APPENDIX G

Labour Cost Escalators in the Australian Energy Regulator's Powerlink Draft Decision (November 2011)

January 2012

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An expert report by Professor John Mangan, University of Queensland

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Executive Summary

This report finds disagreement with the conclusions of the Deloitte/Access Economics (DAE) report in relation to real labour cost escalators for the Electricity, Gas, Water and Waste Services (EGWWS) sector and in particular, as they relate to Powerlink's expected circumstances over the 2013-17 regulatory period.[1] This is because:

- Although the report acknowledges that above national economic growth will occur in Queensland over the period of interest, leading to increased labour demand and increased competition for skilled labour in the local labour markets accessed by Powerlink, it does not see this as having an impact upon real labour costs in the EGWWS sector which, after labour productivity adjustments, are predicted by DAE's modelling to fall.
- In part this appears to reflect DAE's view that employment in the EGWWS sector will defy national trends and decline over the period 2010-2025. Agencies such as the Department of Education, Employment and Workplace Relations (DEEWR) disagree with this outlook.
- The DAE report also places a degree of emphasis on the belief that new sources of labour supply will open up to the industry, further easing wage pressure. I argue that this is unlikely to occur, particularly over the medium term covering the forthcoming regulatory period, because of likely tight labour market conditions and skill shortages.
- Importantly, the DAE analysis uses its manipulation of the Labour Price Index (LPI) to yield State/industry LPI indexes, and then further adjusts these downward on the basis of an imposed EGWWS sector labour productivity adjustment. I agree with Professor Borland and BIS-Shrapnel that both the LPI and particularly the productivity-adjusted LPI is unsuited for this task, in general, and in the specific case of Powerlink:
  - This is because of the acknowledged difficulties the LPI has with addressing the important issues of labour force quality adjustment, regional specific demand and additional payments, such as productivity bonuses. These deficiencies make it unsuited to the task of monitoring real labour cost escalation in a theoretic sense.
  - The issue then becomes how important these omissions in the LPI are in practice.

[1] Deloitte Access Economics (2011), Forecast growth in labour costs: Queensland and Tasmania, (August).

- Data supplied by Powerlink on earnings/employment over the period 2008/09 to 2010/11 show that substantial compositional change to their workforce occurred during this period, principally through the employment of additional employees on individual employment contracts at the high end of the skill ladder.
- In this respect I disagree with DAE's "Response to Professor Borland" in which they attempted to deflect his criticism of the LPI over the compositional productivity issue by arguing that the Utilities sector has been saving money by, on average, moving to a less skilled workforce[2]. In doing this DAE have, once again, failed to properly consider whether circumstances in the electricity industry (and electricity network sub-sector in the regions important to Powerlink specifically) are closely aligned with that of the broader Utilities sector.
- In regard to empirical tests as to the suitability of each series, the Average Weekly Ordinary Time Earnings (AWOTE) series has been found to more closely monitor movements in labour productivity and price inflation over the period 1997-2010 and the LPI has been found to understate movements in earnings over a similar period.[3]
- There is also evidence that Powerlink is experiencing on-going labour recruitment difficulties and has a large percentage of its workers on enterprise agreements. The influence of these factors will be reflected in the labour costs incurred by Powerlink. To the extent that such costs are prudently and efficiently incurred they should be incorporated into regulatory forecasts for the company.
- My analysis indicates that the AEM Macro model operated by DAE may have difficulties in accurately forecasting wage movements in an environment of labour market rigidities and labour shortages.
- I also highlight other issues connected with the use of the LPI series as an input into the forecasting model and the use of the Utilities or EGWWS sector data to represent the electricity industry in general and electricity network businesses specifically.

Finally, I find the DAE results fail the test of plausibility given the reasonably known labour market conditions Powerlink will face in the short to medium term. As such, in my opinion, the DAE forecasts do not reflect a realistic expectation of the real labour costs that are likely to be incurred by Powerlink over the 2013-17 regulatory period.

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2 Deloitte Access Economics (2011), Response to Professor Borland, (April), p 5.

3 Borland J. (2011), Labour Cost Escalation Report for Envestra Limited (March), p 9.

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1 Introduction

I have been asked by Powerlink to provide my expert opinion on:

- the relative performance of the AWOTE and LPI Wages series as alternatives to measure labour cost escalation with regards to the specific circumstances of Powerlink and its operations within Queensland; and
- in undertaking this analysis, make reference to recent submissions covering these issues from DAE, BIS Shrapnel, Economic Insights and Professor Jeff Borland.[4]

Central to these issues is the relative merits of the AWOTE and the LPI series in accurately forecasting labour cost movements over the period 2012 to 2017. That is, which series (assuming a robust forecasting methodology is used to provide a forecast of both series) will provide a realistic expectation of the labour input costs that will be faced by Powerlink over the 2013-17 regulatory period.

As is well known, predicting labour costs into the future is a difficult task because it involves accurately tracking movements in a number of variables that may be correlated but which may also move independently and possibly in opposite directions. A primary case in point is the relationship between wage inflation and average labour costs. These in turn are driven by:

- inflationary pressure, including localised inflation caused by labour shortages;
- institutional settings in the form and length and determinants of collective and individual wage agreements;
- shifts in the skill composition of the workforce; and
- changes in labour productivity driven by improved labour performance of the existing workforce.

It follows that the preferred series for predicting labour cost escalators is the one that is best able to incorporate the relative importance of these factors into its predictions, irrespective of whether these factors are themselves forecasts (such as from a macro model) or gathered externally from other sources of information (such as the Australian Bureau of Statistics).

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[4] Deloitte Access Economics (2011), Productivity measures to adjust LPI and AWOTE (November); Deloitte Access Economics (2011), Response to the Economic Insight Report of March 2011, (April); BIS Shrapnel, (2010), Labour Cost Escalation Forecasts to 2016-17 – Australia and Queensland, (November); Professor Jeff Borland (2011), Labour Cost Escalation Report for Envestra Limited (March); Economic Insights (2011), Review of AER Draft Decisions on Envestra Queensland's and Envestra South Australia's Input Price Escalators - Report prepared for Envestra Ltd (March).

The nominal AWOTE series reflects the full influence of movements in the price index and productivity movements as well as the impact on wages of institutional factors and specific labour market pressures.

The LPI is also a nominal wages series but because the LPI concentrates upon changes in wage rates relating to specific (and fixed) job classifications it abstracts from structural changes in the labour market, such as job status (full time/part time split)[5], the impact of job reclassifications and the impact of compositional changes on productivity. For example, in regards to this latter point the Australian Bureau of Statistics state: [6]

> Changes in the price of labour resulting from changes in the composition of the labour market are also excluded from index movements. To achieve this, price movements for each segment of the labour market (defined by state/territory, sector and industry) are combined using expenditure weights that remain constant between successive weighting base periods

In other words, due to the statistical need to maintain a comparable regimen of labour force classification over time, the LPI abstracts from a significant amount of typical labour market behaviour. Two important and linked features emerge from this.

First, because it fails to accommodate some forms of productivity-related wage impacts and structural factors, growth in the nominal LPI series has, on average, been below that of the AWOTE series since it commenced in 1997.[7] This being the case, particular care needs to be taken in adjusting the nominal LPI downwards for price and productivity impacts to determine an estimate of real unit labour cost changes, as proposed by the AER in Powerlink's case. In other words, factors that are not originally accounted for in the nominal LPI series should not then be used to adjust the series downwards. This includes the nature and comprehensiveness of the productivity deflator used.

Second, the LPI, in both a nominal and real form, is less suited as a measure of labour cost escalation the more dynamic and competitive is the labour market to which it is being applied. Where compositional change and significant job reclassification is a typical feature of labour market behaviour the LPI becomes less appropriate than AWOTE.

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5 Australian Bureau of Statistics (2011) The Labour Price Index Cat.6345, Canberra September p.1

6 Australian Bureau of Statistics (2011) The Labour Price Index Cat.6345, Canberra September Reference Note 8

7 BIS Shrapnel (2012),Labour Cost Escalation Forecasts to 2016/17, Australia and New Zealand, (January), p 30

These issues are intensified in importance when the LPI is used as data input into macro models which may have inappropriate wage and employment adjustment mechanisms for the purpose for which they are being used. To consider these issues further this report is organised in the following way:

- Section 2 examines the current labour market conditions in Queensland and those likely to be faced by Powerlink and other employers in their local labour markets over the medium term. It uses this information as a backdrop for comparisons over the suitability of AWOTE and LPI in predicting labour cost escalation.
- Section 3 directly compares the AWOTE and LPI series from the point of view of which is the more appropriate series to be used as a proxy for labour cost escalators in general and in the context of the operations of Powerlink and the EGWWS sector in Queensland.
- Section 4 represents a consideration of the merits of using nationally focussed macro models to track movements in wages and productivity in localised and supply constrained labour markets.
- Section 5 provides a summary of my arguments and conclusions.

2 Labour market conditions in Queensland including all areas covered by Powerlink's network

As Queensland Treasury commented in their recent budget review, employment in the Queensland economy deviated from its recent history of growing faster than the national average in 2009/10 to record an annual growth rate of 0.9%[8]. It expects this trend to reverse itself over the next 5 years with employment growth in Queensland exceeding the national average by more than double between 2012-2014 and by a full percentage point in 2015. A full summary of their headline results comparing Queensland and Australia are contained in Table 1.

Table 1 Queensland compared to Australia, Economic Forecasts (annual % change)

	Outcome	Est. Act	Forecasts		Projections	
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Queensland						
Gross state product[2]	2.1	0	5	5 ¼	4	4
Employment	0.9	2 ½	3	3 ¼	2 ¾	2 ¾
Unemployment rate	5.7	5 ½	5	4 ¾	5	5
Inflation	2.7	3 ¼	3	3 ¼	2 ¾	2 ¾
Wage Price Index	3.3	4	4	4 ¼	na	na
Population	2.3	1 ¾	1 ¾	2	2 ¼	2 ¼
Australia						
Gross domestic product[2]	2.3	2 ¼	4	3 ¾	3	3
Employment[3]	2.4	2 ¾	1 ¾	1 ¾	1 ½	1 ½
Unemployment rate[4]	5.2	5	4 ¾	4 ½	5	5
Inflation[5]	3.1	3 ¼	2 ¾	3	2 ½	2 ½
Wage Price Index[3]	3.0	4	4	4 ¼	na	na
Population[6]	1.5	1 ½	1 ½	1 ½	1 ½	1 ½

Note: 1. Decimal point figures indicate an actual outcome. Na – indicates not available. 2. CVM, 2008-09 reference year (CVM stands for chain volume measure and refers to a method of calculating Gross State product used by Queensland Treasury). 3. Seasonally adjusted growth through-the-year to the June quarter. 4. Seasonally adjusted estimate for the June quarter. 5. Through-the-year growth to the June quarter. 6. Through-the-year growth to 31 December.

Source: ABS 6401.0, 6345.0, 6202.0, Queensland Treasury and 2011-12 Australian Government Budget.

[8] Queensland Treasury (2011) "Economic Outlook and Performance" Budget papers 2011 http://www.budget.qld.gov.au/budget-papers/2011-12/bp2-2-2011-12.pdf

A number of features stand out from these predictions. The first is that the Queensland economy post-2011 is tipped to strongly outperform the average for the Australian economy in terms of Gross Domestic Product and employment growth, the latter growing at around twice the rate of the national economy.[9] Queensland Treasury attributes the difference to the following factors:

- Growth in private economic activity and employment growth in Queensland is forecast to accelerate to 3% in 2011-12 and 3¼% in 2012-13, representing an increase in employment of more than 140,000 persons over this period.
- Initially, jobs growth is expected to be driven by sectors related to the resources investment boom, including mining, engineering construction and transport. This will be followed by a recovery in the agricultural sector. In addition the rebuilding effort following floods should drive jobs growth in rural and non-mining construction.
- As economic growth becomes more broadly based in 2012-13, jobs growth in other service sectors related to discretionary spending, such as retail trade and hospitality, is expected to improve.
- Some of the increase in labour demand will necessitate an increase in the average working week in industries such as mining, wholesale and retail trade, accommodation, food services and agriculture due to constrained labour supply.
- An improvement in job prospects and stronger wages growth is expected to encourage persons into the labour force over the next two years, with the year-average participation rate forecast to reach an historic high of 68% in 2011-12 and rise further to 68¼% in 2012-13.
- Queensland Treasury forecasts labour force growth to accelerate to 2¾% in 2012-13. However jobs growth will outpace labour force growth such that the year-average unemployment rate is forecast to fall to 5% in 2011-12 and 4¾% in 2012-13.

[9] On January 13th 2012, Queensland Treasury produced the mid-year up date of the 2010-2011 for the Queensland economy which contains an updated assessment of the current state of the Queensland economy and provides predictions of the performance of the Queensland economy in the future (State Budget 2010-2011 Mid Year Fiscal and Economic Review (at http://www.treasury.qld.gov.au/office/knowledge/docs/mid-year-review/mid-year-review-2010-11.pdf). Data in this report varies from that shown in Table 1, principally to allow for the full influence of the floods on the predicted 2010/11 Gross State Product. These changes do not alter the conclusion made in this report that Queensland Treasury expects the Queensland economy post 2010/11 to substantially outperform the Australian Economy in terms of GSP growth and employment growth. The mid-year fiscal and economic review (MYFER) refers to Queensland already being characterised by a tight labour market (MYFER, p.8). In addition for 2011/12 the Queensland economy is now predicted to grow at 5% (up from earlier predictions of 4.5%) and 1.75 percentage points above the predicted Australian growth rate. At the same time employment in Queensland is predicted to grow by 3.25% compared with 2% for Australia as a whole.

- As a result, employment growth is predicted to exceed labour force growth (including immigration) making for an increasingly tight labour market.

This recent Queensland Treasury report is just one of a number that have forecast that the resource-based states of Queensland and Western Australia will experience economic growth levels well in excess of the rest of Australia. For example, DAE's media release for its June 2011 Investment Monitor noted:[10]

> Between them, Western Australia and Queensland account for 54% of the value of projects in the Investment Monitor database – 52% of definite projects by value and 55% of projects in planning by value. Following the money will be stronger economic opportunities for these jurisdictions as well. That is increasingly the case for WA, though for Queensland some of the strong investment agenda is making up for flood and cyclone devastation. Still, the output losses have mostly passed and the reconstruction spending is now underway, which should help Queensland's economy soon motor ahead

DAE's publication "Economic Outlook for Queensland" (2011) contained forecasts that exceeded the Queensland Treasury's estimates for GDP growth in Queensland, forecasting growth rates of 5.3%, 4.6% and 4.5% for the years 2012-2015 respectively. This was linked to corresponding growth in average earnings of 4.8%, 4.9% and 4.4% respectively.[11] Similarly, the Committee for Economic Development Australia (CEDA) indicated significant growth in Queensland suggesting increases in wages of over 4% per annum using the wage price index as a basis for estimates over the next 5 years.[12]

In essence what is predicted by both government and private sector forecasters is a return to the process of labour market structural change and tight labour market conditions that has been a feature of the last decade in Australia, particularly in the resources and construction sectors.

2.1 Structural change in the Powerlink regional labour markets

One means of examining labour market structural change is to examine movements in the relative employment share of industries and occupations in a regional economy relative to some larger economy, such as Australia as a whole.

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10 Deloitte Access Economics (2011), Media Release: Investment Monitor June 2011: Investors crank it up. Available from http://www.deloitte.com.au [Accessed: 3 January 2012].

11 See, Deloitte Queensland Index, Gala Edition, July 2011

12 CEDA (2011) Economic and Political Overview Series 2011, http://ceda.com.au/news-articles/2011/03/21/epo_summary

The Queensland regions of most interest to Powerlink (the Powerlink regional labour markets), and what might be referred to as their local labour market, are the statistical districts of Mackay, Fitzroy and Central Queensland and the North and Northern regions.

In the following analysis, the labour markets of these regions are aggregated and then compared via shift-share analysis to the performance of the Australian labour market as a whole between the following two periods: 2000-06 and 2007-10. The technique is based on the assumption that local employment can be explained by the combined effect of national, industrial mix and regional factors.

Specifically, the shift-share model provides that change in employment in the study area's *ith* activity from time *t* to time *t+n* is a function of:

- The study area's share of national growth (national share).
- The change in mix of economic activities relative to national shares (industry mix).
- And the shift change of economic activities toward the study area (regional share).

Formally:

$$e_i^{t+n} - e_i^t = share\ change + mix\ change + shift\ change$$

Or

$$e_i^{t+n} - e_i^t = e_i^t \left[\frac{E^{t+n}}{E^t} - 1\right] + e_i^t \left[\frac{E_i^{t+n}}{E_i^t} - \frac{E^{t+n}}{E^t}\right] + e_i^t \left[\frac{e_i^{t+n}}{e_i^t} - \frac{E_i^{t+n}}{E_i^t}\right]$$

Where

e = employment in the area of interest

e_i refers to the industry or occupation of interest

t is time

E refers to the larger area (State or National)

A positive number for national share, regional share and total share means that the industry's share of employment increased. A negative number means that it declined. In terms of industry mix, a positive number means that this industry's share of overall regional job growth has increased. A negative number means that it declined. The regional share component, especially considered next to the expected national share, is

an indication of structural and compositional change in the regional workforce relative to what is happening across the nation or State.

The results in Table 2 below indicate the extent of structural change in the Powerlink regional labour markets:

- Total employment demand in these regions increased by 1.58 times more than would have been expected in the regions had they grown at the same rate as their previous national share.
- However, at the occupational group level, there were much larger regional growth divergences. For example, the Professionals (para-professionals) occupational group increased at a rate of 5.43 times more than what might have been expected based on previous national shares, driven by very strong regional growth.[13]
- All occupational groups' employment growth was well above expected regional shares based on previous national shares except for the Managers and Labourers groups.

Table 2 Powerlink regional labour market compared to Australian average 2007- 2011

Occupational Group	National Share	Industry Mix	Regional Share	Total Share	Total Share/ National Share
Managers	3.33	-0.13	-11.29	-8.10	-2.43
Professionals	2.97	1.81	11.32	16.10	5.43
Technicians and trades workers	4.44	-2.38	3.54	5.60	1.26
Community and personal service workers	1.78	3.60	3.22	8.60	4.83
Clerical and administrative workers	3.16	-1.00	3.94	6.10	1.93
Sales workers	1.98	-0.95	8.07	9.10	4.59
Machinery operators and drivers	2.70	0.21	1.59	4.50	1.67
Labourers	3.09	-3.43	-3.56	-3.90	-1.26
Total	23.45	-2.28	15.83	37.00	1.58

Source: Shift share estimates are based on data from ABS Cat No. 6291.0.55.003.

Inadvertently, the decline in the regional share of Managers compared to growth in national share is itself an indication of the structural change in the Queensland regional areas and was driven entirely by a decline in farm and pastoral managers as resource-

[13] Particularly in Business, Human Resources and Marketing Professionals, Design, Engineering , Science and Trades Professionals and ICT Professionals

based industries forced structural change in the traditional agricultural and pastoral industries.[14]

The decline in the regional share of Labourers compared to growth in national share is driven in part by "credential creep" and comes on the back of shifts in the educational base (under the Australian Qualifications Framework (AQF)) towards higher formal qualifications within the regional labour market.[15]

In essence the traditional category associated with Labourer (Certificate I and II) have declined and those of Certificate III and above have increased leading to a reclassification of occupations. Such data are not recently available for the Powerlink regional labour markets. However, for Queensland as a whole the large increases in the numbers of employed persons with Certificate III or above qualifications suggest significant upward reclassification of occupational categories. This trend is shown in Table 3 with all AQF categories other than Certificate I/II showing strong growth.[16]

Table 3 Summary of trends in non-school qualifications for the period 2012-2021, Queensland

Non-schol qualifications	Growth rate 2006-2011
Postgraduate diploma or graduate (postgraduate degree)	4.9 %
Graduate diploma or graduate certificate	2.18 %
Bachelor degree	3.34 %
Advanced diploma or diploma	4.39%
Certificate III/IV	5.39 %
Certificate I/II	-2.41 %

Note: Results were derived from shift share analysis using historical data from ABS Cat No. 6227.0.

The main implication of both the relatively high predicted economic growth for Queensland as a whole and the extraordinary structural shift in labour demand in recent years in the Powerlink regional labour markets, particularly in the skilled and semi-skilled areas, is that the company and other regional employers face a tight labour market for the foreseeable future, not just locally but at the interstate level. DEEWR reported that the internet vacancy index (IVI) increased over the year to November 2011 by 12.2% in Western Australia, 7.7% in the Northern Territory and 5.8% in Queensland[17] and that:[18]

[14] In the Australian Bureau of Statistics, this group make up the largest individual category of Manager.

[15] See, Buchanan, J., Yu, S. Wheelahan, L., Keating, J.; and Marginson, S (2010) "Impact Analysis of the Proposed Strengthened AQF, Workplace Research Centre, University of Sydney

[16] For a full explanation of the learning skills covered in Certificate I-IV see http://www.aqf.edu.au/AbouttheAQF/TheAQF/tabid/108/Default.aspx

[17] Department of Education, Employment and Workplace Relations (2011) Vacancy Report. www.deewr.gov.au/default.aspx?LMIP/Vacancy Report.

[18] Ibid, p. 2

> The strongest increases over this period were recorded in the Pilbara & Kimberley WA (up 35.9%) and Central Queensland (up 34.2)

Some of the labour markets in which Powerlink competes, namely the mining and Construction markets, had the greatest growth in unfilled vacancies.

In keeping with these results a recent survey by the Capricornia Regional Council (whose geographic reach includes the major industrial centre of Gladstone and Bowen Basin coal reserves) found that employers in local industries were finding increased difficulties in filling vacancies. The report stated:[19]

> Results indicate that recruitment activity in the region was high and that a high proportion of recent vacancies were not filled with applicants considered unsuitable for the vacancy for which they had applied. This suggests a substantial gap between employer expectations and the skills, experience and attributes possessed by applicants. Future recruitment expectations were also high, which suggests that as labour market conditions continue to strengthen, employers in the region may face increased recruitment and retention difficulties.

However, difficulties in occupational recruitment translate differently across different industries. Therefore it is of interest to examine forecasts of the behaviour of labour demand in selected industries into the future.

A number of forecasts exist for future trends in industrial employment at the national level over various time periods. Below in Table 4, the national predictions of two well-established forecasting agencies, being the Commonwealth Department of Employment Education and Workplace Relations (DEEWR) and the then Access Economics (now known as DAE) are listed and compared.

The DEEWR projections (by industry and occupation) are based in part on the Monash model developed by the Centre of Policy Studies at Monash University, but also take account of recent employment trends and DEEWR intelligence on industry developments.[20] The DEEWR projections were anchored to Australian Treasury employment forecasts (in the sense that DEEWR estimates had to fall within a defined range derived from Australian Treasury employment forecasts) and were initially developed for the 19 major industry groups for the period 2012 to 2016. These were then cascaded down to 214 industry sectors.

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[19] The Capricornia Council (2010) Survey of Employer Recruitment Experiences , p 2

[20] See, Skills Info (2011) Labour Market Information http://www.skillsinfo.gov.au/skills/IndustryReportsCharts/

Access Economics forecasts were prepared for Skills Australia as part of research and analysis on the future demand for post-school skills and qualifications to 2025.[21]

Table 4 Growth projections of employment by industry divisions from 2012, year on year growth rate (%)

Industry	DEEWR	Access Economics
Agriculture, forestry and fishing	1.4	1.1
Mining	6.1	1.0
Manufacturing	0.6	0.0
Electricity, gas, water and waste services	3.9	-0.3
Construction	3.6	1.8
Wholesale trade	1.1	1.2
Retail trade	1.2	2.2
Accommodation and food services	2.5	2.3
Transport, postal and warehousing	1.2	3.1
Information media and telecommunications	1.2	2.4
Financial and insurance services	1.9	2.3
Rental, hiring and real estate services	3.3	2.8
Professional, scientific and technical services	2.4	3.1
Administrative and support services	1.1	2.7
Public administration and safety	2.1	2.8
Education and training	2.1	2.2
Health care and social assistance	4.5	2.9
Arts and recreation services	0.6	2.4
Other services	2.0	1.9
Overall	2.1	2.1

Note: All Industries are classified according to ANZSIC 2006 divisional structure. Year on year growth rate predictions for DEEWR are based on DEEWR's 5 year Industry Employment Projections in 2010 and are derived only to the period to 2015/16. Access Economics had projected annual employment growth for the period 2010-2025.

Source: DEEWR (2010), Industry Employment Projections, Access Economics (2009), "Economic Modelling of Skills Demand", report prepared for Skills Australia.

It is recognised that there are dangers in comparing annual average growth rates that have been estimated over different time periods and due caution should attach to any analysis based upon them. However, both forecasters present average year-on-year growth rates and therefore should be comparable, at least up until 2015/ 2016.[22] As a

[21] Access Economics (2009), Economic modelling of skills demand (October).

[22] Care must be taken in comparing year on year growth rates for series of different time periods as one or two outlier results in either series can affect the calculation of the annual averages. However, it might be expected that the data in each series would be comparable in size or would at least move in the same direction. For most industries this is the case. Inspection of the data in table 4 shows a reasonable similarity between the DEEWR and Access results. The exceptions are in Mining and EGWWS where the differences in annual average movements are so large that

result it would be expected that a general consensus in expected trends, particularly in relative size and direction, may emerge.

The results in Table 4 show a reasonably close level of correlation between the two sets of predictions with some notable exceptions (such as mining where the DEEWR predicts 6.1% year on year employment growth whereas DAE predicts 1% year on year employment growth through to 2025).

For this report our major interest is in the EGWWS sector and here major differences also emerge. DEEWR predict a high (3.9% per year) growth in employment in EGWWS through to 2016. In contrast DAE forecast a small negative annual rate of growth (-0.3%) in employment in the industry per annum through to 2025.[23]

The results here are for the 'Open Doors' scenario used by Access Economics (2009) in its Skills Australia report. They describe this scenario as "seeing Australia's economy grow at an average rate, a little above global GDP growth" (Access Economics 2009, p.9). Access Economics also ran two other scenarios, 'Low-Trust Globalization', in which exposure to the international economy is reduced in comparison to the 'Open Doors scenario and the 'Flags' scenario, which is essentially a return to protectionism.

Under these latter two scenarios employment in the EGWWS industry throughout Australia in 2010-2025 is predicted to grow at an annual rate of -0.6% and +3.2% respectively. In other words, under the Flags scenario, as Australia becomes more 'protectionist' the local demand for labour in the EGWWS experiences strong annual growth rates (3.2%), even though under this scenario, the employment growth in labour demand for Australia as a whole is forecast to drop to 0.89%. This drop in overall labour demand would be expected following a reduction in trading opportunities – although it is unclear how this drop in overall demand can be connected with an increase in the EGWWS sector – whose employment demand is presumably derived from the rest of the economy.

In other words, what is not clear is why employment growth in the EGWWS sector should move inversely with labour demand in the rest of the economy and inversely with the degree of openness in the economy. This is because, in general, services supplied by the EGWWS sector are generally not regarded as highly tradable items.

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they are unlikely to be due to differences in length of series. These two industries, mining and EWGS (or at least parts of it) are key elements of the Powerlink labour market.

[23] Synergies (2011) using a non-linear forecasting model for South East Queensland 2012-2021, predicted annual employment growth in the EGWWS industry at 2.3% per annum, roughly in line with DEEWR. See, Synergies (2011) p. 47

Access Economics offer the explanation that the Flags scenario presents a somewhat different industry growth pattern with stronger growth for manufacturing and utilities as Australia's economy moves back towards one based more on domestic production.[24] Yet under this line of thinking it might be expected that the forecasts for labour demand in the EGWWS sector under the low-trust globalization scenario (-0.6%) would increase in comparison to the Open Doors Scenario (-0.3%) as it would also, in the short run, encourage domestic production. However, it does not, it declines even faster.

In comparing the DEEWR (Monash) and Access Economics predictions, there is a substantial difference in forecast outcomes for the EGWWS sector nationally. For example, a hypothetical workforce of 100 persons in 2012, under DEEWR predictions would be 127 persons in the year 2020 compared to 79 persons under Access Economics forecasts, an approximate 60% difference in outcome over an 8 year period.

The different predictions of DEEWR and Access Economics about labour demand in the EGWWS sector might mean that they would also differ significantly in their predictions for growth in the occupations that constitute a major proportion of workers in the relevant industries.

However, the forecasts for occupational demand in Australia by DEEWR (Monash) and DAE are in much closer agreement. For example, in the key employment groups likely to impact on the labour force requirements of Powerlink, the forecasts of growth in occupational demand into the future are relatively similar, albeit somewhat weaker.[25] These are Managers; Professionals; Technicians and Tradespersons; and Clerical and Administrative workers.

[24] Access Economics, 2009, p. 13

[25] Results for Access (2009) relate to their "Open Door" scenario which I consider most suitable for comparison with DEEWR. In the other scenarios occupational demand drops as the level of protection rises. See Access Economics (2009) p. 14

Table 5 Growth projections of employment by major occupational groups from 2012-16, year on year growth rates (%)

Occupation	DEEWR	Access Economics
Managers	2.9	2.0
Professionals	3.0	2.4
Technicians and trades workers	2.7	1.7
Community and personal service workers	3.7	2.3
Clerical and administrative workers	1.3	2.3
Sales workers	1.0	2.4
Machinery operators and drivers	1.7	1.9
Labourers	1.3	1.9

Occupational major groups are classified according to ANZSCO 2006 classifications structure

Note: Year on year growth rate predictions for DEEWR estimated are based on DEEWR's occupation major group employment growth to 2015-16. Access Economics have projected annual employment growth for the period 2010-2025.

Source: DEEWR (2011), Employment Projections, Australian Jobs 2011, Access Economics (2009), "Economic Modelling of Skills Demand", report prepared for Skills Australia

Considering the two sets of industrial and occupational employment forecasts, it appears that Access Economics have singled out the EGWWS as the only industry to suffer absolute employment decline into the foreseeable future, unless Australia becomes more protectionist (under the "Flags" Scenario). Paradoxically, this in turn suggests that the EGWWS sector will grow at the same time as the remainder of the economy stagnates (noting that it is the rest of the economy that will drive employment growth in the EGWWS sector). It is also difficult to reconcile Access Economics' pessimistic employment outlook for the EGWWS Sector with their rosy predictions for the Queensland economy as a whole.

As a result, I consider DEEWR's sectoral and occupational employment forecasts for 2012-16 to provide a more realistic expectation of labour market conditions in Queensland. Moreover, it is hard to see Powerlink facing anything other than a tight labour market in the medium term, certainly until 2016. As a result, labour shortages, potential wage inflation and recruitment difficulties will be an ongoing issue.

The reasons for my conclusions are:

- Above average growth in the Queensland economy, as forecast by Queensland Treasury, DAE and CEDA, with particular emphasis on resource-based industries.
- Continuance of the significant labour market structural change shown for 2007-2011 in the Powerlink regional labour markets with increasing demand for skilled labour across a range of areas.

- Strong regional wage pressures in localised labour markets, such as in the Central and Northern Statistical districts of Queensland caused by competition within the resources industry and strong post disaster reconstruction activity.
- Forecasts of moderate to strong growth in demand for labour in the EGWSS, Construction and Mining industries by the DEEWR (Monash) industrial employment projections.
- Forecasts of moderate to strong national growth in demand for key occupational groups needed by Powerlink, as forecast by DEEWR and DAE.

These latter two points indicate the difficulties Powerlink will face in attempting to fill labour vacancies through inter-state migration and hence will constrain the supply-side response to labour demand pressures.

3 AWOTE and LPI compared

The Labour Price Index (LPI) began in September 1997. It is one of a number of price indexes produced by the Australian Bureau of Statistics (ABS), of which the best known is the Consumer Price Index (CPI). The major strength of these types of price indexes is their simplicity. For example, in reference to the CPI the ABS argues:[26]

> The simplest way of thinking about the CPI is to imagine a basket of goods and services comprising items bought by Australian households. Now imagine the basket is purchased each quarter. As prices change from one quarter to the next, so too will the total price of the basket. The CPI is simply a measure of the changes in the price of this fixed basket as the prices of items in it change. .

Similarly the LPI uses a quasi-fixed regimen to study underlying movements across time in wage costs. This regimen consists of a wage price index (the largest contributor) for defined classes of labour plus some adjustment for movements in non-wage labour costs. Specifically, the LPI is designed to:[27]

> Enable analysts and policy makers to assess the impact of changes in wage and non-wage costs on the labour market, the economy more generally, households and the community.

The design logic behind the LPI is for it to be "unaffected by changes in the quality and quantity of work performed"[28] and is designed to reflect changes in the price of labour services by concentrating on wages and salaries for constant categories of labour in the belief that "wages and salaries account for the majority of expenditure on labour costs by employers". The reference point measure is the index of hourly rates of pay excluding bonuses.

However, the LPI does take note of non-wage costs in that the LPI is constructed from an amalgam of wage price indicators and four non-wage price indexes covering such non-wage components as holiday leave loading, employer funded superannuation, payroll tax, and workers' compensation.

State and Territory differences in labour costs are recognised by the construction of wage price indexes (private/public) and across broad industry groups across the different geographical areas, but these are not combined. In other words, the ABS produces LPI series for State and Territories and for Industries but not for States and

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[26] Australian Bureau of Statistics "Consumer Price Index, Australia," cat 6401.00, Sep 2011.

[27] Australian Bureau of Statistics "Labour Price Index Australia", cat 6345.00, March 2010, p.16

[28] Which the ABS indicates does not reflect compositional change.

Industries combined. As a consequence, DAE constructs via their modelling an LPI Series for the EGWWS Sector.

The function of price series such as the CPI and the LPI are to provide reasonable approximations of average movements in prices in their respective markets (product market for the CPI and the labour market for the LPI) over time to act as a general indicator of price/wage movements. This is why it is necessary to tightly define the regimen (basket of goods and services for the CPI and fixed category of labour for the LPI) so that price behaviour of these indicators is distinct and may be relatively easily traced over time and, by reference to a base year, provide a relatively consistent inter-temporal data set. However, such data sets are best suited to tracing general movements in the direction of wage/price movements rather than providing a true picture of the level of these changes over time.[29]

In essence the ABS is attempting, through the LPI, to provide a relatively uncomplicated estimate of inter-temporal movements in wage costs by reducing the "noise" of the changes in the composition and behaviour of the complex labour market factors that influence actual earnings on a quarter to quarter basis. However, a problem with restricted indexes such as these is they are less reliable as a basis for providing forecasts in prices/wages because they ignore a number of factors that influence nominal and real labour costs.

For example, the ABS concedes that the level of earnings across labour force groups (even within the same quality grouping), "reflect variations within different population groups and across industries and occupations" and that "changes in the level of earnings are also of interest in reflecting the strength of labour demand and supply" (ABS, Cat 1310, 2009/10). As well, in relation to the LPI, the ABS makes it clear that movements in average weekly earnings may be affected by changes in both the level of earnings per employee and in the composition of the labour force.[30]

A well-known omission from the LPI is that of compositional change in the workforce. These changes impact upon the skill and productivity of the workforce under the assumption that higher skill makes workers more productive and therefore likely to earn higher real wages. Successive Australian Governments have placed emphasis upon 'up-skilling' the workforce and the data shown in section 2 of my report indicates that up-skilling and upward movements in the qualification levels of the workforce is a

[29] For example, even within a tightly controlled index such as the CPI, the RBA and policy makers have found it necessary to distinguish between core inflation and headline inflation as movements in food prices became more erratic.

[30] Australian Bureau of Statistics "Year Book Australia 2009/2010", cat. 1310.00

consistent feature of the Australian labour market. Yet in the interests of having a stable point of reference, these aspects are removed from the calculation of the LPI. However, if compositionally-based productivity issues are important the LPI series will sacrifice labour cost accuracy for consistency. The relative importance of compositional productivity is discussed later using data relating to Powerlink.

However, another less highlighted factor that impacts on the reliability of the LPI is its value as input data to economic models in labour markets where localised demand or supply constraints exist and where institutional factors inhibit downward wage adjustment. In such circumstances the relevant question then becomes whether or not a statistical technique that works reasonably well in the product market (CPI) is sufficiently inclusive to be applied with similar authority to labour markets, which are subject to:

- a much larger degree of institutional pressure than product markets due to unions and collective agreements;
- localised market effects; and
- the educational/quality mix of the labour force which is consistently on an upward trend.

In their search for the most reliable sources of current and future real labour cost escalation a number of analysts, BIS Shrapnel, Economic Insights and Professor Borland have stated a preference for an average earnings series such as AWOTE in preference to LPI. The characteristics of each of the two data series are examined below.

3.1 Average Weekly Ordinary Time Earnings

The ABS has based its concept of earnings on the definition adopted by the twelfth International Conference of Labour Statisticians in 1973. Under this definition, earnings refers to remuneration to employees for time worked or work done, as well as remuneration for time not worked (e.g. paid annual leave) (1301.0 - Year Book Australia, 2009–10). The ABS produces several series on earnings paid to employees including: the quarterly Survey of Average Weekly Earnings (AWE) and the bi-annual Survey of Employee Earnings and Hours (EEH). The EEH provides estimates of earnings for employees under various institutional arrangements, such as collective bargaining.

The AWE survey provides three types of earnings measures; average weekly ordinary time earnings (commonly referred to as AWOTE) for full-time adult employees, which relates to that part of total earnings attributable to award, standard or agreed hours of

work; full-time adult total earnings, which includes both ordinary time and overtime pay and total earnings for all employees (including full-time and part-time, adult and junior).

The ABS have specifically argued that AWE data should not be seen as a substitute for or directly compared with wage price index data, which is the building block for the LPI series:[31]

> Period to period movements for the AWE series is not comparable with those from the wage price index. The two series have different purposes. Consequently, they have different concepts, and use different sample selection and estimation methodologies.

However, despite these arguments advanced by the ABS, it has become commonplace for AWOTE and LPI to be put up as alternative measures in energy determinations relating to labour cost escalators under the National Electricity Rules and the National Gas Rules. As such it is important to briefly investigate their relationship.

Figure 1 AWOTE (QLD)

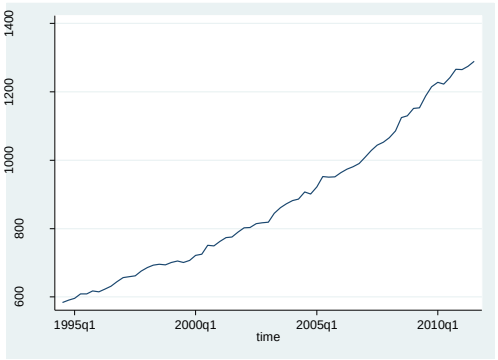
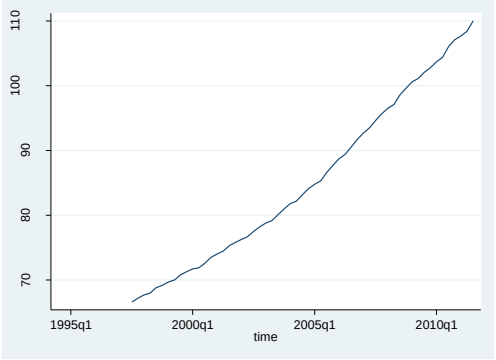


Figure 2 Labour Price Index (QLD)



Source ABS Cat 6345.0 Labour Price Index (various editions)

Both the AWOTE and the LPI are non-stationary series, with a pronounced upward trend.[32] A comparison of the two series in their original form indicates that differences in volatility between the two unadjusted series are not as great as often claimed by DAE and the Australian Energy Regulator. For example, Table 6 lists a number of summary statistics of their behaviour.

[31] Australian Bureau of Statistics (2005) "Labour Price Index; Concepts, Sources and Methods" cat 6251.0.55

[32] Essentially this means that unadjusted (or made stationary) they should not be used in time series analysis where classical hypothesis testing is used.

Table 6 Summary Statistics for Unadjusted AWOTE and LPI series

Variable	Obs	Mean	Std. Dev.	Min	Max	Coefficient of Variation
LPI (QLD)	57	85.35	13.10	66.60	110.00	0.15
AWOTE (QLD)	69	874.38	210.84	583.80	1289.50	0.24

For example, the summary smoothing statistics for the coefficient of variation[33] suggests that in the case of the LPI the standard deviation is approximately 15% of the mean while it is 24% of the mean for the AWOTE series. However, as argued above, both are non-stationary series and a better comparison of their time series behaviour is shown through comparing first differences.[34] Figures 3 and 4 compare the time series behaviour of both series in terms of first differences.

Figure 3 Time Series AWOTE (First Differences)

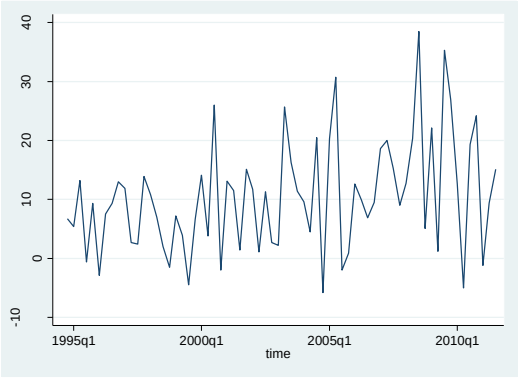
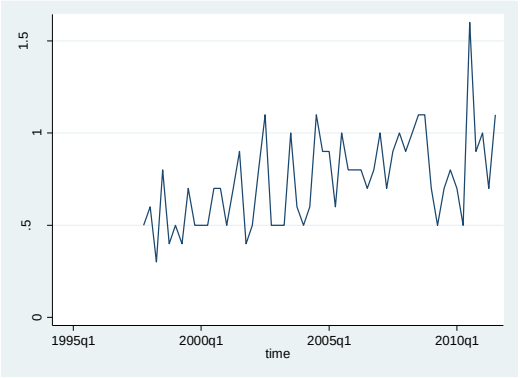


Figure 4 Time Series LPI (First Differences)



Source Derived from data used in figures 1 and 2 using Stata 11 econometrics package

The differenced data shown in Figures 3 and 4 show that on the basis of quarter to quarter differences, AWOTE shows considerably more variation than the LPI. Summary statistics are shown below in Table 7.

[33] Coefficient of Variation = 100*Standard Deviation/Average

[34] Using an augmented Dickey Fuller test both first differences were shown not to contain a unit root, In other words both AWOTE and LPI are I (1)

Table 7 Summary Statistics for the first differenced AWOTE and LPI series

Variable	Obs	Mean	Std. Dev.	Min	Max	Coefficient of Variation
DLPI	56	0.74	0.25	0.30	1.60	0.33
DAWOTE	68	10.38	9.56	-5.80	38.50	0.92

In this case of the first differenced LPI the standard deviation is approximately 33% of the mean while it is 92% of the mean for the first differenced AWOTE.[35] Given the design structure of the LPI, with its restricted regimen, this result is not unexpected.

However, the key point is that greater 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.

Further tests using Granger causality tests show that first differenced LPI and AWOTE series are not good predictors of one another and should not be regarded as alternatives. This confirms that the factors that are not incorporated into the LPI measure but form part of the AWOTE measure are important to the latter series and the underlying variable under consideration. It therefore becomes important to decide which is the more appropriate series in general and when specific to individual industries.[36]

In this context it is important to note here that the LPI is essentially a measure of generalised wage inflation while AWOTE is a measure of average labour costs.

Professor Borland identifies three factors that influence the change in earnings over time:

- compositional change by which the proportion of higher skill workers increases (and which is reflected in higher nominal earnings);
- other productivity impacts on the individual worker apart from skill change; and
- price increases.

[35] First differencing (subtracting the last period observation from the current period to get a one period or first difference) is the standard first line of attack in correcting for non-stationary series in time series analysis. It is designed to allow researchers to proceed with their analysis using classical hypothesis methods

[36] The Granger causality tests were obtained from the diagnostics of a simple VAR between differenced LPI and differenced AWOTE but were not able to reject the null hypothesis of Granger causality].

Borland provides a hypothetical example, in which compositional productivity is set at 40% of the total AWOTE % change which he uses to indicate the potential for the LPI to underestimate true labour cost movements by ignoring compositional productivity impacts.[37]

In contrast, the LPI is set by reference to fixed labour categories and therefore has no compositional effects but some other worker productivity effects and price effects such as those productivity effects caused by improved worker efficiency via better capital equipment. It measures, in essence, the real wage behaviour of particular categories of workers. If this series is adjusted downwards by further assumed productivity increases, as appears to be the case with the DAE LPI productivity-adjusted forecasts for the EGWWS sector, it will understate true labour cost changes.

Two issues arise from this:

1. Where compositional productivity is important the LPI clearly becomes the less reliable series. As BIS correctly argue:[38]

   > "BIS Shrapnel considers the LPI to be a measure of underlying wage inflation in the economy or in a specific industry, as the LPI only measures changes in the price of labour, or wage rates, for specific occupations or job classifications, which are then aggregated into a measure of the collective variations in wage rates made to the current occupants of the same set of specific jobs. The LPI, therefore, reflects pure price changes, but does not measure variations in the quality or quantity of work performed. The LPI also does not reliably measure the changes in total labour costs which a particular enterprise or organization incurs, because the LPI does not reflect the changes in the skill levels of employees within an enterprise or industry." BIS-Schrapnel (2011)

2. How important are compositional labour force changes to Powerlink? I investigate this matter further in section 2.2.

3.2 Compositional change in Powerlink

Central to the issue of comparing the two series becomes determining the importance of compositional labour force shifts and their resultant impact upon labour productivity. This relative importance might be expected to vary across industry and spatial area. Below I consider this issue in the case of the recent labour force experience of Powerlink.

[37] Where compositional productivity shift is set at 2% from a 5% shift in AWOTE, See, Borland (2011) pp.3-4

[38] BIS Shrapnel (2012) Labour Cost Escalation Forecasts to 2016-17, Australia and Queensland (January)

Powerlink has provided data on employment and average wages (by labour force classification) for the period 2008/09 to 2010/11 using the following eight labour categories:

- Administration
- Employment Contract
- Engineering Officer
- Power Worker
- Professional/Managerial
- Supervisor
- System Controller
- Trade/Technician.

[redacted]

It is instructive to decompose the observed increase in earnings bill into these components to obtain an estimate of the relative importance of compositional shifts. To do this, it was decided to concentrate upon the wages and employment [redacted] identified in the eight labour categories, [redacted]

The change in total wage bill may be decomposed into:

- Changes due to additional employment (employment effect)
- Changes due to movements in nominal wages per classification of labour (nominal wage effect)
- Changes due to compositional changes that reflect changes in the relative importance of types of worker by skill (compositional effect)

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

[Employment effect] + [nominal wage effect] + [Compositional Effect]

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

aw_{ij1} average earnings of employees in category i in period j_1

The employment effect is simply the number of new employees (in the eight labour categories times the average wages for each category) on the assumption that there has been no compositional change. The nominal wage effect is found by multiplying the number of existing employees in each category in period one by the change in the average nominal wage in between the periods.

The compositional effects are found by differencing from the sum of total earnings in each category in period two from the total earnings that would have been paid in period two if the composition of the expanded workforce (the relative share of each category of labour) had been fixed to that operating in period one; that is if the workforce would have expanded proportionally.

Populating this equation suggests that the total change in earnings across the eight selected groups over the two year period can be decomposed into:

- 56.0% due to increasing the size of the workforce
- 27.0% due to the rise in nominal pay rates across each employee category
- 17.0% due to changes in composition of the workforce between the employee classes).

The role of compositional change may also be seen in terms of the rate of increase in the average wage over the period 2010/11 to 2008/09. Again using the examples of the eight labour groupings, the average wage for these workers over the period rose [redacted] If the compositional structure of the workforce had remained unchanged from the proportions of 2008/09, the rise in average wage would have been constrained [redacted] In other words compositional change raised the average wage by 2.7% over the 2 year period.

This compositional impact is driven entirely by the increase in the numbers of individual employment contracts and the associated higher average earnings.[39] Table

[39] The absolute numbers of some higher paid groups fell, probably substituted by contractors

8 indicates the percentage impact of increased number of workers on individual employment contracts.

The increase in number of employees on individual employment contracts is likely to reflect an upgrading of the skill base of the Powerlink labour force in response to labour market pressures facing the company in its preferred labour markets. By and large, workers move to individual employment contracts to earn higher income, including in a constrained labour market where employers have little choice but to meet the market median wages for skills in short supply.[40] I regard this to be the situation currently facing Powerlink and one unlikely to change materially in the medium term given the tight labour market conditions that are expected to prevail in Queensland (as discussed in Section 2 of my report).

Company data indicates that most individual employment contracts are in the professional, managerial and trades areas, which is indicative of workers utilising a tight local labour market.

Finally, the company has instituted an Approved Training Plan (ATP) involving training and competency progression within employee roles, which has resulted in a skill-augmented wage increase of approximately 1.5% per annum over the last 10 years and 1.4% per annum over the period 2007/08 to 2009/10.

3.3 Other Indicators of a tight labour market

Other company supplied data (from July 2011 onwards) supports the view of a tight local labour market.

[40] Mangan, J (2000) "Workers without Full-Time Employment; an International Study of Non-Standard Employment, Edward Elgar, London, pp. 3-12

[redacted]

This data supports the view that Powerlink is operating in a tight labour market. For example, Kelly HR/First report that across Australia, on average vacancies are filled in 2 to 6 weeks (14 to 42 days). Some key Powerlink positions are taking 2.5 times that period to be filled.[42]

Finally, Powerlink's wages bill is impacted by institutional agreements which will tend to make wages downwardly rigid over the term of collective agreements. For example, approximately 80% of employees are covered by enterprise agreements with additional flexibility reflected in having 20% of employees working on individual employment contracts.

[42] See, http://www.smartmanager.com.au/res/content/au/smartmanager/en/docs/kelly_services_measuring_cost_per_hire.pdf

4 The appropriateness of using economy-wide macroeconomic wage models in localised labour markets

DAE's real labour cost forecasts are based on their use of the LPI as the preferred wages escalator for the EGWWS sector within their National Macro Forecasting Model (AEM). For reasons outlined in section 2, I agree with Professor Borland, BIS-Shrapnel and Economic Insights that this is not the appropriate earnings measure to use for this purpose.

I also have concerns, originally raised in Synergies (2007)[43] about DAE's overall modelling approach, particularly the suitability of using large Australian economy-wide models to deal with industries and regionalised labour markets where skill shortages, labour force competition and upward wages pressure are a characteristic feature. In the final analysis, one of the tests of the outputs from modelling is how their results equate with other known or highly likely outcomes.

Consequently, in the likely labour market within which Powerlink will be operating, at least until 2017, predictions of negative real labour costs for Powerlink's operations over this period as proposed by DAE do not appear plausible.[44] Specifically, I disagree with the overall approach used by DAE beginning with their decision to model Powerlink's labour costs within the Utilities labour market without properly accounting for localised labour market factors.

The latest DAE Report (2011), particularly in its analysis has similarities with its conclusion made four years earlier, particularly their view of the behaviour of wages and labour costs in the Utilities sector. Essentially their arguments were and are:

- The Utilities sector in Australia has benefited from a long period of above national average growth in wages up until 2008/09 and will inevitably start to slow and return to be more in line with national trends (the 'adjusting markets' argument).
- Skill shortages in the industry which, in part, drove these above-average wage increases will inevitably be neutralised by increased labour supply from educational and training institutions. Similar predictions were made for the related industries of Mining and Construction.
- State and localised labour markets will conform to wage adjustments and labour market adjustment models embedded in DAE's AEM model.

[43] Synergies Economic Consulting (2007), Review of Wage Growth Forecasts (February)

[44] Deloitte Access Economics (2011), Forecast growth in labour costs: Queensland and Tasmania, p 72.

Synergies (2007) argued that the AEM model lacked transparency in terms of its adjustment mechanism and, as a result, it was difficult understand how much account it took of State and localised labour markets and conditions in specific industries. Part of that criticism has been addressed.[45] 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.

In general, errors in economic modelling can result either independently or by the interaction of two factors:

- the use of incorrect information or assumptions being fed into the model; and/or
- a misspecification of the model, whereby the structure of the model is not suited to accurately modelling the industry, spatial area or economy in question.

I believe both types of error are occurring in relation to the measurement of labour cost escalation for Queensland and Powerlink. This is occurring in a number of ways.

First, 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. As previously argued (in Synergies, 2007, p 11) there are substantial intra-Utilities differences in skills and labour market positions between electricity workers and those in gas, water and sewerage services. For example, within the EGWWS there are a number of differentiated activities which require different labour force skills. There are a relatively large number of segmented labour market areas within the EGWWS industry including:

- Electricity, Gas, Water and Waste Services
- Electricity Supply
- Electricity Generation
- Electricity Transmission
- Electricity Distribution
- On Selling Electricity and Electricity Market Operation
- Gas Supply
- Water Supply, Sewerage and Drainage Services

[45] DAE (2011) Forecast growth in labour costs: Queensland and Tasmania, Appendix C, p. 93-104

- Waste Collection, Treatment and Disposal Services
- Waste Collection Services
- Waste Treatment, Disposal and Remediation Services

It is well established (Synergies, 2007) that employers in the electricity supply industry seeking skilled and semi-skilled labour are more likely to be in competition for labour with employers in the Mining and Construction industries than with employers in the water collection, treatment and disposal services sub-industry or other sub-industries within the EGWWS sector. In this sense the use of data from the broad Utilities sector to proxy labour cost movements in the electricity supply industry without considering and adjusting for the specific labour market and localised circumstances of the latter is likely to lead to errors in prediction.

The correct labour market to make pronouncements about potential skill shortages would be an amalgam of the mining, construction and electricity supply labour markets. While this is not as convenient and straightforward as using the Utilities sector it would make much more sense in terms of labour supply cross-elasticities at play and set a much more realistic framework for judging the tightness of the Labour Market facing Powerlink. I note that DAE used an approach in 2007 broadly consistent with this intent, which was adopted by the AER.

In this context, I am unaware of any commentator, including DAE, that sees anything other than a prolonged skilled labour shortage for the Mining and Construction sectors within regional Queensland, nor one that is predicting negative real labour costs for firms in those industries. For example, the April (2011) Clarius Skills index, which provides a measure of underlying demand and supply of skilled labour in Australia, stated:[46]

> The shift of resources to support flood recovery efforts is impacting upon Australia's construction and engineering sector .

The Clarius report Index went on to suggest:[47]

> The sector is also bearing the brunt of the resources boom, which is adding to competition and wage pressures for talent – particularly in Western Australia and Queensland. The demand for skills in the mining, oil and gas sectors has also

[46] Clarius Index (2011) " Dire Shortages in Construction and Engineering Sectors" Quarry Magazine, April 29, 2011

[47] ibid

> remained high, particularly for electrical engineers, technicians and construction project managers.

Similarly Senator Chris Evans, Minister for Tertiary Education, Skills, Jobs and Workplace Relations in his address to the National Press Club (21st September 2011) stated:[48]

> I'm sure you are all aware that qualified trades people – be they working in small business or construction or mining - command very competitive wages because their skills are in high demand... That demand has recently grown steadily, and all the forecasts tell us that there is no sign of it slowing.
>
> In the short term we know there will be a spike in demand for skilled workers in the mining and construction sectors as $430 billion in mining investment comes on stream.

It is acknowledged in DAE (2011) that there is labour market cross-over occurring between electricity workers and workers in mining and construction but curiously this is not seen as sufficient to modify their conclusions of an easing in labour supply constraints within the EGWWS sector.

In part this conclusion is a continuation of their forecast of negative growth in employment for the EGWWS up until 2025, which is predicted in 2009 and which is discussed in section 3. As such DAE's assessment is logically consistent, in the sense that where employment growth is low or negative there will be fewer supply pressures on wages.

However, I showed that this prediction was at considerable odds with the DEEWR/Monash predictions of relatively strong employment growth in the sector at least until 2016. I am also unaware of any other forecaster that predicts negative employment growth for this sector over any part of the next 5-7 years. For example, BIS Shrapnel are forecasting employment growth for the Queensland EGWWS sector of 2.9% per annum over the 2012-17 period.[49]

The other contributing factor to the DAE prediction of easing labour supply constraints in the EGWWS sector is their assumption that labour shortages can be eliminated through labour supply increases via increased workers from educational institutions and migration.

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[48] Senator Evan's remarks cited in www.nationalvisas.com.au/blog/australian-news

[49] BIS Shrapnel (2011), Labour Cost Escalation Forecasts to 212-17 – Australia and Queensland, Final Report (January).

Mangan and Trendle (2008, 2010) show the sensitivity of VET completions to economic conditions, in part explaining the high drop-out rates for apprenticeships to the fact that students who only completed modules rather than entire courses could command high wages in mining and elsewhere and therefore had little incentive to complete courses, which in fact constituted an opportunity cost to their earnings.[50]

In high demand periods, educational institutions in VET have been shown to be unlikely to be able to supply industry needs, heightening the demand for skilled migration.

In other words, the supply conclusions made by DAE in their 2008 report proved wrong (note the increase in skilled employment contracts at Powerlink since 2008/09, discussed in section 3) and are even less likely to be correct over the period up to 2016 in the light of the widespread forecasts of excess labour demand across the related activities of mining and construction. This is particularly so in Queensland where the Queensland Treasury argues that labour force participation is expected to peak at 67.5%.

The Reserve Bank of Australia has examined patterns of regional labour market adjustment in Australia over a number of years.[51] This research has demonstrated the difficulties experienced by regional labour markets in Australia to adjust to conditions of diseqilibrium (excess demand or excess supply).

Moreover, the evidence worldwide demonstrates the relative slowness at which regional labour markets respond to excess demand pressure during periods of growth. Brosesma and Van Duk (2001) in their study of Dutch labour markets, which are argued to be among the most efficient in the world and where inter-regional migration is much easier than in Australia in terms of distance, find that even the most flexible of regional labour markets take up to 5 years to adjust on the downswing (from an exogenous downward shift in labour demand) and on the upswing (from excess demand situations).[52]

Accepting that current labour shortages exist in the Powerlink region and that competition from mining and construction will be intense, there seems little likelihood

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[50] See, Mangan, J. and Trendle, B. (2010) "Cancellation of Indigenous Persons from the Apprenticeship Contract" Education Economics, Vol.18, No. 4, December 2010, pp.377-394 and Mangan, J. and Trendle, B. (2008)) Surviving Apprenticeships Surviving Apprenticeship Training: A Duration Analysis of Apprenticeship Contracts in Australia', Journal of Interdisciplinary Economics, Vol. 19 No. 4, December 2008, pp. 379-398

[51] See for example, Debelle G and J Vickery (1998**), "**.Labour Market Adjustment: Evidence on Interstate Labour Mobility", Reserve Bank of Australia Research Discussion Paper 9801.and Dwyer, J. And Lawson, J. (2002) "Labour Market Adjustment in Regional Australia" Reserve Bank Discussion Paper 2002-04.

[52] Broesma, L and Van Duk, J (2001) "How do Dutch Labour Markets adjust to Demand Shocks" Regional Science Paper Series , University of Groningen, Netherlands

that the skill labour shortages will be relaxed within the 2011-2017 period. This fact highlights one of the problems of macro models of wages and employment. They invariably assume fairly rapid monotonic adjustment[53] of wages and employment. At the national level this is not an unrealistic assumption as markets will eventually adjust.

However, all the evidence in the Powerlink region indicates continuing labour market disequilibrium for a considerable period driven by intra-regional and interstate demands for skilled labour.

The monotonic adjustment problem extends to the specification of the wage adjustment mechanism in DAE's AEM model. The argument raised above is strengthened by the likelihood that real wage rigidity mechanisms will be operating in the EGWWS market and among other skilled workers in Australia for the foreseeable future. For example, where strong institutional pressure exists and in the presence of binding institutional agreements real wages will be sticky both an absolute and relative sense.[54] As a result, Hyclak, Johnes and Thomas (2005) argue that real wages are unresponsive to excess labour supply in the short run.

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. This implies a competitive market adjustment mechanism of the form outlined in Synergies (2007) specifically:

$q_d = D(pt-1)$ (1)

$q_s = S(pt-2)$ (2)

$dp/pt = f(E)$ (3)

$E = \alpha (qd - qs)$ (4)

Where, q_d = labour demand, q_s= labour supply; E is the level of excess demand, p is the real wage and α is the reaction coefficient which determines the speed of adjustment to excess demand.

Equation 1 indicates that in the main. Labour demand is a function of one period lagged wages (price). By contrast labour supply q_s is also a function of lagged wages by a longer lag (two period lag), so supply lags demand. This leads to wage adjustment

[53] This suggests an adjustment process that is continually moving in one way (monotonically) so the market adjusts smoothly and in one direction. This assumption of consistency in the adjustment pattern is an efficient way to solve a model but rarely reflects the high level of fluctuations that characterised dynamic labour markets

[54] Hyclak, T., Johnes G. and Thorton, J. (2005) *Fundamentals of Labor Economics, Houghton Mifflin, Wisconsin* for a discussion of the real wage rigidity model and its likely occurrence in supply constrained markets

(equation 3) and the speed of that adjustment is determined by the extent of the original difference (excess demand) in labour demand and supply (equation 4).

The reaction coefficient may be decomposed into 2 components: the pure excess demand factor β; and the institutional factor ψ, which measures the impact of institutional factors, such as collective agreements, union pressure and statutory regulations in slowing down the labour market.

The key point here is that DAE place too much emphasis on the excess demand factor, β and not enough emphasis on the institutional factor (ψ) because even if DAE are right on excess labour supply it will not depress wages in the fashion they argue because of institutional pressures.

The presence of widespread collective agreements emphasise the importance of institutional factors. At the same time these agreements reduce the potential strength of the excess demand factor, particularly if they extend for a reasonable period (3 to 5 years) and have built-in productivity and other bonus payment agreements. This is because they constrain upward wage movements.

It has been shown that around 80% of Powerlink's workforce is under collective agreements while the other 20% are under individual employment contracts which have shown wage increases in recent years which are reflective of strong labour supply competition in the area.

5 Summary and Conclusions

In considering the use of the LPI series and other aspects of the DAE modelling of real labour cost escalators in the case of Powerlink, I use three criteria of assessment:

- Theoretical soundness
- Empirical performance
- Plausibility

5.1 Theoretical soundness

I believe AWOTE to be a more comprehensive index for assessing shifts in real labour costs in general and specifically within the EGWWS sector. This is because of its recognition of compositional-induced productivity effects and additional payments, such as productivity bonuses.

In the case of Powerlink it was found that primarily through the trend to more workers on individual employment contracts, there was evidence of a significant compositional shift over the period 2008/09 to 2010/11. On past trends and in view of the current state of the labour market in Central and Northern Queensland, these trends are likely to continue.

To ignore these labour market realities and their impact on real labour cost escalation would be harmful to Powerlink and understate the real costs faced by the company in operating in this market.

Furthermore, the company will, for the foreseeable future, be operating in a competitive labour market with the mining and construction industries. This will lead to labour cost escalation through nominal wage inflation, increased recruitment costs and high turnover costs through labour market competition.

In my analysis, it was shown that while LPI is a more stable quarterly series than AWOTE, its restricted regimen will tend to provide underestimates of both real wage increases and real labour cost increases. This weakness in the LPI appears to be borne out in consideration of empirical results discussed below.

Finally, the issue of workplace compositional change (and its productivity implications) is often raised. It is an acknowledged weakness of the LPI. However, this weakness is often down played by arguing that while this issue is theoretically valid its empirical importance is limited.[55]

[55] See, Deloitte/Access Economics "Response to Professor Borland", Report prepared for the AER, April 2011

I agree that the significance of compositional productivity will vary across industries and across time. However, a decomposition of actual labour force data for Powerlink between 2008/09 and 2010/11, undertaken in section 3 of this report, showed that compositional change contributed approximately 17% of the observed increases in payments to its labour force. In the context of the current and likely future labour market conditions facing Powerlink, this level of compositional change is likely to continue.

5.2 Empirical performance

Borland shows that, over the period 1997/98 to 2009/10, the AWOTE series grew at an average rate of 4.55% per annum, which tracked the combined CPI + Labour productivity growth (4.45%) better than the LPI series (3.65%).[56]

In addition, Synergies (2011)[57] and BIS Shrapnel[58] (2011) have compared DAE's Australian LPI forecasts against actual changes in the LPI for a number of sectors over the period 2006-07 to 2010-11. They found evidence to indicate that DAE's AEM Model appears to be systematically under-forecasting growth in the Australian EGWWS LPI series.

BIS Shrapnel also found that the actual reported LPI data does not support DAE's persistently held view, reflected in its forecasts, that higher LPI growth for the Australian EGW/EGWWS sector relative to the 'All Industries' total is not sustainable.

The Synergies and BIS Shrapnel data raises legitimate concerns about the empirical performance of DAE's model in relation to the EGWWS sector both at a national level and, as discussed in detail in my report, at the State and regional levels.

5.3 Plausibility

Ultimately an important diagnostic check of the validity of economic forecasts is whether or not they fit in with what is confidently known about the environment within which they are to be used. Put simply, model predictions should, in the main, be compatible with other available robust data about likely future outcomes.

The scenario presented by DAE is that a company competing for labour in the regional Queensland labour market against the mining and construction industries during an

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[56] Borland, J. (2011), p 9

[57] Access Economics, 2007, Labour Cost Indices for the Energy Sector, April, pp. 70-71.

[58] BIS Shrapnel (2011), pp 53-56.

expected resources and associated infrastructure boom will have declining real unit labour costs over four of the 5 years of the next regulatory period up to 2016-17.

I do not consider this scenario to be plausible given available robust data about likely labour market conditions. Such a scenario becomes even more unlikely when it is known that the company has, in recent times, needed to employ increasing numbers of high cost skilled employees under individual employment contracts and has an enterprise agreement in place for around 80% of its workforce.

It is widely accepted that growth in the Queensland labour market and the Queensland economy is, barring any new natural disasters, almost assured. As well, this will lead to increased competition for skilled labour in all spatial areas but particularly, in the case of Powerlink, intra-regional and inter-state areas.

Economic theory would suggest that in the face of excess labour demand and strong labour market institutions, real wages (and hence real labour costs) do not fall except where exceptional productivity gains can be made. The recent productivity behaviour in Australia and within the electricity industry and broader EGWWS sector makes such a scenario unlikely.

In short, DAE's real labour cost forecasts for the Queensland EGWWS sector do not align with the known expected parameters of the Queensland and regional Queensland labour markets in the 2012-17. As a result, they are inappropriate to be applied to Powerlink as the basis of their reasonably expected real labour costs over this period.

5.4 Expert witness declaration

I confirm that I have undertaken this engagement having regard to the Guidelines for Expert Witnesses in Proceedings in the Federal Court of Australia. In doing so, I have made all the inquiries that I believe are desirable and appropriate and no matters of significance that are relevant have, to my knowledge, been withheld from the Court.

A Curriculum vitae

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Professor John Mangan

In brief

Professor Mangan is currently employed as Associate Dean (Research) within the Faculty of Business Economics and Law at the University of Queensland and as Professor of Economics within the School of Economics and is a principal of Synergies.

Professor Mangan has held a number of other labour market research positions largely focussing on the Queensland Labour Market. From 2001-2006, he was the Director of the Centre of Economic Policy Modelling (CEPM) at the University of Queensland (UQ) and concurrent with that position, he held senior research positions in the Queensland Government, including the inaugural Director of the Labour Market Research Unit (LMRU) within the Department of Employment and Industrial Relations; a Professorial Fellow within Queensland Treasury and the Eminent Scholar in Residence in the Department of Education and Training (2008).

Professor Mangan's main areas of interest are in Labour Economics, Regional Economics and Economic Modelling. He has published over 70 refereed publications, 5 books authored or edited and a large number of consultancy reports. Recent publications (2010/2011) have appeared in Education Economics, Applied Economics, The Economic Record and the Journal of Sports Economics. He has written a number of papers and reports examining skill related areas with a particular focus on the Queensland labour market.

Qualifications

Bachelor of Economics, University of Queensland, 1971

Diploma in Education, University of Queensland, 1972

Master of Economic Studies, University of Queensland, 1976

Master of Arts, University of Lancaster, 1977

PhD, University of Lancaster, 1981

Key appointments

2004 – Present Director, Synergies Economic Consulting

2006 – 2007 Consultant to Bahrain Government on Skills Formation in Bahrain

2001 – 2003 Director Labour Market Research Unit, Queensland Government

1999 – 2003 External Member, Queensland Jobs Council

1999 – 2001 External Consultant, Department of Premiers and Cabinet

1993 – 2004 Economist/Director, Queensland Treasury

1991 – 1993 Economist, Trade Practices Commission

1990 – 1991 Economist, Industry Commission

Skills and capabilities

- Applied economic and social modelling
- Economic impact analysis
- Human resource management
- Workplace health and safety
- Applied micro-economics

Relevant Reports and Publications

Reports:

- 'Variation in apprenticeship cancellation across regional Queensland', (with B. Trendle), Labour Market Research Unit Working Paper Series, Department of Education Working Paper No. 58, October 2008.
- Mangan, J (2006). 'The Efficiency of Vocational Education in Australia' report undertaken for NCVER'.

  This report examined the operational efficiency of Vocational education by using a number of indicators. These indicators related to student outcomes, cost effectiveness of TAFE service delivery, and the use of an econometric model to examine returns to Vocational education in both an absolute sense and in comparison to other forms of tertiary education. The report formed part of a review into the effectiveness of vocational education in skills formation in Australia.
- Mangan, J (2005). 'The Regional Distribution of Skills in Queensland, report undertaken for Queensland

Treasury.

This report used small area data over successive Census to examine the distribution of skills in regional and rural Queensland. These data were then used as part of a Data Envelopment Analysis (DEA) to determine the relative efficiency of skills distribution by industry and occupation within Regional Queensland and to provide policy responses to perceived skill shortages.

- Mangan, J. & Trendle, B. (2002). 'Changing skill composition of employment in Queensland', Working Paper No. 6, Labour Market Research Unit, Department of Employment and Training.

  This study used shift-share analysis and dynamic shift share to measure shifts in skill distribution in Queensland. These results were used to simulate various policy options for removing skill bottlenecks.

- Mangan, J. & Hagan, P. (1996). 'Skill development and economic performance with special reference to vocational and educational training in Queensland, Working Paper No. 41, Labour Market Research Unit, Department of Employment and Training, Brisbane.

Publications:

- Mangan, J. & Trendle, B. (2010). Cancellation of Indigenous Persons from the Apprenticeship Contract, Education Economics, 18(4), December 2010, pp. 377-394.

  The study used duration and survival analysis to examine the determinants of high drop-out rate s for Indigenous apprenticeship in Australia. The study identified the relative significance of factors such as income, age, gender and education levels. Simulations involving shifts in these variables were then used to examine the potential effectiveness of policy initiates designed to reduce attrition.

- Mangan, J. & Trendle, B. (2008). Surviving Apprenticeship Training: A duration analysis of Apprenticeship Contracts in Australia, Journal of Interdisciplinary Economics, 19(4), December, pp. 379-398.

  This study examined the high drop-out rate among Australian Apprentices by using duration analysis econometrics. The duration model identified the most important factors in determining this high drop-out rate and was then used to investigate the potential impact of policy responses on reducing the attrition rate.

- Mangan, J. & Borooah, V. (2008). Education, occupational class and unemployment in regions of the United Kingdom, Education Economics, 17(2), May 2008, pp. 1-19.

  This study used logit and ordinary regression analysis to measure the impact of human capital (skills and formal education) in reducing unemployment by occupation across UK regions. It was the first study to measure returns to human capital in terms of the probability of securing desired employment instead of the traditional wages approach.

- Mangan, J. (e.d.) Reducing Unemployment in Queensland, DETIR 2001.

  This report was commissioned by the Queensland Government to examine ways of reducing unemployment in Queensland below its then (9 per cent) unemployment rate. The report developed a model of employment and identified those factors most likely to increase job production and increase labour force participation in Queensland. The report contained contributions from other leading Australian economists.

- Mangan, J. (2001). Workers without full employment: an international study of non-standard work, Cheltenham: Edward Elgar.

  This was the first book to examine the growth of non-standard employment across a range of economies including; Australia, UK, U.S.A, Japan and France. The book tested for similarity of labour market responses across these countries and examined the factors leading to the growth in non-standard employment. It concluded with an analysis of the social and economic implications of these trends in the labour market including the impact on income distribution and skill formation.