	-0.7	-0.2	
December 2009	BIS Forecasts	Utilities					4.3	4.2		133%
Forecast 4		All industries					3.1	3.3		
	Actual	Utilities					4.3	4.2		123%
		All industries					3.1	3.8		
	Difference	Utilities					0.0	0.0	0.0	108%
		All industries					0.0	-0.5	-0.3	
November 2006	AE Forecasts	Utilities		5.4	5.9	5.2	3.4	3.4		108%
Forecast 1		All industries		4.3	4.6	4.2	4.2	4.2		
	Actual	Utilities		5.0	4.1	4.5	4.3	4.2		116%
		All industries		3.9	4.1	4.1	3.1	3.8		
	Difference	Utilities		0.4	1.8	0.7	-0.9	-0.8	0.2	93%
		All industries		0.4	0.5	0.1	1.1	0.4	0.5	
April 2007	AE Forecasts	Utilities		5.6	5.7	5.1	3.6	3.9		112%
Forecast 2		All industries		4.1	4.6	4.4	4.0	4.3		
	Actual	Utilities		5.0	4.1	4.5	4.3	4.2		116%
		All industries		3.9	4.1	4.1	3.1	3.8		
	Difference	Utilities		0.6	1.6	0.6	-0.7	-0.3	0.4	96%
		All industries		0.2	0.5	0.3	0.9	0.5	0.5	
September 2009	AE Forecasts	Utilities				4.5	3.5	3.4		99%
Forecast 3		All industries				4.1	3.5	3.9		
	Actual	Utilities				4.5	4.3	4.2		118%
		All industries				4.1	3.1	3.8		
	Difference	Utilities				0.0	-0.8	-0.8	-0.5	84%
		All industries				0.0	0.4	0.1	0.2	
March 2010	AE Forecasts	Utilities					4.0	3.9		114%
Forecast 4		All industries					3.2	3.7		
	Actual	Utilities					4.3	4.2		123%
		All industries					3.1	3.8		
	Difference	Utilities					-0.3	-0.3	-0.3	93%
		All industries					0.1	-0.1	0.0	
September 2010	AE Forecasts	Utilities					4.7	3.7		129%
Forecast 5		All industries					3.1	3.4		
	Actual	Utilities					4.3	4.2		123%
		All industries					3.1	3.8		
	Difference	Utilities					0.4	-0.5	0.0	105%
		All industries					0.0	-0.4	-0.2	

Source: The BIS Shrapnel report, Deloitte Access Economics

The BIS Shrapnel report (page 51) uses this table to conclude that:

> *BIS Shrapnel has been closer than DAE with its utilities LPI forecast to the actual for the relevant forecast periods, particularly over recent years.*

Deloitte Access Economics disagrees with this statement. As shown in Table 4.1, our forecasts have been closer to the ABS actual data for the utilities LPI on average across the forecasts shown.

4.2 Response to criticisms raised by Synergies

A second assessment of Deloitte Access Economics' past forecasting performance is undertaken in the Synergies report (from page 23).

The Synergies report criticises a perceived lack of transparency in Deloitte Access Economics' modelling. Our modelling methodology is detailed in our latest (15 August 2011) report and previous reports to the AER, and further information is provided in the previous chapter of this report.

In an attempt to critically assess our previous forecasting performance, the Synergies report draws forecasts from a 2007 Access Economics (now Deloitte Access Economics) report to the AER and makes a comparison with actual ABS data.

The table of forecasts as presented in the Synergies report is reproduced as Table 4.2 below.

Table 4.2: Forecast comparison included in Synergies report

	2006-07	2007-08	2008-09	2009-10	2010-11	Annual average percentage point difference
Composite						
DAE forecast	4.4	2.0	2.1	1.9	2.2	2.5
ABS actual	5.5	5.1	5.2	3.8	4.2	4.8
Difference	-1.1	-3.1	-3.1	-1.9	-2.0	-2.2
Mining						
DAE forecast	4.5	1.2	1.4	1.4	1.9	2.1
ABS actual	6.0	5.7	5.7	3.6	4.3	5.1
Difference	-1.5	-4.5	-4.3	-2.2	-2.4	-3.0
Construction						
DAE forecast	5.2	2.5	2.4	2.8	2.7	3.1
ABS actual	4.9	4.7	4.6	3.3	4.0	4.3
Difference	0.3	-2.2	-2.2	-0.5	-1.3	-1.2
Utilities						
DAE forecast	2.4	4.2	4.1	2.6	2.7	3.2
ABS actual	4.8	4.2	4.5	4.4	4.1	4.4
Difference	-2.4	0.0	-0.4	-1.8	-1.4	-1.2

The Synergies report (page 25) uses this table to claim that Deloitte Access Economics' model "systematically under-forecast growth in the LPI series over the forecast period."

The comparison undertaken in the Synergies report is incorrect and misleading. The most crucial error by Synergies is the use of Access Economics' forecasts for nominal LPI *excluding productivity growth* for comparison against the nominal LPI published by the ABS.

This clearly understates and misrepresents the forecasts published in the report.

Second to that, the table also compares the forecast to the 'ordinary hourly rates of pay excluding bonuses' LPI produced by the ABS. Deloitte Access Economics forecasts the 'total hourly rates of pay excluding bonuses' LPI.

The Access Economics report[7] from which these forecasts were drawn is publicly available on the AER website.

A corrected version of the Synergies comparison is constructed in Table 4.3 below. The table compares the forecasts for nominal LPI by industry for Australia with the actual data published by the ABS. The composite industry data is a weighted average of the LPI growth in mining, construction and utilities.[8]

Table 4.3: Corrected forecast comparison

	2006-07	2007-08	2008-09	2009-10	2010-11	Annual average percentage point difference
Composite						
DAE forecast	5.8%	6.1%	4.8%	3.7%	4.4%	5.0%
ABS actual	5.5%	5.2%	5.1%	3.6%	4.2%	4.7%
Difference	0.3%	0.9%	-0.3%	0.1%	0.2%	0.3%
Mining						
DAE forecast	6.8%	6.3%	5.3%	4.9%	4.8%	5.6%
ABS actual	5.9%	5.8%	5.6%	3.6%	4.2%	5.0%
Difference	0.9%	0.5%	-0.3%	1.3%	0.6%	0.6%
Construction						
DAE forecast	4.8%	6.1%	3.8%	1.5%	4.1%	4.1%
ABS actual	4.8%	4.5%	4.6%	3.2%	4.0%	4.2%
Difference	0.0%	1.6%	-0.8%	-1.7%	0.1%	-0.2%
Utilities						
DAE forecast	5.6%	5.7%	5.1%	3.6%	3.9%	4.8%
ABS actual	4.9%	4.1%	4.4%	4.4%	4.1%	4.4%
Difference	0.7%	1.6%	0.7%	-0.8%	-0.2%	0.4%

Source: Access Economics (2007), Labour Cost Indices for the energy sector (12 April), ABS Cat. No. 6345.0

[7] See Access Economics (2007), Labour Cost Indices for the energy sector (12 April). Available: www.aer.gov.au

[8] The weights used to develop the composite series are: Mining – 57.1%, Construction – 28.4%, Utilities – 14.5%. This information is published by the AER in its Powerlink 2007-08 to 2011-12 Final Decision (p.109).

As the corrected table shows, far from "systematically" under-forecasting growth in the nominal LPI, the Access Economics forecasts in 2007 were, in general, too optimistic. On average over the five year forecast horizon, forecast nominal LPI growth in the utilities industry was too high by an average of 0.4% per annum. LPI growth in the mining industry was also too strong (by an annual average of 0.6%).

Although LPI growth in the construction sector was underestimated, the margin was small – Deloitte Access Economics forecast nominal LPI for construction to grow by 4.1% on average over the five years to 2010-11, compared to an actual result of 4.2%.

We stand by our record.

5 DAE labour productivity forecasts

This chapter responds to criticisms of Deloitte Access Economics' productivity forecasts by BIS Shrapnel.

The first point raised in the BIS Shrapnel report (from page 39) is that Deloitte Access Economics' productivity forecasts are too optimistic. Deloitte Access Economics' 15 August 2011 report to the AER (at pages 52-53) explains the rationale for our productivity forecasts:

> *Reports by the Productivity Commission (2009), the House of Representatives (2010) and the Treasury suggest 70% of the rapid decline in productivity since 2003-04 is accounted for by:*
>
> - *Declining resource quality and large capital investment that has not yet translated into output in the mining sector;*
> - *Capital investment and reduced rainfall in the electricity, gas and water sector; and*
> - *Drought affecting the agriculture sector.*
>
> *Other possible causes of the decline in productivity growth include capacity constraints within the economy, following the very long period of uninterrupted economic growth.*
>
> *That said, Deloitte Access Economics' assumption of productivity growth is stronger in the medium term than it has been in recent years, averaging close to 1.5% per year as boosts to efficiency from the strong levels of business investment begin to be seen across the economy.*
>
> *...[T]he utilities sector is projected see a more volatile version of the national productivity trend in the short term. In the longer term – and as capital investment in the sector lifts – productivity growth should average a similar rate to the national, although it may be more volatile from year to year.*

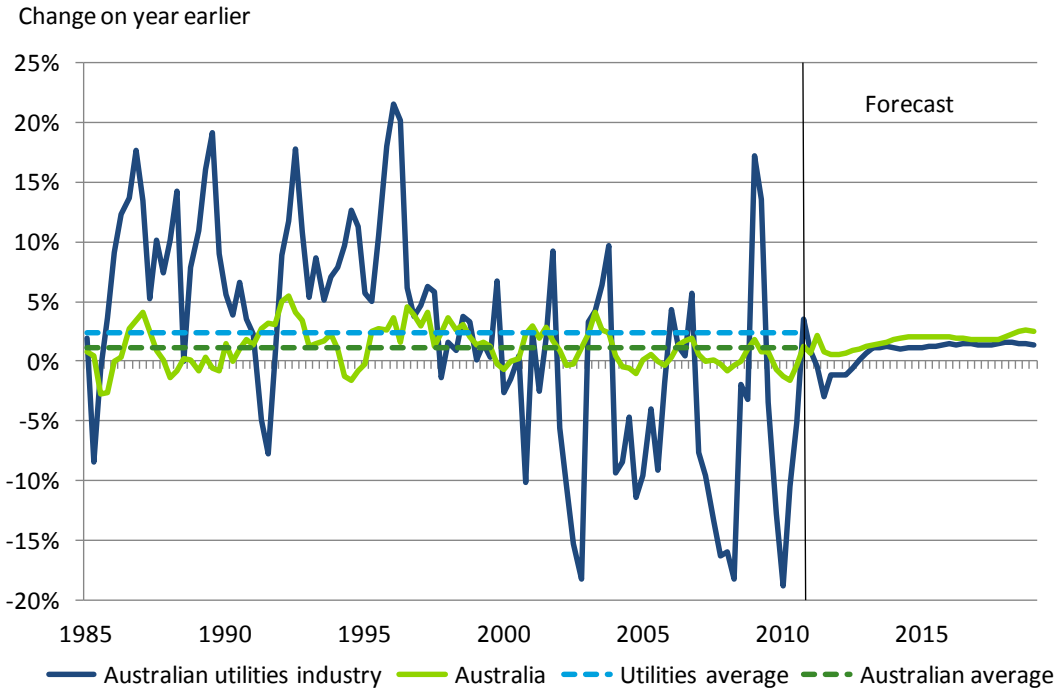
As the report explains, there are some well-recognised causes of the decline in Australia's productivity over the past decade. Deloitte Access Economics maintains the view that these are not influences that will persist going forward. Most particularly, the relatively recent increase in the level of business investment is generating a larger capital stock in the Australian economy generally and in the mining (and related) industry in particular. As noted in our report, that is expected to produce higher rates of labour productivity growth over the decade ahead compared with the recent past.

Chart 5.1 shows historical and forecast labour productivity in Australia and in the Australian utilities industry.

The forecasts are shown here on a year-to basis and are the same as those used in our 15 August 2011 report to the AER. Labour productivity is calculated as real Gross Domestic Product divided by total employment in the case of Australia, and real Gross Value Added divided by total employment in the case of the utilities industry.

Deloitte Access Economics does not believe that the labour productivity forecasts are optimistic. As the chart shows, the forecasts for labour productivity growth in the utilities sector are below the average seen over previous decades.

Chart 5.1: Forecast of productivity growth in Australia



Source: ABS, Deloitte Access Economics

The BIS Shrapnel report (at page 41) also claims that Deloitte Access Economics underestimates workforce composition productivity. BIS Shrapnel states that:

> *"despite acknowledging that the LPI does not capture the workforce composition productivity effects and the need to find a 'matching' productivity measure (ie one that excludes the workforce composition productivity) to adjust the LPI, DAE chose not to make any adjustments for workforce composition productivity. In other words, DAE effectively assumed a zero value for workforce compositional productivity."*

Deloitte Access Economics agrees – we assume a zero value for workforce compositional productivity. BIS Shrapnel (page 41) argues that workforce compositional productivity is greater than zero because:

> *Assuming difference between AWOTE and LPI is largely due to workforce compositional effects, then one can assume workforce compositional effects is roughly equal to this difference.*

Deloitte Access Economics disagrees with this statement and approach. As noted previously in this report, the LPI includes labour productivity derived from factors such as changes in the capital-labour ratio, technological advancement and changing organisational structure. This labour productivity is distinct from that due to compositional effects. Assuming that the difference between the AWOTE and the LPI can be attributed to compositional effects is incorrect.

BIS Shrapnel (page 41) notes that the difference between growth in AWOTE and growth in the LPI has averaged between 0.5% and 1.0% over time. It is impossible to know with certainty the degree to which difference influences account for this deviation in the wage measures. However, given that workforce compositional effects are *not* the only difference between AWOTE and the LPI, Deloitte Access Economics is of the view that their influence is small.

Indeed, as detailed in our 8 November 2011 report to the AER, we assume compositional productivity is zero. As noted on page 9 of that report:

> *That said, we value [compositional productivity] at zero both in forecasting the LPI, and in forecasting the productivity adjustment to be applied to the LPI.*
>
> *Hence 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.*
>
> *Deloitte Access Economics' wage forecasting methodology initially generates a generic wage variable. Those wage forecasts derived from this process are then used to generate separate forecasts for a number of different wage variables including, for example, AWE, AWOTE, national accounts-based average earnings, as well as the LPI.*
>
> *That forecasting process has two implications:*
>
> - *Deloitte Access Economics' existing methodology implicitly assumes that the labour quality adjustment is zero; and,*
> - *to the extent that the quality adjustment is different from zero, it would automatically net out in Deloitte Access Economics calculations of productivity-adjusted LPI growth, as it would be deducted from both productivity growth and from LPI growth.*

The final point raised in the BIS Shrapnel report relates to Deloitte Access Economics' comment in our 15 August 2011 report (pages 102-103) that:

> *"because so many factors can influence productivity…it is often best measured over an entire economic cycle."*

BIS Shrapnel (page 42) has assumed that because our view is that productivity is best measured over the economic cycle, that we have applied an "*(over-the-cycle methodology (which is tantamount to long-term average rates)*" in order to forecast productivity. That is not the case.

Deloitte Access Economics undertakes forecasting on a quarterly basis. Our macroeconomic model and wage model forecast all variables (including wages, output, employment and productivity) on a quarterly basis. These variables are not smoothed before the forecast is completed and no trends or long term averages are forecast.

The Synergies report raises a further point regarding smoothing of productivity. It notes (at page 17) that:

> *"DAE argues that the AWOTE series is particularly volatile and is therefore not suitable for wage forecasting purposes, including because of difficulties in smoothing this volatility. However, this argument is somewhat undermined by its use of volatile sectoral ABS labour productivity data, which it forecasts and then uses to adjust its real wage forecasts to derive LPI-based real labour cost forecasts for the AER. In doing so, DAE notes it addresses the volatility inherent in this data by taking 'an average productivity trend across the past two years' prior to developing its forecasts."*

This statement is incorrect. As noted above, Deloitte Access Economics does not undertake any smoothing of the productivity data "prior to developing its forecast". We do not forecast trend productivity or smoothed productivity. We forecast productivity on a quarterly basis.

The full context of the quote from Deloitte Access Economics' 15 August 2011 report to the AER (pages 99-100) is reproduced below:

> *Modelling of specific labour price indices (LPIs) begins with the movements in the total Australian LPI – taken from the Deloitte Access Economics Macroeconomic model. This measure serves as an anchor to overall wage rates in every part of the economy, in part because it provides a measure of the wage rises that other employees are receiving, making it a common starting point for negotiations.*
>
> *From this initial index, the model adds in deviations from the average. Three key factors will drive these wage differentials:*
>
> - ***Business cycle factors**. Deviations in industry (or State) performance from the national average. Faster growing industries and States will tend to see faster growth in wages and vice versa. In this model, the key factor is how fast the industry (or State) is growing relative both to the national average, as well as to historical averages. So, while manufacturing growth in the future may be below the national average, if the gap is relatively less that has been seen in recent years, this is view as an out-performance by the sector and would see some upward pressure on wages. In this model the methodology is forward-looking, with forecast growth across the next six months (as well as the past twelve) used to determine the current performance of an industry.*
>
> - ***Productivity factors**. The model assumes that industries with faster growth in productivity will see faster growth in wages – workers across an industry being rewarded for increasing the average amount of output*

per employee faster than the national average. As these factors take some time to become evident (and due to the inherent volatility in productivity measures at the State and industry level) an average productivity trend across the past two years is used.

- ***Competition (relative wage) factors**. Depending on the nature of the industry, workers will have skills that are relatively more or less transferable to other sectors where wages may be rising faster than in their own. Indeed, many workers will be performing effectively the same task (or same occupation – effectively their job description) across different industries (as their industry classification is determined by what their employer produces, rather than what they do). This will tend to limit the ability of wage rates to diverge. As wage rates in (say) mining rise higher, companies in (say) the construction sector will be forced to pay higher wages to keep their staff. Similar factors operate across States – although they are likely to be less significant (and react only to relatively larger discrepancies in wages). The modelling here will see wages in competitor industries tend to move more closely together – with industries that are benefiting from the two previous factors tending to be drawn back towards the average, and wages in otherwise slow growing industries boosted.*

In addition to these three 'mechanical' factors, there is often the need to use judgement to determine movements in wages – particularly when other data is volatile (which employment data currently is) and when factors not relevant to wage determination are having effects on broader output and employment measures.

The smoothing of productivity data relates to trying to determine how productivity has moved recently in the industry relative to the longer term trend. This is an influence on wage pressures and is taken into account in the wage model. The productivity forecasts in Deloitte Access Economics' reports to the AER are not smoothed. Neither is the productivity used to calculate the 'productivity-adjusted LPI' measures in the reports.

This methodology simply assumes that productivity improvements may take time to be recognised and flow on to wages, rather than assuming that quarterly changes in productivity directly influence wages in the same quarter.

We reiterate the point, detailed in Section 3.1, that at the 'by State by sector' level, our productivity estimates are a weighted average of the labour productivity estimates for the relevant State as a whole and the relevant industry at the national level. We use this methodology because of the statistical volatility in the historical labour productivity data at the more detailed level.

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