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| Modelling of the Macroeconomic Impact of the Fair Pay Commission’s Minimum Wage Decisions  2006-2009 |
| **Report prepared for the Fair Pay Commission** |
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Outlook Economics is an Australian based economic consultancy, established in 2009, that specializes in economic modelling, policy analysis and forecasting. Staffed by former Treasury officials we provide professional, independent and timely analysis of the economic outlook, events and policies. Outlook Economics is independent and non-partisan – funded only by subscriptions to its models and forecasts, and by commissioned research and reports.

This report was prepared in conjunction with the Centre for International Economics utilising the CIE’s version of the Monash University Centre of Policy Studies MMRF Model for the detailed long-run state results for occupations by industry in Appendix B.

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# Executive Summary

The modelling has been commissioned to examine the macroeconomic impacts of the Commission’s minimum wage decisions.

The original brief was to analyse the effects of the three decisions from 2006 to 2008 and to test the sensitivity of the results to different modelling assumptions. However as the economy slowed sharply in late 2008 and early 2009 with the onset of the global financial crisis, it became apparent that an important issue was the likely impact of minimum wage increases in a deteriorating labour market. Consequently this work was extended to examine the impact of the Commissions decisions under different scenarios for the labour market over the next few years. This is reflected in the structure of the report. The first part provides a detailed analysis of the impacts of the Commission’s decisions from 2006 to 2008, while the second part examines the effect of future minimum wage increases under different scenarios for unemployment.

* The model results suggest that, in the absence of the Commission’s decisions through 2006 to 2008, unemployment would have been around 0.05 of a percentage point lower at the end of 2009, and employment about 8,000 higher.
* It is important to note that this result depends on the counterfactual, or what is chosen as a benchmark for the simulation. The above results are for a counterfactual where there are no changes in minimum wages over the three years.
* However, minimum rate wage changes were less than those in the market between 2006 and 2009. Hence, rather than adding to wage growth, it could equally be argued that the Commission’s decisions helped to restrain wage growth during the period, thereby reducing inflationary pressures and leading to higher aggregate employment growth and lower unemployment than otherwise.
* Whichever benchmark is used the aggregate employment and unemployment effects appear small when compared with the employment effects estimated in previous modelling exercises examining Australian Industrial Relations Commission (AIRC) safety net increases.
* This is not due to any significant difference in employment elasticities in the models used.
* The main reason for the smaller employment effects relative to previous studies is that the proportion of employees reliant on awards (or more correctly Pay Scales) has fallen over time. The AFPC award wage increases are directly affecting a much smaller proportion of workers (12.5 per cent of employees in 2008) compared to around 25 to 30 per cent for the AIRC decisions in the late 1990s.
* Moreover, as average weekly earnings of Pay-Scale-reliant employees are relatively low, half that of other employees, the impacts on overall labour costs are even smaller. (Earnings of federal Pay-Scale-reliant workers account for only around 6 per cent of wage costs for the economy as a whole.)
* In addition the labour market was much tighter in the boom years of 2006 to 2008 compared with earlier periods. This affects the decisions impacts in two ways.
* Firstly, in a tight labour market there would be greater leakage of Pay-Scale-reliant workers onto over-award payments if there was no mandated increase.
* Secondly, in a tight labour market unfilled vacancies are at much higher levels. In that situation, when aggregate employment demand increases, part of the increase shows up as a rise in unfilled vacancies rather than a rise in actual employment.
* For the same reasons a given rate of minimum wage increase would have a larger effect in a deteriorating labour market.
* When employment is falling and unemployment is high, wage increases available from the market are low. In those circumstances there would be little or no leakage of Pay-Scale-reliant workers onto over-award pay. Rather the reverse would be the case.
* When unemployment is high, unfilled vacancies are low and hence there is a relatively direct translation of changes in employment demand into actual employment.
* The model results suggest that if the Commission were to continue to raise minimum wages in the current year and future years at the same rate as it did in 2008, then the impacts on employment and unemployment in the deteriorating labour market would be larger.
* Instead of impacts of around 0.05 of a percentage points on unemployment, the impacts would be: around 0.1 of a percentage point if the unemployment rate were to rise to 7 per cent in 2009-10; and 0.12 of a percentage point if the unemployment rate were to rise to 8 ½ per cent.[[1]](#footnote-1)
* For employment the respective numbers are 17,000 and 20,000 compared to a 8,000 impact for the historical simulation.
* Again these numbers are highly dependant on the counterfactual which is for no award wage increase (although in this case the counterfactual is much more in line with likely market outcomes for low paid workers.)
* There are also a large number of caveats to the model estimates. As always they should be interpreted with caution.
* For example one key aspect of the impact of minimum wage increases is what would happen to wages in the absence of the wage increase. The analysis presented in the report suggests that this would depend on the state of the labour market at the time. For the historical simulation the assumption is made that some Pay-Scale-reliant workers would have received an increase from their employers over the three years if there had been no increase in the Pay Scales. This is in part because of the tight labour market at the time and the fact that other workers on similar income levels were receiving larger increases than those mandated by the Commission.
* If on the other hand we were to assume that no Pay-Scale-reliant worker received an increase over the three years, then the estimated employment impact by late 2009 would have been larger at around 13,000 additional jobs and the unemployment rate 0.07 of a percentage point lower.
* While the responses in the model reflect the average response to wage changes in history, there are ranges of uncertainty around the estimated relationships and a number of special factors that need to be accounted for in the case of minimum wage increases. For example the impacts of award wage changes will be felt mainly in low income households, whereas the model uses a representative average household in modelling consumption responses.
* Finally while the macroeconomic impacts of the Commission’s decisions have been small, the impact on particular industries and occupations over time has been larger.
* The largest long run effects by occupation and industry are for elementary clerical sales and service workers and for the accommodation, cafes and restaurants sector. In the absence of the Commission’s decisions through 2006 to 2008, employment would eventually be 0.3 and 0.4 per cent higher for this occupation and sector respectively, and 0.8 per cent higher for elementary clerical sales and service workers within the accommodation cafes and restaurants sector.

The Commission has also asked us to address a couple of specific questions.

The first is whether the elasticity of the employment response changes with the cycle – whether employers are more sensitive to wage changes in a downturn than during a boom?

* Certainly the proposition seems plausible. There are many instances in behavioural economics where threshold effects and pricing points are important. Therefore a wage rise during a boom would possibly have different employment impacts from that during a downturn, particularly for firms under financial pressure.
* However we are not aware of any quantitative evidence to support that conjecture in the Australian context. That suggests that if such an effect is present it is not large enough or widespread enough to be reflected in the aggregate or industry-level data.[[2]](#footnote-2)
* The models unfortunately are estimated at the industry level and do not have the firm level detail that would be required truly to test this issue (to confirm or invalidate the hypothesis). The employment demand elasticities with respect to wages do not vary over the cycle in the AUS-M model. However there are large cyclical variations in the relation of employment to output contained in the model’s employment equations. At the start of a downturn, labour productivity tends to fall as firms hoard (particularly skilled) labour in the face of declining demand. At the start of a recovery it tends to rise as work intensity increases before firms feel impelled to put on more staff.[[3]](#footnote-3)

The second question is whether an increase in minimum wage scales would lead to an increase in household consumption via their effect on household income?

* The short answer is: yes, in the very short term, but no in the medium to long term. Household income does increase in the first few quarters after a wage shock leading to a small rise in consumption. But this is quickly reversed as employment falls in response to the wage change, and as rising prices gradually wipe out the real value of the initial increase in income. At the same time, profitability is a little lower and interest rates are slightly higher leading to a fall in investment. This in turn leads to lower demand adding to the fall in employment and household income. After around two years (in the case of a continuing wage shock) consumption is lower than it would have been otherwise. Again there are many caveats around the model estimate of the size of the consumption response.

# Modelling of the macroeconomic impact of the Fair Pay Commission’s minimum wage decisions

## Introduction

Between December 2006 and October 2008 the Australian Fair Pay Commission (Commission) raised the Federal minimum award wage by 12.2 per cent or $59 dollars, taking the weekly rate from $484 to $544. Minimum wage rates for higher classifications increased to a smaller degree. The increases took place in three stages, with the first being delayed by several months relative to the previous timing of the Australian Industrial Relations Commission’s Safety Net Wage increases. Over the same period the labour price index rose by 14 per cent, average ordinary time earnings rose by 16 per cent and consumer prices by 9 per cent.

The Commission increases were unexceptional compared to previous increases by the Australian Industrial Relations Commission (AIRC). Over the period 1997 to 2005 the AIRC increased the minimum wage by 35 per cent while consumer prices rose by 19 per cent, an increase of around 1.5 per cent per annum in real terms. In comparison the Commission increases represent about 1 per cent per year in real terms.[[4]](#footnote-4)

Previous modelling work has indicated that the AIRC increases had come at a cost in terms of lost employment, lower output and higher unemployment. Treasury estimates of the four AIRC decisions to 2001 using the TRYM model put the cost in terms of lost employment at 60,000 jobs with the unemployment rate 0.4 of a percentage point higher than it otherwise would have been in 2001.[[5]](#footnote-5) Results with larger orders of magnitude were reported by the Monash Centre for Policy Studies using the Monash model in 2005. The Monash study put the cumulative employment effect of the AIRCs decisions over 1997 to 2005 at 5.3per cent, or 510,000 jobs.[[6]](#footnote-6) Econtech in 2006 estimated the employment loss from a 1 per cent increase in all award rates at 0.5 per cent or 53,000 jobs.

However the AIRC increases were granted at a time when unemployment was still high. The unemployment rate was 8.4 per cent at the beginning of 1997, with much higher rates for unskilled and low skilled workers. The AFPC increases in contrast came at a time when the labour market was very buoyant. This was a period of falling unemployment (unemployment hit 3.9 per cent in early 2008 and averaged 4.3 per cent through 2007 and 2008). The economy was booming with high commodity prices and a rising exchange rate offsetting the impact of increasing wages on the CPI.

This report looks at the impact both of past and prospective increases in award wages by the AFPC. The first part looks at the historical experience of the impact of the wage increase through 2006 to 2009, tracing through the effect of the minimum wage increases by occupation and industry. The second part looks at the likely impact of future AFPC decisions at this time of exceptional uncertainty. Given that uncertainty a number of scenarios are explored. The model assumptions underlying those scenarios is set out in Appendix A on the model’s outlook.

Much of the more technical or detailed material in relation to the modelling is contained in the Appendixes.

## What is the shock? – Estimating the wage increase.

The first question is what impacts have the Commission decisions had on wages paid? Once an estimate of the wage increase has been made, that estimate is introduced into the models to gauge the impact on output, employment, prices and other macroeconomic, industry and occupation variables.

To answer this wage impact question we need to briefly explore three things. The first is the evolution of wage setting and the changing share of workers who are award reliant. The second is the state of the economy during the period and what increases award workers would have received in the absence of the mandated increases by the Commission. And finally we need to consider the flow on of minimum wage increases to those on over-award payments either via informal individual agreements or by enterprise agreement.

To put it briefly – there are two very large differences between earlier wage increases and those granted by the Commission. The first is that the Safety Net increases granted through 1996 to 2005 applied directly to a much larger percentage of the workforce. They were also granted at a time when the unemployment rate was much higher. In contrast the Fair Pay Commission increases directly impact a smaller percentage of employees, and were granted at a time when the labour market was much tighter.

*Developments in the wage setting system*

The key developments in the wage system over the last twenty years have been:

* The progressive encouragement of decentralised bargaining in the late 1980s and the formal introduction of enterprise bargaining in 1991 under the sixth Price and Incomes Accord (Accord Mark VI); [[7]](#footnote-7)
* The Workplace Relations Act 1996, which further expanded the role of enterprise bargains, introduced Australian Workplace Agreements as an alternative to collective agreements, abolished paid rate awards and required the AIRC to simplify award conditions to allowable matters. The AIRC was for the first time required to make decisions with regard to economic conditions and the “desirability of a high level of employment”. While required to set wages in a way which encouraged enterprise bargaining, it was also required to have regard to maintaining a relevant system of wage relativities and a safety net for low paid workers.
* The Workplace Relations Amendment (Work Choices) Act 2005 – this established the Fair Pay Commission giving it among other things jurisdiction over the safety net wage increases. In doing so the emphasis on the employment objective was increased (including the ability of the unemployed to obtain work), and that on maintaining award relativities was removed.[[8]](#footnote-8)

There are many consequences of these changes. The first is that there has been a declining proportion of the workforce who are reliant on minimum-wage pay scales. The proportion of employees on awards and who have their pay set by registered collective agreements are shown in Chart 1. In 1990, 67 per cent of all employees were reliant on awards to set their rate of pay. By the time of the AIRC safety net hearings of the late 1990s this had shrunk to around 30 per cent (although the proportion was higher in the private sector). By 2008 the proportion had shrunk to 17.4 per cent.[[9]](#footnote-9) Moreover the change in institutional arrangements with the Work Choices legislation meant that the state tribunals no longer automatically passed on the decisions of the Commission.[[10]](#footnote-10) This means that the Fair Pay Commission only directly influences the rate of pay of 12 ½ per cent of employees (or 11 per cent of those in employment).

1 **Employees by method of pay setting**

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*Notes:* Figures for 2000 to 2008 from ABS 6306.0 interpolated. Figures for 1990 to 1999 drawn from various sources – mainly the DEWRSB, Workplace Agreements Database, AWIRS 95 Survey, and unpublished EEH data referenced by DEWRSB.

*Data source:* ABS Cat No 6306.0, 6306.0.55, DEWRSB, 1998, 1999, 2000, author calculations.

However, even this overstates the size of the direct impacts of the Commission on wages. This is because over time many of those on higher wages have been covered by enterprise agreements or moved onto over award payments on informal individual agreements. Those who remain Pay-Scale reliant[[11]](#footnote-11) have been increasingly those on low incomes and those engaged in casual and part-time work. Moreover, the relative pay of the low skilled has gradually declined over time (Chart 2). Because those who are pay scale dependent are on lower wages, the impact on the total wage bill (and hence on price and cost pressure) of a Pay-Scale increase is relatively small. In 2008, average weekly earnings of those who were Pay-Scale reliant was half that of aggregate average weekly earnings.[[12]](#footnote-12) That means that the Commission decisions directly impact on just 6 ½ per cent of the nations wage bill (or 5 ¾ per cent if we include the wages of employers and self employed in the denominator).

2 **Relative wages by occupation**

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Notes: Total hourly rates of pay excluding bonuses by occupation relative to total and indexed to 1997=100, and smoothed using a five quarter Henderson filter.

*Data source:* ABS Cat No 6345.0 and author estimates.

Moreover, unlike the previous decisions by the AIRC (which needed to have regard to maintaining award relativities under the 1996 Act) the Commission has granted lower absolute increases for those on higher than average award earnings.[[13]](#footnote-13) So for example a worker on the federal minimum received an increase of 12.2 per cent over the three and a half years to October 2008, but the increase for those on above average awards has been 6.2 per cent. This compares with an increase in the CPI of 9.5 per cent over the same period and 14 per cent in the labour cost index.[[14]](#footnote-14) The average increase in wage minimums has been around 8.2 per cent.

It seems fairly clear, therefore, that the macroeconomic effects of the Commission decisions have been small:

* The direct impacts of the federal Pay-Scale decisions are only on 6 to 7 per cent of wages paid.
* The increases in the minimum wage have been less than that of the labour cost index.
* The increase in federal award wage rates on average has been less than that of the CPI.

Therefore if anything the impact of the increases has been to reduce inflationary pressures slightly. (That is measured against a benchmark where relativities were unchanged and minimum wages grew at the same rate as the labour cost index.) Clearly if wage minimums have been growing more slowly than the CPI then the Commission’s decisions can hardly be said to have been adding to inflationary pressures.[[15]](#footnote-15) If that is the case then from a macroeconomic point of view the Commission’s decisions, if anything, have led to interest rates and unemployment being slightly lower than otherwise.

## Wage impacts if the counter factual is no change

However that conclusion depends on the counterfactual. The Commission, in reaching its decisions is weighing up the impacts of award wages on a number of things. It has to have regard to such things as the capacity of the least skilled unemployed to find employment, and the efficacy of the award system in meeting equity goals in a country with significant redistribution through the tax transfer system, and where many on award wages are members of high income households. It also has to consider potential perverse incentive and labour supply effects if wages fall too low relative to available welfare payments for those who might otherwise seek employment. Clearly the Commission has to finely balance the costs and benefits of its decisions across a number of dimensions.

This study is not looking at all of those dimensions, but rather is focussed on the macroeconomic and employment impacts. The question therefore arises: what would the macroeconomic impact have been if the Commission had for other reasons come to the conclusion that it should grant no increases in minimum wages? Would there have been significant gains in terms of overall employment and competitiveness? Or would for example an absence of minimum wage increases lead to lower household consumption and hence lower demand and employment?

To answer these questions requires careful consideration of what would happen in the absence of an award wage increases. There are two aspects that need to be considered. The first is the impact on the wages of those who are Pay-Scale reliant. Would they gain wage increases in any case and how large would those increases be? The second is what would the flow through be to those whose pay is determined by collective agreements or informal arrangements. Would the absence of a minimum wage increase reduce wage pressures in other parts of the industrial relations system?

*Increases for those who are award reliant*

The experience of falling award wage relativities so far has been for a falling proportion of workers being reliant on awards. That is workers have moved increasingly into collective bargains or onto informal over-award arrangements. That trend would surely accelerate if there were no increase in wage minimums.

The relative increase in wages for those on award minimums by wage level are shown in Chart 3 below. These are compared with the wage increases achieved on average for those on the same wage levels but who are not Pay-Scale reliant (roughly half of low paid employees are either covered by collective agreements or over-award payments)[[16]](#footnote-16).

3 **Wage increases over the three and a half years to the December quarter 2008**

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*Notes:* The series for award workers shows the percentage change in wages progressively up the pay scale measured in $100 increments from $500 dollars per week. For example 29 per cent of award workers earned less than $600 per week in 2006, and 50.5 per cent earned less than $700 per week (~$18.4 / hour). Increases for award workers estimates are based on AFPC increases. The distribution for all workers are inferred from the ABS Labour Cost Index data for normal hourly earnings by occupation – see Chart 0.2. Increases for non award workers inferred using the Labour Cost Index data and the proportion of workers in each wage category who were award reliant.

*Data source:* ABS Cat No 6306.0, ABS Cat No 6345.0, AFPC Decisions and author calculations

As can be seen the increases in wages being delivered by the market were much higher at each level of wages than those being granted by award wage increases. [[17]](#footnote-17) Clearly the 2006 and 2007 Commission decisions with their lower dollar increase for those on above average award wages had the effect of driving a large wedge between what others in the market were obtaining and what was available through the award system. We can therefore infer that the fairly substantial 2.1 percentage point drop in the proportion of Pay-Scale-reliant employees between 2005 and 2008 was probably largely attributable to the gap in wages opening up particularly for the highest 20 to 30 per cent of award workers. With the reduction likely to have been concentrated in the federal arena, there has probably been an 11 to 14 per cent reduction in the numbers reliant on federal minimums.[[18]](#footnote-18)

It seems likely then, that if the Commission had granted no increases over the period, and the gap between minimum wage and market increases had been far wider, then there would have been a larger fall in the proportion of workers who are Pay-Scale reliant and a greater incidence of workers gaining increases above the award, particularly the 53 per cent of Pay-Scale-reliant employees who have permanent status.

It is of course impossible to tell precisely what would have happened in the no Pay-Scale increase counterfactual. On the basis of the analysis above, we assume in the following that the average increase for those reliant on award minimums at the start of the period, would have been a third of that which actually occurred, even if the Commission had granted no increase. By way of illustration this is equivalent to assuming that a quarter of workers (or half the permanent employees) received the equivalent of a CPI increases. Given the tightness of the labour market at the time, and the general expectation of most employees that their wages should rise with prices over time – this seems like a reasonably conservative assumption. This is also consistent with some simple econometric work conducted for this study which indicates that the impact of award wage increases on wage growth across industries is somewhat less than would be expected from the proportion of workers who are award reliant in the individual industries.

*Indirect impacts*

The indirect impacts of increases would normally come via a number of sources:

* Pass on by State tribunals to state awards. Since the 2005 Act establishing the Commission the State tribunals have acted independently, (and in fact pre empted the 2006 decision with larger increases to State awards). State award increases seem likely to have proceeded irrespective of the decisions of the Commission.
* Impacts on collective bargains. Most collective bargains run over a number of years. More than two thirds of these have no extra claims provisions.[[19]](#footnote-19) Moreover, past survey data has indicated that award increases are usually only a minor consideration in setting wage increases in negotiating new collective agreements. The main factors usually considered are the inflation rate, productivity increases within the firm and the general state of the economy.[[20]](#footnote-20) With award wages running well behind general wage increases they seem unlikely to have had an impact on enterprise bargains.
* Impacts of those on informal individual agreements. Many firms pay employees according to different systems.[[21]](#footnote-21) For example permanent employees might be subject to a collective agreement, casual and part-time workers might be paid according to the award, while management might be on individual agreements. There might be some impact of award increases on those on informal over-award arrangements if firms have a policy of maintaining internal relativities. However with market wages running well ahead of award wages over the relevant period this effect, if it exists, has probably been working in the direction of lifting the wages of those who are on awards rather than the other way around.

Awards have an asymmetric effect. It is possible to pay above the award but not below it. If they are increasing faster than other wages then it seems more likely they will have an impact on wage increases more widely. However, if they are increasing more slowly then they are unlikely to have any effect at all (apart from their indirect impact on other wage earners via their effect on consumer prices). These latter wage to price to wage feedbacks are picked up automatically in the model simulations.

Hence as in previous modelling exercises we discount the indirect wage to wage effects, and include only the direct effects calculated below.

*Estimate of Direct Effects*

The estimates of the direct effects on wages are derived by applying the increases granted by the Commission in each year (Table 4) to the wage rates paid to Pay-Scale-reliant employees by industry and occupation. The incidence of federal Pay-Scale-reliant employees across occupations and industries in May 2006 is shown in Table 5 below. Table 6 shows average hourly rates of pay for the same employees. Note that the percentages of employees who are federal Pay-Scale-reliant shown in Table 5 are on a heads basis. As most Pay-Scale-reliant employees are casual or part-time, their shares on an hours worked basis are lower.

As can be seen the share of federal Pay-Scale-reliant employees in the nation’s wage bill has fallen to a low level (Table 1.4). Consequently the direct effect of the increases in minimum wages on average weekly earnings is not large averaging around 0.1 a year over the last three years. This is much lower than estimates of the direct impact of the AIRC’s decisions in the late 1990s which were estimated at the time to have a direct effect of around 0.3 of a per cent a year. The lower figure reflects the declining share of award workers over time, their increasing concentration among casual and part-time workers, and their declining relative wages. Whereas the AIRC decisions directly affected almost a third of employees, those of the Commission now only directly affect 12 ½ per cent, with the proportion declining year by year.

4 **Federal award increases 2006-2008 and estimated direct impact on AWE**

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Federal Minimum Wage increase | Increase for Pay Scales up to $18.42 | Increase for Pay Scales over $18.42 | Average award increase | Proportion federal award-reliant | Proportion of the wage bill | Impact on AWE |
| Date | $ per hour | $ per hour | $ per hour | % | % | % | % |
| 1-Dec-06 | 0.72 | 0.72 | 0.58 | 3.7 | 13.7 | 6.9 | 0.17 |
| 1-Oct-07 | 0.27 | 0.27 | 0.14 | 1.2 | 13.1 | 6.7 | 0.05 |
| 1-Oct-08 | 0.57 | 0.57 | 0.57 | 3.1 | 12.5 | 6.4 | 0.13 |
| Total | 1.56 | 1.56 | 1.29 | 8.2 |  |  | 0.35 |

*Notes:* AWE stands for average weekly earnings*.* The proportion federal award-reliant in 2008 assumes that the proportion of employees on federal awards fell at the same rate as the proportion of all award employees. The proportion of the wage bill is estimated as federal award wage and salary earnings divided by total wage and salary earnings (including imputed wage earnings of the employers and the self employed).

*Source:* AFPC Decisions, ABS Cat No 6306.0, 6306.0.55 and author estimates

It is interesting to note that while the largest concentrations of Pay-Scale-reliant workers are in low paid occupations in particular sectors, such as accommodation, cafes and restaurants and retail trade, there is a significant spread across occupations and industries, with for example significant numbers of managers and professionals in health and community services being Pay-Scale-reliant.

In terms of the estimated impacts on wages by industry the largest effects are on accommodation cafes and restaurants, with the Commission decisions adding 1 percentage point to total wage growth in the sector over the three years to the December quarter 2009. The most prevalent occupations are elementary clerical sales and service workers, and labourers and related occupations, where the federal award increases have contributed 0.7 and 0.6 percentage points to aggregate wage growth respectively over the last three years. Details of the estimated contributions to aggregate growth in each category for each year are contained in Appendix B (Table 31).

The impacts seem broadly consistent with the developments in occupational and inter-industry wage relativities where the industries (Chart 5) and occupations (Chart 2) with the greatest proportion of award workers have shown the slowest increase over the last ten years. [[22]](#footnote-22)

5 **Trends in relative wages by industry**

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*Notes:* Series are total hourly wages excluding bonuses for each industry divided by the equivalent series for all industries and indexed to 1997=100. The wage price index for each industry excludes effects that come from occupational change – i.e is the price for a constant quality of labour.

*Data source:* ABS Cat No 6345.0 and author calculations.

6 **Proportion of federal pay-scale-reliant employees, by industry and occupation.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Managers & admin | Profess-ionals | Assoc. Prof | Trades & related | Advanced clerical and service workers | Inter clerical, sales and service workers | Inter prod-uction & transport workers | Elem clerical, sales and service workers | Lab-ourers and related workers | All |
|  | % | % | % | % | % | % | % | % | % | % |
| Manufacturing | 0.6 | 2.0 | 3.2 | 7.0 | 14.2 | 6.8 | 8.6 | 30.1 | 10.7 | 7.8 |
| Construction | 0.7 | 3.3 | 1.5 | 14.6 | 5.2 | 11.5 | 11.0 | 50.8 | 2.5 | 9.2 |
| Wholesale trade | 1.2 | 4.7 | 3.8 | 7.9 | 16.4 | 11.2 | 14.3 | 26.3 | 16.0 | 10.6 |
| Retail trade | 1.5 | 6.9 | 4.4 | 14.1 | 8.4 | 14.7 | 14.4 | 24.7 | 30.7 | 19.3 |
| Accom, cafes & restaurants | 3.2 | 32.0 | 16.2 | 42.2 | 22.8 | 46.0 | 32.8 | 55.6 | 41.1 | 40.0 |
| Transport & storage | 0.8 | 4.9 | 2.8 | 6.6 | 5.5 | 10.4 | 11.7 | 16.0 | 15.2 | 9.7 |
| Finance & insurance | 0.7 | 2.0 | 1.2 | 6.3 | 10.2 | 6.9 | 4.1 | 21.7 | 0.0 | 4.7 |
| Property & bus. Servs | 1.5 | 2.6 | 8.8 | 39.3 | 4.7 | 21.7 | 25.7 | 44.0 | 44.9 | 18.7 |
| Education | 2.9 | 6.8 | 7.3 | 38.2 | 18.2 | 11.7 | 7.4 | 9.3 | 7.1 | 8.5 |
| Health & comm. Servs | 10.2 | 7.0 | 9.4 | 31.3 | 10.9 | 31.8 | 6.4 | 12.8 | 19.8 | 17.7 |
| Cultural & rec services | 1.0 | 6.6 | 6.5 | 21.7 | 7.3 | 17.4 | 11.2 | 20.5 | 16.8 | 12.9 |
| Personal & oth services | 1.2 | 5.2 | 3.0 | 26.9 | 5.9 | 17.5 | 32.5 | 34.8 | 24.7 | 14.4 |
| Other industries | 0.0 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 2.1 | 0.3 | 1.6 | 0.4 |
| **All industries** | 1.1 | 4.9 | 5.5 | 15.9 | 7.8 | 18.9 | 11.9 | 27.0 | 22.2 | 13.7 |

*Notes:* Industry data is classified according to ANZSIC93 and occupational classification accord to ASCO. “Other industries” include government administration and defence, electricity gas and water and mining. Federal award reliant employees refers to employees in the federal jurisdiction whose pay was set by a federal or state award. Employees in the federal jurisdiction comprises: employees of employers located in Victoria, the Northern Territory or the Australian Capital Territory, or classified to Type of Legal Organisation (TOLO) codes 1-5, 11 or 21-26. This includes employees transitioning into the federal jurisdiction. While data was collected according to the pre-March 2006 workplace relations system, these estimates have been compiled by the ABS according to the post-March 2006 workplace relations system and hence should be interpreted with caution. Cells are shaded where the incidence is more than 1/3 of a standard error higher than the average for all industries. Numbers in blue font have been interpolated by the CIE. (The ABS suppresses the original data when the underlying quantities are too small to be reliable.)

*Source:* Cat No 6306.0 unpublished data supplied by the ABS. author estimates.

7 **Average hourly ordinary time earnings for federal award reliant employees**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Managers & admin | Profess-ionals | Assoc. Prof | Trades & related | Advanced clerical and service workers | Inter clerical, sales & service workers | Inter prod-uction & transport workers | Elem clerical, sales & service workers | Lab-ourers & related workers | All |
|  | $/hr | $/hr | $/hr | $/hr | $/hr | $/hr | $/hr | $/hr | $/hr | $/hr |
| Manufacturing | 43.0 | 32.4 | 17.9 | 16.9 | 19.2 | 17.2 | 17.8 | 17.6 | 15.7 | 17.4 |
| Construction | 38.8 | 24.8 | 21.2 | 14.6 | 16.5 | 16.7 | 16.6 | 20.6 | 15.8 | 15.7 |
| Wholesale trade | 27.3 | 19.8 | 14.8 | 12.6 | 18.8 | 16.1 | 15.4 | 17.1 | 16.2 | 16.3 |
| Retail trade | 37.8 | 24.1 | 17.9 | 13.1 | 19.0 | 17.8 | 15.9 | 15.6 | 12.0 | 15.3 |
| Accom, cafes & restaurants | 46.7 | 21.2 | 23.6 | 15.4 | 19.8 | 19.3 | 16.8 | 17.5 | 18.0 | 18.9 |
| Transport & storage | 47.7 | 18.1 | 22.4 | 20.0 | 20.3 | 19.2 | 20.2 | 15.7 | 18.4 | 19.3 |
| Finance & insurance | 49.6 | 32.9 | 24.0 | 17.3 | 19.3 | 20.6 | 21.2 | 18.1 | 16.3 | 21.6 |
| Property & bus. servs | 43.8 | 24.1 | 19.3 | 14.4 | 18.2 | 17.6 | 19.3 | 18.5 | 17.5 | 17.7 |
| Education | 49.2 | 32.0 | 20.1 | 11.5 | 21.4 | 17.2 | 25.0 | 16.6 | 16.8 | 25.4 |
| Health & comm. servs | 38.0 | 29.8 | 22.9 | 17.0 | 17.8 | 18.5 | 16.0 | 17.7 | 16.2 | 20.7 |
| Cultural & rec services | 46.0 | 20.4 | 20.8 | 19.2 | 19.5 | 17.3 | 18.3 | 17.3 | 19.0 | 18.6 |
| Personal & oth services | 41.3 | 23.0 | 28.8 | 13.8 | 16.2 | 19.1 | 20.3 | 14.5 | 16.7 | 16.7 |
| Other industries | 45.2 | 28.9 | 21.2 | 17.2 | 19.2 | 16.7 | 20.4 | 17.4 | 15.1 | 18.3 |
| **All industries** | 45.0 | 28.7 | 21.1 | 14.6 | 19.1 | 18.3 | 17.9 | 16.8 | 16.4 | 18.2 |

*Notes:* See notes to Table 1.4.

*Source:* ABS Cat No 6306.0 and ABS unpublished data.

## Model Results for the 2006-2008 decisions

The changes in minimum wages have direct impacts on wages across industries and occupation. These changes are entered into the model (by ‘shocking’ the relevant wage variables) and the response of households, business and government organisations are simulated. As the historical data already contains the effects of the Commission’s decisions, the shock is entered by removing the decisions from wage growth. The results of the shock are therefore interpreted below as what would have happened if the decisions had not been taken and award wages not been increased through 2006 to 2009.

*Response of households, business and government*

Business responds in three ways: by changing employment; by changing investment; and changing prices. The Reserve Bank may respond to changing prices and employment by altering interest rates, while the Federal government may respond to changes in employment and its tax base by altering expenditure and taxation. Households respond to the change in wages, and the business and central bank responses, by changing consumption, labour supply and investment behaviour.[[23]](#footnote-23)

*Business response*

In the short term, business responds to low wages in three ways: they will increase employment in response to lower labour costs; they will increase capital expenditure in response to higher profits; and they will pass on some of the reduced cost in the form of lower prices. [[24]](#footnote-24) The degree of the employment response largely depends on the estimated elasticity of substitution between capital and labour for each industry. In AUS-M these are estimated on the basis of historical data and range from 0.4 to 0.7 across industries, while in the Monash model they are assumed to be 0.5 in each industry.[[25]](#footnote-25) (An elasticity of substitution of 0.5 means that a sustained 1 per cent fall in wages would lead to a 0.5 per cent increase in employment demand[[26]](#footnote-26) other things such as output, the capital stock and prices held constant.)[[27]](#footnote-27) The investment response depends on the increase in profitability, the extent to which the Reserve Bank responds to lower prices by reducing interest rates, and the general expansion of the economy.

*Government response*

The main government or public sector response comes from the Reserve Bank in the form of an interest rate response to the slightly lower inflation that results from lower wage increases. The Reserve’s Banks behaviour in the past indicates that it usually changes the cash rate on a more than one for one basis to a sustained change in inflation relative to its target.[[28]](#footnote-28) In this case the change in inflationary pressure is very small, with wage growth around 0.1 per cent lower. This leads to a proportional temporary fall in the cash rate of around 0.1 of a percentage point.

Discretionary fiscal policy is assumed to be unchanged. That is, tax rates and government discretionary expenditure are unchanged and the budget balance is allowed to improve relative to baseline with higher tax receipts and less expenditure on unemployment benefit payments. (In other words the automatic fiscal stabilisers are allowed to work but no discrete fiscal action is taken.)

*Household response*

The main household response is in term of consumption and some of the key variables determining the consumption outcome are shown in Chart 8. In the short term, the impacts on consumption of lower wages and higher employment are offsetting. After a few quarters the losses to real income in terms of lower nominal wages are eroded by business passing on some of the wage cost reductions in terms of lower prices. Another part of the decrease in household real income is eroded by an increase in employment. After three quarters real household income begins to rise despite the fact that wages continue to fall.[[29]](#footnote-29) With employment increasing and unemployment falling, and a pick up in equity prices, lower interest rates and higher levels of wealth, consumption begins to increase after around three quarters.[[30]](#footnote-30)

8 **Impacts on household income and consumption of the Commission’s 2006-2008 decisions**

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*Notes:* Data in percentage deviation from baseline level

*Data source:* AUS-M model simulation

As mentioned the Reserve Bank responds to any changes in inflation and unemployment by changing interest rates (Chart 9). With slightly lower interest rates higher profits and increasing demand and capacity utilisation, businesses increase investment (Chart 10). Households respond to lower interest rates by increased borrowing for discretionary consumption items and dwelling investment.

9 **Response of macroeconomic variables**

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Note: Data in percentage deviation from baseline levels for labour demand and GDP, and in percentage point deviation from baseline levels for the other variables.

*Data source:* AUS-M model database, AUS-M model simulation.

10 **Response of broad categories of demand**

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Note: Data in percentage deviation from baseline levels.

*Data source:* AUS-M model simulation.

The rise in demand leads to a fall in unemployment. The fall in unemployment leads to higher wage growth across the spectrum. With higher wage growth the impact of the shock on aggregate wages, prices interest rates etc is reversed and economic conditions return to normal (Chart 11). What remains are the changes in relative wages and changes in occupational and industry employment patterns. Aggregate employment and unemployment return to their original (baseline) level (unless the changes themselves alter the level of equilibrium unemployment, for example by reducing mismatch unemployment).

11 **Labour market responses in the no pay-scale wage rise counterfactual**

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Note: Data are expressed in percentage deviation of the level from baseline, except for the vacancy rate and the unemployment rate where deviations are measured in percentage points.

*Data source:* AUS-M Model simulation.

## Caveats

There are of course many qualifications to these responses. The consumption response for example depends in part on the distribution of the income changes across households. It may be the case that a reduction of wage minimums leads to a more direct response of consumption because the impacts are more than proportionally on low income households who tend to be more credit constrained and have a higher than average propensity to consume out of income. On the other hand it may also be that with higher effective marginal tax rates for these households, the impact of the wage change on disposable income is less than average.[[31]](#footnote-31) Consumption also depends to some extent on what households expect to happen. If they were more forward looking the responses might be smaller. Similarly there are uncertainties in the response of businesses to the changes in terms of their investment, employment and price decisions. Ditto for the Reserve Bank and the monetary policy response. Hence the results should be interpreted with caution. They do not represent exact estimates but rather what would happen if the average response to wage changes in the past were to be replicated.

Another issue that might lead to questions is the size of the shock. If the initial shock to wages is small then all of these responses are small.[[32]](#footnote-32) However, whether the shock is large or small, the transmission of the response is the same. The pattern of responses described above, and the results shown are very similar to those that have been shown in previous modelling of the impact of wage changes on the Australian economy.[[33]](#footnote-33)

A dynamic macro-econometric model like AUS-M estimates the timing of these changes on the basis of historical relationships. As a forecasting model there is a strong emphasis on fitting the data and being able to replicate history. It also has sufficient structural detail to capture how economic responses change over time. That said every model has its limitations, and results should be interpreted with caution.

***The transitional and long run industry effects are quite different.***

Because the transition to the medium and long run involves a range of cyclical responses discussed above, the transitional impacts on industry are different to the long run effects. In particular manufacturing and construction are more sensitive to the economic cycle, because they are dependent on discretionary expenditure (such as housing investment, durables consumption and expenditure on motor vehicles). Other sectors, which rely on non-discretionary expenditure, such as health and education are less sensitive to the cycle.

The cyclical effects can be isolated from the price effects in the model, by looking at the variables that link the demand side variables to the supply side variables. In the model the cyclical impacts on expenditure are mapped back to the demand terms for industry output using coefficients drawn from the input-output tables. These input-output weighted demand terms do not include relative price effects (except insofar as the changes that flow through the price system impact on demand at the expenditure level [[34]](#footnote-34)). These are shown in Chart 12. As can be seen the increase in business and dwelling investment noted above has significant effects on construction, manufacturing and finance.

12 **Cyclical effects on industry demand**

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*Notes*: PBS stands for property and business services, EGW for electricity gas and water, Distribution for distributional services including transport and storage, retail and wholesale trade (the margin industries in input output analysis). Accommodation cafes and restaurants are contained in consumer services. Variables are deviations from baseline of the input output weighted demand terms for each industry.

*Data source:* AUS-M model simulation.

If we then add in the substitution between industries due to the effect of the award wage shock on relative prices between industries we obtain the overall GDP results by industry. The GDP results reflect both the cyclical demand terms and the relative price effects. These latter depend on the historic estimates of cross-price elasticities of demand for each industry. Substitution occurs towards those industries with heavy concentrations of Pay-Scale-reliant workers such as consumer services and distributional services, and away from industries with few such as manufacturing and electricity gas and water (Chart 13).

The GDP impacts plus the relative wage effects in turn lead to the employment results. This is done sequentially in Charts 13 and 14 below. In the long run the wage changes are largely passed through to prices in each industry, although some relative wage effects remain.[[35]](#footnote-35) The wage substitution effects are therefore felt mainly in the short term. For example the largest wage shock is to consumer services and the short term impacts can be seen in Chart 14. The increase in consumer services employment in the short term, accounts for most of the increase in aggregate employment over the same time period shown in Chart 11 above.

13 **GDP effects by industry (cyclical plus price impacts)**

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*Notes:* Percentage deviation in chain linked value added by industry from baseline – selected industries

*Data source:* AYS-M model database and simulation.

14 **Employment impacts by industry**

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| --- |
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*Notes*: Data shown are percentage deviation from baseline level of industry employment on a heads basis – selected industries

*Data source:* AUS-M model simulations

In the long run the results for employment are in a similar direction and a little larger than the output results. The employment results are also comparable to the long-run results from the MMRF model contained in Appendix B, which provides detailed results by industry, occupation and state.

## What if the direct effects on wages are larger?

As discussed above the direct wage impacts of the Commission’s decisions depend in part on what would happen to the wage increases of the low paid in the absence of the Commission’s decisions. The results in the previous section depend on the assumption that in the absence of a minimum wage increase, some low paid workers would still have received an increase in the buoyant labour market conditions of 2006-2008. However, it could also be argued that wouldn’t happen, or alternatively that any such increases would be offset by direct flow-on effects to non-award reliant workers, i.e. those covered by enterprise bargains or on informal over-award agreements. If we assume that no federal Pay-Scale-reliant employee receives a wage increase through 2006-2008, in the absence of the Commission’s decisions, then the wage shock applied to the model would be a third higher than that shown above. The results from this simulation for unemployment and employment are shown in Chart 15 below.

15 **Employment and unemployment responses with larger direct wage impacts**

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*Notes:* Series are percentage and percentage point deviations from baseline levels. The “larger direct wage impacts” series refer to the case where federal pay-scale-reliant employees receive no wage increases from any source through 2006-2009.

*Data source:* AUS-M model simulation

As can be seen if the shock is a third larger, then so are the employment and unemployment outcomes, as are all of the other model responses. The transmission mechanisms described in the previous section are the same irrespective of the size of the shock.

Assuming that no federal Pay-Scale-reliant employee would have received a pay rise through 2006 to 2009 in the absence of the Commission’s increases, then the unemployment rate would have been around 0.07 of a percentage point lower in late 2009, and employment around 13,000 higher.

## What if the shock is sustained?

As can be seen in Chart 11 above the aggregate employment effects gradually decline once the shock is removed so that in the long run all that is left are the distributional impacts across industries and occupations. But as the Commission is making decisions year after year, the question arises as what would be the impact if the shock were continued into the future. To test this we have assumed that the nominal wage shock implemented in 2008 continues each year into the future. The result is that the aggregate labour market impacts are sustained for longer with the unemployment rate being around 0.06 of a percentage point lower in 2010 (Chart  15) in the absence of the Commission’s assumed decisions. In comparison with a peak employment effect of around 8,000 in 2009 for the 2006-08 decisions, the employment effect peaks at around 10,500 in late 2010 for the sustained decisions. The fact that the unemployment rate returns to its baseline in the long run, despite continued changes in relative wages, reflects the fact that, in the model, wage relativities between occupations and industries ultimately affect the distribution of employment and unemployment not the overall level. The slight fall in the unemployment rate in these simulations, and the slight tightening of the labour market leads to slightly higher overall wage growth so that the real wage in aggregate returns to its original level.

16 **Employment and unemployment impacts with continuing AFPC decisions**

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Note: Unemployment rate: number of unemployed as a percentage of the labour force.

*Data source:* ABS Cat No 6203.0 and AUS-M model simulations and projections.

***Long-term constraints – where is the steady state?***

However the relative level of the minimum compared to average wages cannot fall indefinitely. Sooner or later the rate of change of the minimum would have to match that of the broader labour cost index to maintain relativities. Moreover, if it fell continuously it would increasingly intersect with income support for the unemployed – presumably leading to a second set of problems. In the experiment above, the Federal minimum wage drops to around 33 per cent of adult ordinary time earnings by 2015 (Chart 17). With this sort of decline the number of workers reliant on the minimum would decline. In the United States where the minimum wage is at about this level relative to average earnings, only around 3 per cent of employees are reliant on the minimum.[[36]](#footnote-36) At this point it would become more or less irrelevant for the aggregate outcomes. But even if coverage remained at a high level – as the long run results show – once output prices and capital stocks adjust the aggregate employment would return to close to its baseline level.[[37]](#footnote-37)

17 **Federal minimum as a percentage of adult full-time AWOTE**

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*Note*: The minimum wage series is not seasonally adjusted whereas the adult full time average weekly ordinary time earnings series is seasonally adjusted.

*Data source:* ABS Cat No 6302.0, Commission and AIRC decisions and AUS-M model projections.

***Impacts on employment in equilibrium***

That is not to say that minimum wages do not have an impact on equilibrium unemployment or labour supply. Rather insofar as they have an effect it is at a level of detail below that contained in the model - that of the firm and individual skill gradations within occupations. Reducing minimum wages would plausibly lead to an improvement in matching of workers to jobs and hence a reduction in mismatch unemployment.[[38]](#footnote-38) To estimate such an effect would require a detailed study and is beyond the scope of this report. If such an impact were estimated it would be entered in the model via the unemployment, unfilled vacancies relationship. Lowering the level of vacancies for any given level of unemployment automatically reduces the NAIRU in the model and hence the equilibrium level of employment and unemployment.Where there plausibly might be effects is at the level of the firm and within occupational categories, for example with minimum wage changes affecting the chances of workers with lower skills or aptitudes within occupational categories of finding a job.[[39]](#footnote-39)

## The deteriorating outlook and the Commission’s decisions

The results in the previous sections provide a picture of the effect of the Commission’s decisions in a buoyant labour market. However the Commission’s 2009 decision will be taking place at a time when the labour market is deteriorating. This then leads to the question: would a given increase in wage minimums have a different impact in a deteriorating labour market than in a tight labour market? If it does, then the uncertainty around the outlook becomes important to the Commission’s decision (which is made in May/June but implemented in October). If the labour market deterioration is relatively mild and temporary then that would be more conducive to an increase in wage minimums than one where there was a significant contraction in demand and rise in unemployment. Hence the outlook becomes important to the decision, and some of the factors that are shaping the outlook, with a particular focus on the labour market, are discussed in Appendix A.

## Labour turnover and the impacts on the low skilled of a downturn in unemployment

One of the reasons that the outlook has a bearing on the impacts of the award decision is that a deterioration in unemployment will have its largest effect on the low skilled. Pay-Scale-reliant workers are predominantly low skilled, casual and part-time[[40]](#footnote-40). With high turnover rates and often little in the way of firm-specific skills, they are the group that tends to be caught out by a falling labour market.

The main reason for this is high turnover rates. This was seen in the responses of unemployment for teenage workers and unskilled occupations in the 1991-92 recession. Both groups have turnover rates that are multiples of the average. Without any prior change in wage relativities, unemployment rates for both went to high levels relative to other occupational and demographic groups during the recession.[[41]](#footnote-41)

The higher turnover of lower skilled employees can be inferred from their average tenure in employment (Chart 18). In February 2007, 21 per cent of labourers had been in their position for less than six months compared to 6 per cent of managers. Allowing for employment growth of around 3 per cent in the year to February 2008, this implies that the turnover rate of labourers was around 5 to 6 times that of managers.

18 **Job tenure by occupation (per cent in current job for less than 6 months)**

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*Data source:* ABS Cat. No. 6206.0 – Labour Force Experience, February 2007.

The high levels of turnover mean that as the labour market deteriorates, the rise in unemployment will be concentrated on the low skilled. For example if the unemployment rate rises to 7 per cent in 2010 (compared to an average rate of 4.2 per cent in 2008) the unemployment rate of labourers and related low skill manual workers will possibly rise by around 7 percentage points, while unemployment rates for managers and administrators and professionals rise by ½ to ¾ of a percentage point (Chart 19).

19 **Unemployment rates by occupation**

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*Notes*: The projections for 2010 are derived from the AUS-M model “UEFO consistent” projections where unemployment reaches 7 per cent in 2007. The unemployment rate was 6.7 per cent in 2001.

*Data source:* ABS Cat No 6202, AUSM Model simulation and author estimates.

This larger increase in unemployment for the lower skilled in turn has implications for wage outcomes. The model has an aggregate wage equation that links wage growth to the level of the unemployment rate.[[42]](#footnote-42) As a rough rule of thumb a one percentage point increase in the unemployment rate leads to around a ½ to ¾ of a percentage point reduction in wage growth.[[43]](#footnote-43) On the assumption that the aggregate relationship between wage growth and unemployment holds at the occupation level, the large increases in unemployment for the low skilled and low paid occupations would imply very low rates of wage increases for the low paid as the economy moves into recession (Chart 20). This is arguably the time when the system of minimum pay rates has its greatest effect.

20 **Wage increases implied by the Commission’s 2008 decision versus possible market outcomes**

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*Notes:* The equilibrium increase assumes that the Reserve Bank is maintaining inflation at 2 ½ per cent, and that underlying labour productivity is running at 1.5 per cent per annum, and that 0.4 of a percentage point of this is due to compositional shift in the labour force towards more high skilled employees.

*Data source:* AFPC decision, ABS Cat No 6206.0 and author estimates

The net effect of this is to reverse the logic of the previous assessment of the impact on wages in aggregate if no increase is given. If no increase is given as the unemployment rate climbs towards seven or eight per cent, then it is unlikely that award workers would be given a rise in lieu by business. Moreover if the 2008 increase were given it would probably have the effect of pushing up the wage rates of workers on close to the minimums, who would not otherwise have received an increase. This in turn would increase the impact of the award on wage outcomes in aggregate.

Therefore instead of reducing the overall impact of the minimum wage increases by a third as in the analysis of the impact of the Commission’s wage increases from 2006 to 2009, we assume that they would be a third higher in the case where the unemployment rate climbs to 7 per cent in 2010 and fifty per cent higher in the case where the unemployment rate climbs to 8 ½ per cent.

## Model results for the cases where unemployment rises to 7 and 8 ½ per cent:

The key results for unemployment are shown in Chart 21 below:

21 **Unemployment impact: 5.5 per cent, 7.0 per cent and 8.5 per cent unemployment scenarios**

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*Notes*: Unemployment rate expressed as a percentage of the labour force

*Data source:* ABS Cat No 6202.0 and AUS-M simulations.

As can be seen, the effect of the decisions is larger the greater the deterioration in the labour market. If unemployment peaks at around 7 ½ per cent, then the absence of an increase would mean that unemployment would be 0.1 of a percentage point lower. If it peaks at around 8 ½ per cent then the unemployment rate would be around 0.12 of a percentage point lower, compared to around 0.05 of a percentage point lower where the labour market outcomes were more benign.

As discussed earlier, this reflects the different assumptions about wage flow-ons to other workers, and hence a difference in the size of the shock being entered into the model. There is also a difference in the transmission of the shock in that in the high unemployment case, unfilled vacancies are much lower, and hence the fall in employment demand translates more directly into employment. (The main difference however is in the size of the shock.) Otherwise the details of the transmission of the shock are the same as described in the earlier sections.

## Impact of the Fiscal Stimulus

With the economy deteriorating in early 2009 the question arose as to what potential employment impact the Government’s fiscal policy response might have in comparison to the impacts of the Commission’s minimum wage decisions. In response to the downturn the Australian Government introduced several fiscal measures to support the economy and employment. These were introduced in two main stages the first, the Economic Security Strategy $10.4 billion stimulus announced in October 2008 and the second, the $42 billion Nation Building and Jobs Plan in February 2009.[[44]](#footnote-44)

Model simulations with and without the stimulus packages indicate that they will boost GDP growth in 2008-09 and 2009-10 by around 0.2 of a per cent and 1.1 per cent respectively, with the unemployment rate ½ a percentage point lower than otherwise by the June quarter 2010, and employment around 106,000 higher than otherwise (see Chart 22). [[45]](#footnote-45)

Key uncertainties revolve around the size of the bring-forwards due to the temporary increase in the first home owners allowance and the temporary 30 per cent investment allowance. These provisions have the impact of shifting expenditure from 2010-11 into 2009-10, considerably boosting the effectiveness of the package. Currently finance approvals for first home buyers seem to be running at around the same pace as they did when the Howard Government temporarily doubled the allowance in 2001. Consequently we may be underestimating the effect of these measures on the activity profile.

22 **Impact of the fiscal package on unemployment**

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*Notes:* PSBR is the net general government borrowing requirement derived from the quarterly national accounts (seasonally adjusted). Data prior to 2008 smoothed with a 7 quarter Henderson filter.

*Data source*: ABS Cat No 6202.0, AUS-M model database, AUS-M simulations.

An interesting feature of the simulation is that the discretionary stimulus of 1 ½ per cent of GDP leads to a deviation in the PSBR of around 1 per cent of GDP. That is the increased activity and reduced unemployment as a result of the stimulus feeds back to reduce the effect of the stimulus on the PSBR itself. In the model, a sustained 1 percentage point reduction in the unemployment rate will reduce the PSBR by around 1 percentage point as a per cent of GDP.[[46]](#footnote-46) That is there is roughly a one to one relationship between unemployment and the PSBR. (This also accords roughly with history – see Chart 22 – where there have been roughly equivalent movements in the PSBR and the unemployment rate over time. Therefore it could be argued that the persistent high levels of deficits during the seventies, eighties and early nineties had a lot to do with the disequilibrium in the labour market.) This in turn means that the small .12 deviation in the unemployment rate in the case of unemployment rising to 8 ½ per cent shown in Chart 21 translates into a reduction in the budget deficit of around $1.5 billion a year.

## Conclusion:

This report has canvassed a large number of issues surrounding the impact of increases in wage minimums on the economy. It seems likely that the Commission’s decisions through 2006 to 2008 had little adverse effect on unemployment or any other macroeconomic variable. The model based estimates indicate that the unemployment rate would have been around 0.05 of a percentage point lower in 2009 if the Commission had granted no wage minimum increases at all, and employment around 8,000 higher. [[47]](#footnote-47)

The small size of the effects reflects three things: the fact that the proportion of workers covered by minimum pay scales has fallen over time (to the extent that the Commission’s decisions only impact on around 6 per cent of the nations wage bill); that the increases were lower for workers on higher pay scales reducing the overall impact of the increases on aggregate wages; and that the economy was in the middle of a commodity boom with a relatively tight labour market and a high level of unfilled vacancies.

However the situation facing the Commission at present is very different from the benign one that existed through 2006 to 2008. If the unemployment rate increases towards 7 or 8 per cent then the impacts of the Commissions minimum wage decisions will be larger. Moreover the high turnover of those workers who are Pay-Scale reliant means that they are the workers most exposed to the higher unemployment that results from the change, both directly from the wage increase, and indirectly via the macroeconomic response to the change (although the direct effects are the dominant ones).

Finally there is at present an extraordinary amount of uncertainly around the outlook with the Consensus survey of forecasters indicating a range for the unemployment rate in 2010 from 5 ¼ per cent to 9 per cent. One indirect consequence of doing the analysis for this report has been to prepare model based forecasts for the economy (and to run scenarios around them). This analysis, for what it is worth, indicates that the outlook for the economy may not be as bleak as suggested by most market forecasters and the official agencies.[[48]](#footnote-48) The fundamentals of the Australian economy are much better than those of almost any other OECD nation. They are also very different to what they were in the 1980s and early 1990s with large structural changes in both the labour and product markets. Hence there are reasons to believe that the recovery from the present downturn will be different from the recovery from previous downturns. While Australia has been hit by large falls in the price of our commodity exports, what the model simulations suggest is that perhaps our largest current problem is a loss of business confidence. If equity markets continue to recover, and business confidence is gradually restored, it may be that growth through 2009-10 will be stronger than many currently anticipate.

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Appendixes

Overview of the model outlook.

One consequence of the need to analyse the Commission’s decisions, was a need to update the model and prepare a model forecast to act as a baseline against which alternative paths for wage minimums could be examined. One of the surprising results that arose from this exercise was that the outlook coming out of the model was much stronger than that of the markets or that of official agencies like the Treasury. This Appendix outlines the model outlook in more detail, and sets out some of the sensitivities and uncertainties behind the numbers.

## Background

Over the last year the Australian economy has been exposed to a very large array of shocks. Up to the middle of 2008 the dominant development was a rapid run up in oil and commodity prices – the largest global oil and commodity price boom since the early 1970s. With unemployment low and inflation rising, the Reserve Bank raised interest rates by 100 basis points in four moves between August 2007 and April 2008. Like many central banks around the World, the RBA was caught by surprise by the rapid deterioration in financial conditions in the US in the second half of 2008. Conditions worsened sharply following the collapse of Lehman Brothers in September. Credit markets froze as the half trillion dollar US bank entered Chapter 11 bankruptcy protection. In response to the dramatic tightening in financial conditions and the worsening economic outlook the Reserve Bank reduced interest rates by 400 basis points between August 2008 and February 2009. The market anticipates further easing over coming months. At the same time the Federal Government introduced very large fiscal stimulus packages, with a discretionary easing equivalent to 1.5 per cent of GDP in 2009-10.

With global growth going from a record high in 2007 to a near record low by the end of 2008, with commodity markets going from boom to bust, with the largest exchange rate depreciation in our history occurring over the last six months[[49]](#footnote-49), with falling equity markets and general financial market turmoil, there is an unprecedented amount of uncertainty over the short to medium term outlook.

### In the face of uncertainty, model results provide a point of reference

The model results can never be exact, particularly in current circumstances where there is great uncertainty over confidence effects and the degree of risk aversion and financial disruption. The focus therefore should not be on precise numbers but the general story emerging from the model. The model’s comparative advantage is in providing a fully articulated and internally consistent framework for thinking through the very large array of shocks that are impacting on the economy. It also has the advantage of providing an independent view, one that is not influenced by the prevailing consensus and/or ever shifting market views. It is a tool that allows us to question prevailing assumptions and think more carefully about our interpretation of unfolding data and events.[[50]](#footnote-50)

### The model shows surprisingly strong growth in 2009-10

The baseline model numbers indicate a much stronger level of growth in 2009-10 than currently anticipated by the Treasury and much of the market. Growth is similar in the near term, with significant immediate effects from falling confidence, lower equity prices and lower export volumes. But while confidence effects are immediate, the impacts of monetary policy, fiscal policy and the depreciation of the exchange rate come through with significant lags. Within the model the interest rate reductions, exchange rate depreciation and fiscal stimulus, are sufficient to more than offset the continued negatives of low equity prices, low commodity prices and a contraction in mining investment and lower activity in our trading partners.

A.1 **Financial variables: History and forecasts**

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a Notes: The profile for the 90 day bill rate is by assumption to the December quarter 2009 after which the model’s default monetary policy reaction function takes over. The rise in the real exchange rate reflects an assumed recovery in commodity prices as growth recovers in China and OECD countries from late 2009 onwards.

*Data source*: AUS\_M model database and simulations

## Impacts of the global financial crisis depend on specific linkages

What the results remind us is that there is no law that says that Australia has to grow at the same rate as the rest of the world. How the global downturn affects us depends on the particulars of our international linkages. These come in three forms, trade, financial and confidence.

*Trade linkages*

With regard to trade, we have fairly limited direct exposure to the severe contraction in global imports. (Our manufacturing exports represent just 3 per cent of our GDP compared to 30 to 40 per cent of GDP in net terms in many of our Asian trading partners. [[51]](#footnote-51)) Two thirds of our exports are bulk commodities which are supply determined. In volume terms they are largely unaffected by the downturn in trade. Where the demand effects come through are in terms of price – feeding back to profitability, investment and then output.[[52]](#footnote-52) The contract prices for our main bulk commodities will be subject to large cuts, but still remain fairly healthy in Australian dollar terms. There will be a downturn in mining investment – but a significant proportion of mining equipment is imported (offsetting some of the negative effects). Our manufacturing and service imports are relatively price sensitive and hence the 30 per depreciation is sufficient to largely offset the impacts of the downturn in trading partner activity. On the import side the slowing in domestic demand combined with the exchange rate depreciation leads to a large reduction in imports. Consequently net exports make a significant contribution to GDP growth in 2009-10.

This is turn means that the exchange rate remaining low is a key assumption underlying the model forecasts.[[53]](#footnote-53)

*Financial market linkages*

The effects from these go both ways. First and most obvious have been the negative effects on equity markets from the global increase in risk aversion and the perception of risk. This combined with confidence effects (below) and the fall in commodity prices and hence mining profitability has led to an almost 50 per cent fall in the ASX S&P200 since its peak in late 2007. However, perhaps less obvious, the global monetary easing in response to the crisis has seen global short-term interest rates fall to close to zero, and 10 year bond yields fall to record low levels. As a small open economy with a floating exchange rate, the global bond yield sets the base level for our own bond market, and our long term interest rates have fallen by 2 percentage points since mid 2008. With the government lending the major banks its AAA credit rating for their overseas borrowing, these lower rates should be feeding through to lower borrowing costs for business and providing a boost to local equity markets and investment.

There have been some adverse local effects from financial disruption from the global financial crisis – particularly for commercial property investors – but our banking system is a picture of stability compared to the rest of the world – and the government has undertaken to underwrite funding to the commercial property sector via the Australian Business Investment Partnership (although the timing of this support remains uncertain).

*Confidence linkages*

Australia’s main current problem is with consumer and investor confidence. Internet usage has increased markedly over the last ten years as has the market penetration of pay TV, and it is arguable that global events have had a larger effect on household attitudes than they might have had 10 or 20 years ago. However, in a small open economy with free capital flows and a floating exchange rate, a downturn in confidence cannot perpetuate a sustained downturn in the economy.[[54]](#footnote-54) Moreover the reduction in discretionary expenditure stemming from confidence effects tends to build up a backlog of demand over time, leading to higher growth in expenditure as the economy recovers. Similarly commercial projects which are being delayed or put on hold due to financial constraints may quickly add to demand when the economy begins to recover and confidence returns. Unlike previous recessions Australia has entered this downturn without any significant oversupply in office space or commercial property. In contrast, prior to our last serious downturn – the 1991-92 recession – there was an office building boom with office vacancy rates already at high levels before the downturn began.[[55]](#footnote-55)

## The balance of the shocks

The model can be used to break down and isolate the impacts on the economy of the various shocks impinging on it. Other things being equal, a 10 per cent depreciation raises output by around 1 per cent after around 18 months. Similarly a 100 basis point interest rate cate would increases activity by around 1 per cent after around 18 to 24 months. At face value then the combined impact of the exchange rate depreciation and interest rate cuts in normal times would be sufficient to lift GDP by around 4 to 6 per cent with the main impacts being felt through 2009-10.[[56]](#footnote-56) There would be an additional impact from the fall in the long bond rate (flowing from lower world bond rates), which would normally add another ¼ to ½ of a per cent to activity in 2009-10.

On top of the exchange rate and interest rate effects are the fiscal policy effects. As mentioned in the body of the report, model simulations with and without the stimulus packages indicate that they will boost growth in 2008-09 and 2009-10 by around 0.2 of a per cent and 1.1 per cent respectively. Key uncertainties revolve around the size of the bring forwards due to the temporary increase in the first home owners allowance and the temporary 30 per cent investment allowance. These provisions have the impact of shifting expenditure from 2010-11 into 2009-10, considerably boosting the effectiveness of the package. Currently finance approvals for first home buyers seem to be running at around the same pace as they did when the Howard Government temporarily doubled the allowance in 2001. Consequently we may be underestimating the effect of these measures on the activity profile.

Weighted against the stimulus flowing from monetary policy, fiscal policy and the exchange rate are the negatives coming from the impact of the commodity shock on mining investment and the impacts of falling confidence on equity prices, investment and consumption. The combined fall in private consumption and investment subtracts 8 percentage points from GDP through to the end of 2009. However around half of this is detraction is offset by a fall in imports. (Australia can be characterised as a commodity exporter and an importer of discretionary consumption and investment goods.[[57]](#footnote-57)) As the confidence shocks are short-term and the exchange rate, monetary and fiscal policy effects are more medium term, the former drives the immediate outcomes while the latter drive the outcomes through 2009-10.

*Population shock*

One shock that has received relatively little attention is the rapid acceleration in population growth due to an increase in net migration. In the three months to January net migration on our estimate was running at an annualized rate of 290,000 a year. Net migration for the year 2008-09 is likely to stand at around 270,000.[[58]](#footnote-58) Long term and permanent arrivals and departures are running at extraordinarily high levels (Chart A.3). Net migration is at its highest levels as a percentage of the population for fifty years, and is only surpassed by the “populate or perish” spurt in the immediate post war years.[[59]](#footnote-59)

A.3 **Net migration, population growth and the dwelling stock**

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*Notes*: Series marked “Arrivals” and “Departures” are long term and permanent arrivals and departures seasonally adjusted and expressed as a percentage of the civilian population at an annualised rate, as is net migration. March quarter estimate assumes seasonally adjusted January rate continues in February and March. Population growth refers to the growth of the civilian population 15 and over. Net migration estimates from the September quarter 2008 assume that category jumping continues at the same rate as in the June quarter 2008.

*Data source*: ABS Cat No 3401.0 and 3101.0, and AUS-M model database and projections

There are a number of implications from the acceleration. The additional people create a greater demand for goods and services including housing. In equilibrium a 1 per cent increase in population growth leads to a 1 per cent increase in GDP growth although the effects come through with a lag (with a lagged cyclical up-kick due to a rise in dwelling investment). The higher population growth helps to explain the low level of rental vacancies and rising rental prices. It is one of several positives for the dwelling investment outlook. It is also consistent with recent labour market outcomes, falling vacancies and rising unemployment with little change in the level of employment. This is exactly the sort of thing we should expect from higher population growth (but very different from the markets current interpretation of the labour market data.)

## Components of Private Demand

Chart A.4 below shows the key components of private final demand.

A.4 **Components of private final demand**

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*Notes:* Underlying business investment is less second hand asset sales. Series are shown as a percentage of potential GDP.

*Data source*: AUS-M model database, AUS-M model simulations

*Consumption*

Household consumption declines with the fall in wealth and the rise in unemployment (which affect confidence) and appears to be behaving pretty much as would be expected. Latest measures of the Westpac / Melbourne Institute consumer confidence index are not out of line with where the model says they should be given the fall in equity prices, fall in household wealth and the rise in unemployment. Falls within consumption are concentrated on motor vehicles and durables due to their discretionary nature and the rising prices for these goods due to the exchange rate depreciation.

*Dwelling investment*

Dwelling investment falls in the very short term put picks up from the second quarter of 2009 driven by the first home owners scheme bring forward, the building short fall due to high population growth, and high levels of affordability for new entrants to the market. On the negative side are increased aversion to risk and uncertainty about future established house prices. This would suggest weakness in the investor market but strength for owner occupiers and first home buyers, which seems consistent with the partial indicators. One area of uncertainty is that developers account for the majority of new building and are currently experiencing difficulty in obtaining finance for new projects. (Note that private dwelling investment in Chart A.4 does not include public investment in housing, which will be boosted by the construction of 20,000 new homes under the Government’s Nation Building and Jobs Plan, with the main expenditure occurring in 2009-10.)

*Business investment*

Business investment is driven down by the imposition of large risk premium and confidence effects. The largest falls by sector are in mining, finance and insurance, and in the basic metal products component of manufacturing. However there is a significant degree of uncertainty about the size and duration of these effects. Partial indicators are mixed with private business surveys indicating a scaling back of investment plans, particularly as some firms reduce leverage. But the ABS capital expenditure survey conducted for the December quarter 2008 showed still strong expectations on investment levels in 2009-10 (although realisation of expectations is historically dependant on the state of the cycle.)

## Implications for trade and labour market outcomes

The outcomes for trade and the labour market so far seem to have been largely as would be expected given the shocks described above (Charts A.5 to A.10 below). Outcomes and partial indicators seem broadly consistent with the models predictions. Imports have fallen sharply in line with the model, average hours worked and unfilled vacancies (as indicated by the ANZ series) have fallen by around the amounts expected and employment is almost exactly in line with the forecast. One exception to this is the labour force participation rate which has not fallen as it usually would, given the slow down in employment growth (Chart A.10). This appears to be partly due to the impact that falling equity prices have had on superannuation funds and hence on the participation decisions of older workers close to retirement. The lack of a participation response, in combination with the increase in population growth, helps to explain the size of the rise in the unemployment rate when employment levels in absolute terms have only fallen modestly. By itself the rise in the participation of the 55 and over age group has added around half a percentage point to the unemployment rate (as of March 2009).

Table A.14 provides a detailed comparison of the model numbers with Treasury’s *Updated Economic and Fiscal Outlook* (UEFO) forecasts.

Illustrative Charts

A.5 **Falling demand for goods and falling imports**

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a Notes: Demand for goods is measured as goods consumption plus private plant and equipment investment plus non-farm stock-building plus exports of manufactures. The demand term is illustrative only. In the model imports are modelled by broad economic category, with input output weighted demand terms for each category.

*Data source*: ABS Cat No 5206.0, 5302.0, AUS-M database and projections.

A.6 **Import and export volumes as a percentage of potential GDP**

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Notes: Exports and imports of goods and services as a percentage of potential GDP

*Data source*: AUS-M model database, AUS-M model simulations

A.7 **Mining exports and commodity prices**

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*Notes*: Non-rural commodity prices in SDRs are base on the RBA fixed weight index. Mining exports include manufacturing basic metal products, and exclude RBA gold sales.

*Data source*: RBA Bulletin, ABARE Commodity Outlook, AUS-M model database, AUS-M model simulations

A.8 **Trade balance and the current account deficit**

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Notes: Trade balance and current account balance as a percentage of nominal GDP.

*Data source*: AUS-M model database, AUS-M model simulations.

A.9 **Labour market outcomes**

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Notes: Job vacancy rate measured as job vacancies over total employment plus job vacancies

*Data source*: AUS-M database and simulations

A.10 **Employment, labour demand, participation and hours worked**

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Notes : Labour demand equals employment plus unfilled job vacancies. Average weekly hours are mid month of quarter.

*Data source*: ABS Cat No 6203.0, AUS-M model database.

A.11 **Dwelling rents and rental vacancies**

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a Rental vacancies are a population weighted average of capital city vacancies seasonally adjusted in TSP.

*Data source*: REIA Market Facts, AUS-M Model database and simulations.

A.12 **Housing affordability**

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Notes: Housing affordability is measured as after tax labour income (adjusted for the unemployment rate) divided by mortgage interest costs (mortgage interest rate times the established house price).

*Data source*: AUS-M model database, AUS-M model simulations

A.13 **Australia-US dollar real bilateral exchange rate 1960-2009**

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*Notes:* Monthly average of $US/AUD adjusted for relative non-food, non-energy CPIs (monthly CPI data interpolated from quarterly data for Australia with our forecasts for January 2009.)

*Data source*: OECD Main Economic Indicators database, author calculations

**A**.23 **Comparison with Treasury UEFO forecasts**



*Notes*: Data is per cent change on a year earlier unless otherwise indicated, apart from inventories, and net exports which are expressed as contributions to GDP growth, and the unemployment rate and labour force participation rate which are per cent of labour force and civilian population (for the age cohort indicated). AUS-M model simulations are based on the September quarter 2008 national accounts.

*Data source*: Treasury UEFO, AUS-M model simulation

Detailed wage impact estimates and Monash long-run results

The following results show the long run effects in Monash Multi-Regional Forecasting (MMRF) model. The wage shock imposed is that of the combined effect of the Commission’s 2006-2008 decisions as discussed in the text, using the ABS break-downs of federal Pay-Scale-reliant employees by industry and occupation. The long-run closure for Monash is used where total employment is set to its baseline level and the model solved for the aggregate wage, while the capital stock is allowed to adjust to its equilibrium level. (This is equivalent to the AUS-M results presented in the text where prices, output and capital stocks have fully adjusted to the shock and aggregate real wages have returned to their pre shock levels.) Hence the only wage effects that remain are those that stem from the changed relativities between occupations and industries introduced by the shock. The model accounts for the flow on effects through the input output data – one industries output being another’s input – which leads to some reallocation of the initial effects across industries. But broadly speaking the impacts reflect the pattern of wage changes by industry and occupation which in turn reflect the pattern shown in Tables 7 and 8 in the body of the report and Table 31 below.[[60]](#footnote-60)

0.24 **Long run employment impacts by industry and occupation – Australia**



*Data source:* MMRF model simulation

0.25 **Long run employment results – New South Wales**



*Data source:* MMRF simulation

0.26 **Long run employment impacts – Victoria**



*Data source:* MMRF simulation

0.27 **Long run employment impacts – Queensland**



*Data source:* MMRF simulation

0.28 **Long-run employment impacts – Western Australia**



*Data source:* MMRF simulations

0.29 **Long-run employment impacts – South Australia**



*Data source:* MMRF simulation

0.30 **Long-run employment impacts - Tasmania**



*Data source:* MMRF simulation

31 **Direct wage shock by industry and occupation**



*Note:* Percentage point contribution to total in each cell.

*Data source:* ABS Cat 6206.0 unpublished data, AFPC decisions and author estimates

Comparison with previous model results

This appendix provides a comparison of the results presented in this report to previous Australian model based studies. To do this it is useful to first have a broad understanding of the different types of models used to analyse the impacts of minimum-pay scale change in the past, and the how the labour market specifications differ between the models. The following section therefore provides some brief background on the models focussing on the labour market.

## Background on the models

The evolution of the different types of Australian models typically used in applied macro-economic analysis is set out in stylised form in Figure 28 below.

32 **Sketch of model evolution**



*Notes:* NIF stands for Treasury National Income Forecasting model (pronounced as in knife by the original builders). SVAR for structural vector autoregressive model, DSGE for dynamic stochastic general equilibrium model, RBC for real business cycle model NAFF for National Accounts Forecasting Framework used by Treasury

*Data source: Outlook Economics*

Of these there are two types that have been used in the analysis of the impact of award wage increases. The first are macro-econometric models like the Treasury Macroeconomic TRYM model, or KPMG Econtech’s Murphy model. This style of model is still used extensively around the world for macroeconomic forecasting and policy analysis. These models are in some ways descendants of the early Keynes-Klein models, such as the 1970s Treasury National Income Forecasting (NIF) model (Figure 28). Like those models they are econometrically estimated on the basis of quarterly time series economic data. They also allow substantial variation in capital and labour utilisation over the business cycle – assuming short-term stickiness in prices and wages.[[61]](#footnote-61) However they differ substantially from the earlier models, which in the 1970s and 80s came under attack on two sides: by Christopher Sims in regard to their econometric underpinnings (a critique that led to the development of unrestricted vector auto-regression VAR models); and by Lucas, Kydland and Prescott and others for their theoretical consistency particularly time consistency and failure to identify ‘deep parameters’(a critique that led to the development of real business cycle (RBC) models – small dynamic computable general equilibrium models calibrated from theoretical priors).[[62]](#footnote-62)

The response to the Sims and Lucas et al critiques was not an abandonment of structural macro-econometric modelling but a borrowing from both streams of academic work to create a new class of smaller more theoretically coherent models. (Examples of borrowing include error correction models and co-integration techniques from the econometric stream, and a well formulated steady state version of the models from the real business cycle macroeconomic stream.)

*Input-output CGE developments*

At the same time as the early Treasury/ABS teams were developing the first NIF models, the first development of Australian input-output based CGE models was occurring mainly around the ORANI team at Melbourne University in the early seventies and then from 1975 onwards under the auspices of the IMPACT project with the involvement of the Industries Assistance Commission. The first operational version of ORANI became available in 1977. The main subsequent development in this class of models has been the addition of ever increasing amounts of detail to the models, for example across regional dimensions with the development of The Enormous Regional Model (TERM). There have also been attempts to add dynamics to the model, although so far this has mainly consisted of developing techniques to update and solve the model sequentially providing essentially a time series of comparative static results.

*Uses and abuses*

Each type of model has its comparative advantage and its limitations – something that points to using different models to address different aspects of a problem. Input-output CGE models have an advantage in terms of their high level of detail, and their theoretical rigour. However their draw back is that the many thousands of parameters the models need are inevitably calibrated by the model builder, rather than estimated on the basis of historical relationships. There is no tradition of testing or validating the models against historical data (at least in Australia). In comparison the structural econometric models have an advantage in terms of the short-term dynamics needed for forecasting and policy analysis. They are estimated on the basis of historical data, validated by out of sample forecasting and cross checking of simulation properties against various moments in the data and also against the properties of simpler systems such as VAR models, and in forecasting applications are constantly being tested against the data (something that often leads to the refinement of model specifications).

To some extent AUS-M spans the two styles of modelling. It incorporates input-output detail at its core, but is almost entirely estimated on the basis of historical data. However the requirement to estimate the model’s parameters limits its size. Arguably best practice, in many applications, is to use macro-econometric models like AUS-M to provide a picture of dynamic macro effects and then to use the CGE models to fill in the detail at the lower level (to disaggregate the result to a fine level of industry and commodity detail).

## Broad labour market differences

There are significant differences in labour market specifications between the two types of models reflecting their respective uses. The simplest labour market model consists of a supply and a demand curve for labour (Figure 29).

33 **Simple labour market framework**



Essentially, while far more detailed at the industry and occupational level, this is what the Monash labour market consists of – hundreds and hundreds of individual labour demand curves derived from the individual industry production functions.

When the model is shocked it is essentially translating the relative wage effects across industries and occupations into relative employment effects (across the same dimensions). But notice in this system there is no reason for persistent unemployment. To solve the unemployment problem is simply a matter of resetting real wages. To obtain an aggregate employment effect from a wage shock the model is constrained in two ways. Firstly the capital stock is fixed, so firms do not respond by changing their investment and hence their capital stock. Secondly output prices are constrained so that the real wage change is held in. This is referred to as the short run closure.

## Labour market framework in AUS-M

In contrast to the framework used in Monash, and reflecting the different purpose and use of the models, the labour market framework in AUS-M has a more elaborate theoretical set-up, one that allows the model to account for presence of persistently high levels of unemployment in the data, and the evolution of the labour market over time. Essentially it adds three features to the simple set up: The first is a Beveridge curve (unemployment / unfilled job vacancies) relationship. Vacancies also enter into the employment demand equations (where labour demand in each industry is defined as observed employment plus vacancies). As can be seen in Figure 34 one definition of full employment is where unfilled vacancies equal unemployment.

34 **Stylised labour market framework in AUS-M**



NAIRU

As can be seen from Chart 35 the Australian economy has been a long way from this full employment equilibrium (given by either of the 45 degree lines)[[63]](#footnote-63) for the last thirty years.

This then leads to the second two lines for wage setting and price setting. In the model workers and firms are assumed to bargain over nominal wages while only firms have control over setting prices. Wage behaviour is captured in an expectation adjusted Phillip’s curve equation. Price setting equations come out of the production function equations. Essentially the output price equations can be stylised as a mark up of prices over unit labour costs with firms setting prices to attain a risk-adjusted real return on capital in equilibrium.

There is a wealth of other detail in the labour market specifications, for example equations for unemployment by duration, average hours worked by industry and unemployment beneficiaries. The point is this detail allows the model to track the path of unemployment over history – provides a coherent explanation for the movements of unemployment over time.

35 **Australian Beveridge (unemployment versus vacancies) curve**

|  |
| --- |
|  |

*Data source:* ABS Cat No 6202.0 and 6354.0 and auhtor calculations

## Similarities in labour demand specifications

While there are significant differences in the labour market set up between the models, perhaps the important thing in terms of interpreting the employment results, is the similarity in the industry supply side specifications. In particular both AUS‑M and Monash use nested constant elasticity of substitution (CES) production functions in modelling industry supply. At the top layer of this nesting is the combination of capital and labour inputs to produce industry value added. In the case of Monash the elasiticities of substitution between capital and labour in each of the 57 industries is assumed to be 0.5. In AUS-M the elasticities are econometrically derived for each of eleven industries via the joint estimation of the employment, investment and output price equations. Elasticities of substitution range from 0.4 to 0.7 across the different industries.

The other determinant of the relative industry employment effects are the substitution effects between industry outputs as a result of the translation of relative wage changes into relative industry output prices. Again these are estimated in AUS‑M on the basis of available time series historical data whereas they are calibrated in Monash. Essentially the steady state of AUS-M incorporates a small-scale input-output CGE model. As the national accounts input output data that the two models are based on is the same, and as the two models employ the same CES specification for production technology, if there are any differences in the long run industry employment results between the two models these must reflect:

* Elasticity differences (both for capital to labour substitution and commodity for commodity substitution) between those estimated for AUS-M and those calibrated for Monash
* The finer level of industry detail and production layering, and greater industry to industry interactions available in Monash

## Key results from previous modelling exercises

The different modelling exercises have yielded a wide range of results. The key results from the four exercises considered below were as follows:

Commission decisions 2006-2008 – leading to an estimated 0.3 per cent aggregate wage increase - AUS-M model

* Employment 8,000 lower and the unemployment rate 0.05 percentage points higher.

AIRC decisions 1996-2000 – a 1.2 per cent wage increase - TRYM model

* Employment 60,000 lower and unemployment rate 0.3 percentage points higher

AIRC decisions 1996 to 2005 – a 5.1 per cent real wage increase - Monash model

* Employment 510,000 lower equivalent to 5.3 per cent

1 per cent increase in awards – Econtech

* Employment 53,000 lower equivalent to a 0.5 per cent increase in employment.

## Comparison with Econtech results

The Econtech results from the Murphy Multi Regional (MMR) model are very similar to those of both the MMRF and the ORANI models when the short-term closure is used. This is perhaps not surprising given that: the same nested CES production function structure is used; the same national accounts input-output tables; and the same assumed elasticities of substitution between capital and labour of 0.5 in each industry. As discussed in the body of the report the problem with using the short-term closure where the capital stock is fixed and real wage changes are locked in, is that as soon as the shock is implemented both prices and the capital stock begin to change – so these assumptions are never met. Hence the difference with the AUS-M and TRYM results despite similarities in the elasticities of substitution.[[64]](#footnote-64)

## Comparison with Monash results

Perhaps the most surprising result is the very large 510,000 employment effect Monash estimate from the AIRC safety net wage increases from 1996 to 2005 compared to the Joint Governments’ position in each case.[[65]](#footnote-65) This is much higher than the comparable results from the other models.

Two features seem to explain the higher result.

* The first is the higher estimate of the increase in wages being fed into the model. A 5.1 per cent impact on aggregate, before-tax real wages representing the AIRC’s decisions over the period 1996-2005 is much higher than 1.3 per cent increase calculated by DEWSRB for the 1996-2000 period fed into the earlier TRYM simulation.[[66]](#footnote-66) Given that the proportion of workers reliant on award was falling through the period, a figure of around 3 per cent would seem more consistent with the earlier estimate. This presumably would reduce the employment effect to around 300,000.
* The second is the modifications made to the model to run the simulation. In particular there is the addition of another layer to the nested production function specification allowing direct substitution between award and non-award labour within firms. The substitution elasticity at this level is set at 2 which is relatively high – to reflect the assumption that there is a high level of similarity between the two sets of workers. This in turn seems to explain the two distinguishing features of the result: (1) the seeming flow on of the award increase to non-award workers; and (2) the large size of the employment effect. The flow on is not of the traditional type due to the preservation of relativities for example, but results from the fact that the substitution toward the non-award workers is so high that raising wages for award employees drives up demand for non-award employees relative to their supply and leads to a rise in their pay.[[67]](#footnote-67)

The problem with the modification to the specification is that it has not been subject to validation against the historical data. If the specification was correct then as award wages have fallen against other wages over the last ten years, there should have been a surge in the numbers of award workers. Rather the opposite has occurred. As awards have fallen the numbers on awards have fallen. This is because in reality there is no separate supply of award and non-award workers. It is not a characteristic of the employee in the same way as he or she might have occupational or demographic features. Rather it is a characteristic of the payment system chosen by the employer. Whether an employee is put on an award or on an over-award payment is a decision of the employer not the employee. As award wages (or minimum pay scales) have lagged behind the market, employers have increasingly switched employees on to over-award arrangements. Hence the distinction seems somewhat artificial. It might be possible to distinguish between award and non award firms but in this case the substitution effects would be more like the conventional ones.

Working in the other direction the authors also reduce the elasticity of substitution in each industry from 0.5 to 0.15. Overall this leads to an aggregate employment impact which is only marginally higher than that coming out of the short-run simulation of the standard model where the employment reduction is roughly one for one to the aggregate wage increase. The difficulty is that is hard to justify the short-run closure (holding the capital stock constant and restricting aggregate output prices to hold the real wage change constant) when the wage changes being considered were introduced over a ten year period.

## Comparison to earlier TRYM results

The estimated aggregate labour market impacts from AUS-M are somewhat lower than those from the TRYM analysis of the AIRC wage decisions. For example for direct wage effects that add around 0.1 per cent to aggregate wage growth over three years we estimate an unemployment effect of around 0.05 of a percentage point. In comparison in the TRYM analysis of a 0.3 per cent direct effect on aggregate wage growth over four years led to a roughly equivalent percentage point increase in the unemployment rate.

The differences are revealing in terms of the key sensitivities that drive the results. The elasticities of substitution between capital and labour are broadly similar between the two models, with those in AUS-M being estimated at the industry level while those in TRYM are estimated at the economy wide level for the private business sector. Part of the difference is due to the fact that the economy was much closer to full employment in the period 2006-08 than it was between 1996 and 2000. When unemployment is higher, unfilled job vacancies are lower and a much greater proportion of the increase in labour demand[[68]](#footnote-68) is absorbed by a fall in unfilled vacancies (Chart 11 in the Report). Another difference comes from the monetary policy reaction, which in turn is due to differences in the speed of pass through to prices the two sets of results (and hence the translation of the decrease in wage inflation to price inflation). The interest rate response in the earlier TRYM analysis was larger than that required to control inflation in the current simulations. (This in turn is partly because the shock in the previous modelling was longer lasting – over four years – compared to three years for the present analysis.)

More details on the specific simulations are contained in the section below.

## Monash modelling of the AIRC safety net decisions 1997-2005.

Three simulations were run using a modified version of MONASH model reflecting three different counterfactuals: See Table 36 for concise results.

* *If the AIRC had granted higher safety net award wages increases in line with ACTU recommendations.* The outcome of this simulation was that aggregate employment would have been reduced by 3.8%, or 365,000 jobs. Almost the entire impact of the reduction in employment is borne by award workers – that is, where award employment falls by 15.83%, non-award employment falls by 1.57% in the simulation.
* *If the AIRC had granted lower safety net award wages increases in line with Commonwealth Government recommendations.* Under this simulation aggregate employment would have been increased by 5.31%, or 510,000 jobs. Also with this simulation award workers were affected more than their non-award counterparts, with award employment increasing by 28.46%, while non-award employment increased by 1.02%.
* *If the AIRC had granted no safety net increases.* Under this simulation aggregate employment would have been increased by 6.96%, or 669,000 jobs. In this simulation award employment rose 38.41%, while non-award employment rose 1.14%.

The results imply that with zero safety net increases, aggregate employment in 2005 would have been 10.76% (i.e. 3.8 + 6.96) higher than if the ACTU’s recommendations had been followed. This shows that safety net decisions have important macroeconomic implications.

36 **Deviation results (%) by policy run**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Deviation for ACTU recommendation | Deviation for Commonwealth recommendation | Deviation for  zero safety  net change |
| Employment, non-award workers | -1.57 | 1.02 | 1.14 |
| Employment, award workers | -15.83 | 28.46 | 38.41 |
| Aggregate employment (hours) | -3.80 | 5.31 | 6.96 |
| Real before-tax wage rate, non-award workers | 3.05 | -3.47 | -4.24 |
| Real before-tax wage rate, award workers | 13.30 | -17.17 | -20.77 |
| Real before-tax wage rate, average | 4.11 | -5.14 | -6.31 |
| Real GDP | -2.88 | 3.50 | 4.37 |
| Real Consumption | -2.80 | 3.27 | 4.12 |
| Real Investment | -5.24 | 7.15 | 8.90 |
| Aggregate capital | -1.50 | 1.78 | 2.23 |
| Export Volumes | -3.90 | 4.62 | 5.67 |
| Import Volumes | -3.34 | 4.17 | 5.16 |
| Real exchange rate | 2.07 | -2.73 | -3.17 |
| Terms of Trade | 1.11 | -1.27 | -1.52 |
| Real after-tax wage rate | 2.44 | -3.78 | -4.88 |
| Average income tax rate | 8.49 | -9.91 | -12.30 |

*Assumptions*

The model was run twice for each simulation, with a base case run followed by a “policy run”. The policy run is the base case *plus* a perturbation in a group of variables of interest, in this case award wage rates. In the base case for the paper, the AIRC’s decisions are assumed to be in place, that is, the safety net review adjustment to award wages in 1997 is $10, in 1998 it is $14 etc. as per Table 37. In each policy run, deviations away from base case were assumed as per each relevant recommendation outlined in Table 37.

37 **Safety net review adjustments to weekly award wage rates ($)**

|  |  |  |  |
| --- | --- | --- | --- |
| Year | AIRC  Decision | ACTU  Recommendation | Commonwealth Recommendation |
| 1997 | 10 | 20 | 8 |
| 1998 | 14 | 20.6 | 8 |
| 1999 | 12 | 26.6 | 8 |
| 2000 | 15 | 24 | 8 |
| 2001 | 13 | 28 | 10 |
| 2002 | 18 | 25 | 10 |
| 2003 | 17 | 24.6 | 12 |
| 2004 | 19 | 26.6 | 10 |
| 2005 | 17 | 26.6 | 11 |
| Total | 135 | 222 | 85 |

The hypothesized variations in the safety net outcomes are assumed to be fully reflected in the wage rates of award workers.

Jobs were divided in each year, t, into 238 activities (a=1,2,…,238), where the first 119 activities are award jobs and the second 119 activities are non-award jobs (7 occupations by 17 industries). Each activity has an occupational and sectoral dimension, as outlined further in the report.[[69]](#footnote-69)

The wage rates for the first 119 activities are determined exogenously, so do not depend on other economic variables such as labour supply or demand. However, in non-award activities, wages were assumed to be determined by the supply and demand for labour.

In the application of MONASH there are three levels of substitution that determine how employment in the policy run moves relative to employment in the base case run:

* substitution between award and non-award jobs of the same occupation group, where a high level of substitution (elasticity of substitution = 2) is assumed;
* substitution between jobs in different occupation groups, where a low level of substitution (elasticity of substitution = 0.35) is assumed ; and
* substitution between labour and capital, where an empirically realistic (such that capital is relatively fixed) short-run macro employment response to changes in the economy-wide average real wage rate would necessitate a low L-K substitution elasticity (assumed equal to 0.15).

In defining unemployment, a broader view than that of the ABS was adopted. People who, while not actively seeking a job, would take a job if it were offered. Therefore, the definition of the unemployed encompasses discouraged workers and others who could be drawn into employment if jobs were readily available.

It is assumed that the shocks will not affect the budgetary position of the government, and hence public expenditure is assumed to remain at its baseline level. To ensure this is the case, in the policy runs endogenous shifts in the rate of a general tax on labour and capital income are allowed. These shifts are designed to keep the public sector deficit to GDP ratio on its base case path.

The wage shocks will, however, affect household disposable income and thus will affect real private consumption. The shocks are also assumed to have no effect on the consumer price index.

## Econtech 2006.

Four hypothetical scenarios were run through Econtech’s general equilibrium Murphy Model Regional (MMR) Model, which is a multi-region, multi-industry model of Australia, as follows:

* Scenario 1 – the lowest one-third of Australian Pay and Classification Scales (APCS) wages in Australia is increased by 10 cents per hour. The MMR simulation showed a decrease of national employment of 0.11%, or around 10,700 jobs.
* Scenario 2 – the lowest one-third of APCS wages in Australia are increased by 1 per cent. This resulted in a reduction in national employment of 0.15%, or around 15,000 jobs.
* Scenario 3 – all APCS wages in Australia are increased by 10 cents per hour. This resulted in a reduction in national employment of 0.33%, or around 32,800 jobs.
* Scenario 4 – all APCS wages in Australia are increased by 1 per cent. This resulted in a reduction in national employment of 0.53%, or around 52,300 jobs.

With scenarios 1 and 2, around 7% of employees are directly affected, while under scenarios 3 and 4, around 20% of employees are directly affected.

38 **Deviation results (%) of MMR simulation by scenario run**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 |
| Employment | -0.11 | -0.15 | -0.33 | -0.53 |
| Real GDP | -0.07 | -0.09 | -0.20 | -0.33 |
| Labour Cost | 0.07 | 0.09 | 0.20 | 0.31 |
| Labour Productivity | 0.04 | 0.06 | 0.13 | 0.21 |
| Real Consumption | -0.08 | -0.11 | -0.25 | -0.40 |

Assumptions

Estimates of labour cost increases by industry were calculated as both direct and indirect contributions. The direct contributions represent the increase in APCS wages under the four scenarios and are estimated as the difference between the average APCS wage in each industry and the hypothetical average APCS wage in each industry under the four scenarios. The indirect contributions represent the flow-on effects of higher federal minimum and APCS wages to the wages of employees on agreements. It is assumed that each 5 per cent increase in APCS wages translates to a 1 per cent increase in the wages of employees on agreements.

The baseline scenario generated by MMR assumed no change in wage rates during the timeframe of the analysis, and was the case against which the four alternative wage increase scenarios were compared. Like the standard version of Monash, MMR assumes an elasticity of substitution between labour and capital of 0.5 in each industry. The authors argue that with a profit share of national income of around 0.3, this implies a wage sensitivity of employment demand in MMR of -1.67 (i.e. -[0.5/0.3]).

## Treasury TRYM Model 2001

The modeling was in two parts. The first was of the ACTU’s 2000 claim relative to the joint governments’ proposal. The second was of the difference between the Commission’s previous decisions and the in the cases from 1996 to 1999.

The ACTU’s claim was estimated to add 0.86 of a percentage point to aggregate wages growth over 2000-2001 and 2001-2002, over and above the joint Government’s proposed safety net adjustment. The Treasury assessment of the macroeconomic impacts of the claim is conducted by taking the estimate of the direct effect of the claim relative to the joint Government’s position, and entering that estimate into the TRYM model. Two different response assumptions have been modelled:

* First, monetary policy and financial markets do not respond to the higher inflation generated by the wage claim (i.e. where inflation effects are allowed to flow through); and
* Second, monetary policy and financial markets react to unwind some of the additional inflation (i.e. where the additional inflation is not allowed fully to flow through, but at the cost of lower growth and employment).

39 **Deviation from baseline with ACTU claim model results (%)**

|  |  |  |
| --- | --- | --- |
|  | Claim Accepted (Monetary policy change assumed) | |
|  | 2001-02 | 2002-03 |
| Inflation | 0.4 | 0.3 |
| GDP Growth | -0.2 | -0.5 |
| GDP Level | -0.2 | -0.7 |
| Employment Growth | -0.2 | -0.3 |
| Employment Level | -0.2 | -0.5 |
| Employment Level (‘000) | -15 | -45 |
| Unemployment Rate | 0.1 | 0.3 |
| Wages Growth | 0.6 | -0.1 |

The joint Governments advocated a safety net wage increase of $8 per week with a cap which would have limited the impact on aggregate wage growth. The AIRC has awarded larger uncapped increases which have considerably added to nominal wage growth. The contribution to wage growth of the decisions has varied between a 1/4 and a 1/3 of a percentage point above that of the joint Governments’ position. The results of estimates of the macroeconomic impact had the AIRC accepted the joint Governments’ recommendations are presented in Table 5. Table 5 shows us had the Governments’ positions been accepted, there would have been a positive impact on the labour market and economy more generally, relative to the base case of what action the AIRC actually took.

40 **Estimated impact of the joint Governments’ positions relative to actual AIRC decisions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1997-98 | 1998-99 | 1999-2000 | 2000-01 |
| Inflation | -0.3 | -0.1 | -0.1 | 0.1 |
| GDP Growth | 0.1 | 0.3 | 0.4 | 0.0 |
| GDP Level | 0.1 | 0.3 | 0.7 | 0.7 |
| Employment Growth | 0.1 | 0.2 | 0.3 | 0.2 |
| Employment Level | 0.1 | 0.2 | 0.5 | 0.7 |
| Employment Level (‘000) | 6 | 20 | 45 | 60 |
| Unemployment Rate | -0.1 | -0.2 | -0.3 | -0.4 |
| Wages Growth | -0.5 | -0.3 | 0.2 | 0.2 |

Background on the models used

## The Monash Multi-Regional Forecasting Model

This study uses the Monash Multi-Regional Forecasting (MMRF) model by the Centre of Policy Studies (CoPS) at Monash University.[[70]](#footnote-70) The MMRF model has been used widely by the CIE, Productivity Commission and others to analyse the effects of public policy in Australia. Most recently, it was used by Australian Treasury and the Garnaut review to model the impacts of climate change and an emission trading scheme.

The CIE has made a number of modifications to the published version of the MMRF model. Specifically, the CIE has enhanced the published frameworks of the MMRF model by:

* upgrading its specification of state and territory taxes (to better reflect their incidence);
* updating state macro aggregates, employment and labour force, and state and federal government revenues and expenditures to 2005-2006 values (from an original 2001-02 database); and
* improving the specification of labour supply response and interstate movements of labour and population.

## Overview of the MMRF model

The MMRF model is a multi-region dynamic computable general equilibrium (CGE) model of the Australian economy. It models the six states and two territories as separate economies with 58 industries in each jurisdiction, recognising:

* domestic producers classified by industry and domestic region;
* eight region-specific household sectors;
* an aggregate foreign purchaser of Australia's exports;
* eight state and territory governments; and
* the Australian Government.

The 58 industries included in each region are presented in table D.1.

D.1 **The MMRF industries**

|  |  |
| --- | --- |
| 1. Livestock | 30. Electricity generation — hydro |
| 2. Crops | 31. Electricity generation — other |
| 3. Forestry | 32. Electricity supplya |
| 4. Fishing | 33. Gas supply |
| 5. Coal | 34. Water & sewerage services |
| 6. Oil | 35. Construction services |
| 7. Gas | 36. Wholesale trade |
| 8. Iron ore | 37. Retail trade |
| 9. Other metal ores | 38. Mechanical repairs |
| 10. Other mining | 39. Hotels, cafes & accommodation |
| 11. Food, beverages & tobacco | 40. Road passenger transport |
| 12. Textiles, clothing & footwear | 41. Road freight transport |
| 13. Wood products | 42. Rail passenger transport |
| 14. Paper products | 43. Rail freight transport |
| 15. Printing | 44. Pipeline transport |
| 16. Petroleum products | 45. Port services |
| 17. Chemicals | 46. Transport services nec |
| 18. Rubber & plastic products | 47. Water freight transport |
| 19. Other non-metal mineral products | 48. Ship charter |
| 20. Cement & lime | 49. Air passenger transport |
| 21. Iron & steel | 50. Air freight transport |
| 22. Other non-ferrous metals | 51. Communication services |
| 23. Metal products | 52. Finance |
| 24. Transport equipment | 53. Business services |
| 25. Other equipment | 54. Ownership of dwellings |
| 26. Other manufacturing | 55. Government administration & defence |
| 27. Electricity generation — coal | 56. Education |
| 28. Electricity generation — gas | 57. Health |
| 29. Electricity generation — oil | 58. Other services |

*Source:* The CIE-Regions database.

The model contains explicit representations of intra-regional, inter-regional and international trade flows based on regional input-output data developed at CoPS. It also includes detailed data on state, territory and Australian Government budgets. Second round effects are determined on the basis of the model's input-output linkages, assumptions about the economic behaviour of firms and households, and resource constraints. Important elements of the theoretical structure of the CIE-Regions model include the following:

* producers respond to changes in the competitiveness of Australian industry;
* demand for Australian exports responds to the export price of Australian products;
* producers alter their use of labour, produced capital and agricultural land in response to changes in the relative cost of these factors;
* households vary consumption of commodities in response to changes in household income and relative prices of goods consumed;
* productivity improvements reduce resource costs;
* inter-fuel substitution in the generation of electricity;
* explicit modelling of the national electricity market;
* inter-modal substitution in road and rail transport; and
* modelling of government finances that aligns as closely as practicable to the ABS government finance data.

Key outputs from the CIE-Regions model include projected changes in:

* national and state outputs as measured by gross domestic and state products;
* industry outputs as measure by gross value added of industry;
* greenhouse gas emission and
* revenues and expenditures for state and for Australia.

Additionally, the CIE version of the MMRF model can also produce results at a regional level. The list of regions for each state is shown in table D.2. The two territories have their own region. The disaggregation into statistical division is a tops-down disaggregation that allows regions to vary according to the economic activities that they are engaged in. The model reports both employment and value added for each region.

D.2 **Regions available in the CIE version of MMRF**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NSW | VIC | QLD | SA | WA | TAS |
| Sydney | Melbourne | Brisbane | Adelaide | Perth | Greater Hobart |
| Hunter | Barwon | Gold Coast | Outer Adelaide | South West | Southern |
| Illawarra | Western District | Sunshine Coast | Yorke & Lower North | Lower Great Southern | Northern |
| Richmond-Tweed | Central Highlights | West Moreton | Murray Lands | Upper Great Southern | Mersey Lyell |
| Mid North Coast | Wimmera | Wide Bay Burnett | South East | Midlands |  |
| Northern | Mallee | Darling Downs | Eyre | South Eastern |  |
| North Western | Loddon | South West | Northern | Central |  |
| Central West | Goulburn | Fitzroy |  | Pilbara |  |
| South Eastern | Ovens Murray | Central West |  | Kimberley |  |
| Murrumbidgee | East Gippsland | Mackay |  |  |  |
| Murray | Gippsland | Northern |  |  |  |
| Far West |  | Far North |  |  |  |
|  |  | North West |  |  |  |

*Note:* Territories are each one region.

*Source:* The CIE-Regions model.

## Short run and long run closures

The MMRF model can be run in either a dynamic or comparative static mode. In either mode, the model reflects a view about the way that the economy will adjust to economic changes.[[71]](#footnote-71) In the short run, the economy is less able to respond to policy changes by adjusting the composition of industrial activity and wages. In this case there can be unemployment. In the longer-term, the economy will fully adjust. All labour will be used and capital is allocated to the sectors according to required rates of return.. In the long-run

* The real wage adjusts to ensure that national employment is fixed. Wage relativities between occupational groups and industries can be fixed or adjusted exogenously according to the requirements of the simulation. Employment by occupation, industry and state adjusts.
* Industry capital stocks adjust to equalise expected rates of return on capital. Industries’ demands for investment goods are linked by an exogenous investment/capital ratio to changes in their capital stock.

In the short-run

* real wages are fixed and unemployment is possible; and
* capital stocks in each industry in each state are fixed.

The ORANI model of the Australian economy

ORANI is a comparative static Computable General Equilibrium (CGE) model of the Australian economy. This report uses the Fiscal Horridge version of the ORANI model. This version of the model differs from the standard ORANI in that it has a richer specification of taxes, allows the income earned by primary factors to go back to households and allows wealth accumulation.

ORANI can be run with two different closures, that is, choices of which model variables adjust in response to the shock. There is a short-run closure (corresponding to an adjustment period of a couple of years) and a long-run closure (corresponding to adjustments that may take up to ten years). This report uses the long-run closure of the model. Some of the assumptions underlying the long-term closure of ORANI are as follows:

* Profit maximisation: the representative business in each industry chooses inputs and outputs to maximise profit subject to prices, and a production function exhibiting constant returns to scale. This involves choosing inputs of land, capital, labour and intermediate goods and services, and outputs for the local and export markets.
* Labour market equilibrium: in the long-run the labour market is assumed to attain equilibrium, so that an economic shock has no lasting effect on total employment. This assumption is implemented by fixing the level of total employment.
* External trade balance: in the long-run, external balance is assumed to be achieved, so that trade shocks have no lasting effect on the trade balance. This assumption is implemented by setting the trade balance equal to the cost of servicing payments on foreign-owned capital — the real exchange rate needed to achieve this outcome is determined by the model
* Budget balance: in the long-run, fiscal policy must be sustainable. Specifically, in ORANI the government budget is assumed to be in balance. It is necessary to designate a swing fiscal policy instrument to achieve that outcome. Generally, the rate of tax on labour income is used as the swing fiscal policy instrument.
* Private savings: in the long-run the level of private sector savings and associated asset accumulation must be accounted for. Further, as mentioned before, Fiscal Horridge version of the ORANI allows for accumulation of assets.

The ORANI model distinguishes about 100 sectors and describes:

* the demands by industries, households and government for domestically produced and imported goods and primary factors (that is labour, capital and land);
* the supplies of commodities (for example crops and livestock, manufactures and services) by domestic producers to the local and export markets;
* the balance between the demand and supply of commodities and primary factors; and
* macroeconomic outcomes (gross domestic product, balance of trade, etc.), which are the sum of their industry and commodity components.

ORANI captures the linkages within an economy by modelling the economic behaviour and interactions of producers, consumers and governments. The in-built behaviour in the model is that consumers are assumed to maximise utility and producers to maximise profits. Markets are assumed to be competitive and there are constant returns to scale. The economy is composed of consumers and producers. Producers can purchase their inputs from any other industry in Australia as well as imports from overseas. Producers supply goods and services to consumers who have a choice about whether they purchase imports based on price and tastes. Producers also supply the export market. Producers have a degree of flexibility in how they combine inputs, using that combination which minimises costs. Technological change is exogenous.

The model reflects a combination of two key components: its database and the theoretical structure embodied in the system of equations of the model. A schematic representation of the production technology used in the ORANI framework is shown below.

Of key importance in this model is that workers can make choices between the occupations they engage in according to the wage they can earn in a particular industry. This labour can be used in varying proportions with capital and land. Also, producers can make flexible choices between the uses of imported or domestic varieties of each commodity from industries, such as motor vehicles. However, each commodity and primary factors in total are used in fixed proportions as given by the input/output structure.

Original documentation of ORANI including a detailed description of the underlying structure of the model and how to interpret results can be found in Dixon et al (1982).

The AUS-M Model

The AUS-M Model is a quarterly time-series structural model of the Australian economy. It is essentially an outgrowth of the Treasury Macroeconomic (TRYM) model. It is an evolution of that model towards a CGE style model incorporating input-output based demand systems and far greater industry and commodity detail than the original model, but retaining the same overarching design philosophy. Like the original TRYM model it has three broad sectors (the household sector, the business sector and the public sector) and three markets: the product market, the labour market, and the financial market. Systems of equations link each sector and each market. Like TRYM each equation has a long run representation. The long run components are combined to form a steady state version of the model that is simulated to provide forward values for expectational variables. Unlike models such as ORANI, GTAP and G-Cubed where parameters are largely imposed by the model builder, the parameters in AUS-M are almost entirely estimated on the basis of the historical time series data. (Doing so limits the size of the model, so it is not as detailed as a traditional CGE model.) The model is designed to be updated quarterly and used for detailed forecasting and sensitivity analysis. The comparative advantage in a model of this kind comes from being constantly tested against the data. If structural change is occurring in any individual sector of the economy this is immediately reflected in the model’s parameters. It has a good fit of the historical data, and hence is able to provide a coherent explanation of historical developments. Its focus on dis-equilibrium adjustment processes, for example in the dwelling and labour markets, and its empirical grounding make it an ideal complement to the more detailed models (or alternatively the more detailed models are an ideal complement to it).

LNJ model and AUS-M

The labour market framework in AUS-M has some similarities to that originally set out by Layard, Nickell and Jackman (LNJ) in their influential 1991 book *Unemployment: Macroeconomic Performance and the Labour Market*. This section provides a little background on the model.

The rise in unemployment in the OECD through the 1970s and 1980s and the persistence of both high inflation and unemployment following the oil price shocks of 1973 and 1980 led to a substantial amount of academic work to explain how this could occur. Out of this literature emerged a loose consensus that the tendency for the economy to generate damaging wage price spirals and persistent unemployment related not only to problems in the labour market (such as job protection legislation, or generous unemployment benefits, or the tendency of some economies to generate high levels of long term unemployment) but also lack of competition in the product market. Firms that were shielded from competition or had market power would tend to pass on wage increases in the form of higher prices. This led to higher inflation, high interest rates as central banks reacted to bring inflation under control and consequently high unemployment.

Hence one part of the solution to the unemployment problem was to make product markets more competitive. This was a key recommendation of the OECD’s 1994 Jobs Strategy - a recommendation which followed intensive study by the Secretariat and widespread consultation with member countries. It was also something picked up in the Australian Committee on Employment Opportunities 1993 Green Paper *Restoring Full Employment*. To summarise the findings of that study, the persistent high levels of unemployment that Australia experienced through the late 1970s and 1980s were not caused by search factors, or a mismatch of skills to available jobs, but by problems in wage setting and price setting. A key part of the strategy that the Green Paper set out for reducing unemployment was not only to reform wage setting and assist the long term unemployed back into the workforce via active labour market programmes, but also to increase the level of competition in the product market. That in turn would both increase productivity and reduce the tendency for the economy to generate wage price spirals.

*A simple model leading to a decomposition of changes in equilibrium unemployment*

The model that describes this process can be simply set out in two equations, consisting of a price setting curve and a wage setting curve. (This in turn is a simplified version of the more detailed model set out in LNJ, 1991.)

*The model*

Price Setting – this represents the mark up of prices over wages where *0* represents the degree of market power that firms have and *1* derives from the marginal revenue product condition – in a perfectly competitive market where the firm is a price taker, where there are no barriers to entry or alternatively capital is free to adjust, and the firm faces a perfectly elastic long run demand curve for its product both *0* and *1* would be zero.

1. 

Wage Setting – this represents the mark up of wages over prices where *0* represents union bargaining power and *1* how responsive that bargaining power is to the level of unemployment - the larger the responsiveness the lower the ultimate level of unemployment.[[72]](#footnote-72)

2. 

Peace is achieved in the battle of the mark ups when unemployment is at an equilibrium *u\** given by:

(a) 

It is clear from this that unemployment is a two sided process. If product markets were perfectly competitive and if unions had no bargaining power then unemployment (in so far as it related to wage setting and price setting factors) would fall to zero. In other words the only unemployment that would exist would be due to normal frictions in the labour market (that is due to normal turnover, levels of mismatch and the time taken to find jobs – which in turn depends on the search intensity of the unemployed and the level of their reservation wage). Evidence from AUS-M indicates that this latter level of unemployment is currently around 3 per cent of the labour force. The model also indicates that there has been little movement in this level over time so that the bulk of unemployment experienced during the 1970s, 1980s and 1990s stemmed from price setting / wage setting factors.

The model also indicates that the price/wage setting component of unemployment has fallen from a peak of around 5 per cent in the late 1980s to a little less than 1 per cent now. The bulk of the four percentage point fall in this measure would be due to reforms to the labour market such as the decentralisation of wage bargaining, the changing structure of the workforce with far more professional and skilled workers, and the decline in union membership. However, part would also have been due to increased levels of competition in the economy, with the opening up of the economy to trade and foreign investment, the deregulation of the financial system, the reform and privatisation of public enterprise and the implementation of competition policy. Based on international evidence these changes have probably accounted for around a one to one and half percentage points of the reduction.

*Translating the model into a conventional expectations-augmented Phillip’s curve*

The simple two equation model can be translated into a standard expectations augmented Phillip’s curve which is then estimated on the basis of the time series wage and price data as follows:

1+2 implies 2(b) 

Substituting 2(a) into 2(b) implies: 2(c) 

To translate the model into a dynamic setting we need to make some assumptions about how quickly prices adjust. Due to overlapping contracts and price indexation there is inevitably some nominal inertia in Price Setting:

3. 

For simplicity in exposition we can assume that in 2. That is workers price expectations are based on current outcomes. This then gives a reduced form price Phillip’s curve as follows:

4. 

In which case, the coefficient on the unemployment gap term depends on the degree of nominal inertia *0* in the product market, the extent of competition in the product market, and the extent to which real wages respond to unemployment in the labour market (i.e. or how much the workers bargaining position responds to the level of unemployment). That is, if prices adjust very rapidly the reduced form slope will be high, and the increase in unemployment required to reduce inflation will be low.

Given 2. 

4. can be rewritten as a wage Phillips curve

5. 

1. Figures are for the first quarter of 2011. [↑](#footnote-ref-1)
2. For example the fit of the model’s industry employment equations is actually slightly better over periods of recession than it is during periods of normal growth, suggesting that if present the effect isn’t particularly large, at least at the industry level. [↑](#footnote-ref-2)
3. These cyclical effects are captured by lags on the output term in the various industry employment equations. [↑](#footnote-ref-3)
4. In both cases (AIRC and Commission) the increases in total minimum wage rates were somewhat lower because the decisions have typically awarded a flat amount, sometimes truncated above a certain level to encourage greater participation in workplace bargaining, particularly for those on higher incomes. [↑](#footnote-ref-4)
5. The wage shock was measured as the difference between the Joint Governments’ position and the outcome in each case. [↑](#footnote-ref-5)
6. Again relative to the Joint Governments’ position in each case. [↑](#footnote-ref-6)
7. A two tiered system of wage increases had been introduced under Accord Mark III in 1987 where unions were encouraged to bargain over productivity related wage increases at the enterprise level, over and above the mandated increase from the AIRC. [↑](#footnote-ref-7)
8. According to the Act the Commission:

   “in performing its wage-setting function is to promote the economic prosperity of the people of Australia having regard to the following:

   (a) the capacity for the unemployed and low paid to obtain and remain in employment;

   (b) employment and competitiveness across the economy;

   (c) providing a safety net for the low paid;

   (d) providing minimum wages for junior employees, employees to whom training arrangements apply and employees with disabilities that ensure those employees are competitive in the labour market.”

   This was a large change from the objectives of the AIRC under the 1996 Act, which did not mention the unemployed, a point referred to in a number of decisions by the AIRC (in discounting arguments about the adverse impacts of safety net increases on the unemployed). [↑](#footnote-ref-8)
9. ABS Cat No 6306.0.55, Employee Earnings and Hours, Australia – Preliminary results for August 2008 [↑](#footnote-ref-9)
10. Although at the same time the Commonwealth legislation expanded the coverage of Federal awards under the corporations power. [↑](#footnote-ref-10)
11. The term Pay-Scale-reliant workers in this report refers to those workers paid at rates set by the Australian Pay and Classification Scales. [↑](#footnote-ref-11)
12. August 2008 figure ABS Cat No 6306.0.55. The ratio for all award workers is .523. The ratio for full-time employees is .609. [↑](#footnote-ref-12)
13. Although the AIRC had similar tapered increases in 1998 and 1999. [↑](#footnote-ref-13)
14. The increase is measured for the period from the September quarter 2005 to the December quarter 2008. The CPI measure used is the index excluding food and fuel prices [↑](#footnote-ref-14)
15. The contrast to the commodity price booms of the early 1970s and early 1980s couldn’t be greater. In both cases the interaction of the large collective increases in the leading sectors with the AIRC’s legalistic desire to preserve “comparative wage justice” led to massive centralised wage increases that impacted directly on most of the workforce and led to sharply higher inflation, tighter monetary policy and a collapse in investment and employment. [↑](#footnote-ref-15)
16. ABS Cat No 6206.0. The relative proportions can be gauged from the position of the average (red) line relative to the non-award (black) line and the award-reliant (blue) line in Chart 3. The closer the average is to the black line, the lower is the proportion of award-reliant workers at that wage level. [↑](#footnote-ref-16)
17. Moreover the lower increases in award wages helps to explain part but not all of the decline in the relative position of the low skilled shown in Chart 2 and also the relative decline of wages in the sectors with the greatest proportion of award reliant employees, namely accommodation cafes and restaurants (57.2 per cent) and retail trade (28.7 percent) incomes where wages have fallen by 8 per cent and 6 per cent respectively, relative to average over the last 11 years. [↑](#footnote-ref-17)
18. Relative to baseline. [↑](#footnote-ref-18)
19. DEWRSB, 2000, P.152 [↑](#footnote-ref-19)
20. DEWSRB, 1998, P.94. [↑](#footnote-ref-20)
21. The AWIRS 95 Survey indicated that 53 per cent of workplaces had a mixture of payment systems, DEWRSB, 1998, P91. [↑](#footnote-ref-21)
22. Note that some industries with high proportions of award workers such as health and property and business services have shown above average wage growth, and hence award wages are only one part of the story. Accounting for the slower growth in award wages relative to average would account for around a third of the decline in relative wages in accommodation, cafes and restaurants over recent years. [↑](#footnote-ref-22)
23. Households will also respond to rising wages, rising unemployment, and higher interest rates by changing dwelling investment, renegotiating wages and altering labour supply (for example if unemployment rise some people will exit the labour market and do other things – for example young people unable to find work might decide to do another year at school or reenrol at TAFE or at university.) [↑](#footnote-ref-23)
24. Unless the business is a price taker, such as those in mining or agriculture, where prices for output are set on world commodity markets. [↑](#footnote-ref-24)
25. Note that neither of the models goes down to the level of the firm. Employment effects will be greater for firms with employees who are mainly award dependent. [↑](#footnote-ref-25)
26. Employment is defined in terms of total hours worked. [↑](#footnote-ref-26)
27. In other word the elasticity of substitution is the slope of the partial derivative of employment with respect to real unit labour costs. For an extended discussion on the various analytical definitions of labour demand and associated confusions see Lewis and MacDonald 2002 and Dowrick and Wells 2004. Note that in a full model simulation context nothing is fixed apart from the underlying rate of labour productivity growth, so that the various partial definitions are of limited relevance. The key parameter we can compare across models is the elasticity of substitution. [↑](#footnote-ref-27)
28. This arguably is a precondition for macroeconomic stability. Otherwise real interest rates fall with a positive shock that leads to a rise in inflation, reinforcing rather than ameliorating the shock. [↑](#footnote-ref-28)
29. The AFPC wage impacts are distributed across the quarters and introduced from the December quarter 2006 to the September quarter 2009. (The underlying wage data in the model is seasonally adjusted, i.e abstracts from regular seasonal factors such as the implementation of the wage decision, essentially spreading it out across the year. Hence in introducing the shock it is also appropriate to spread it out over the year.) [↑](#footnote-ref-29)
30. This is the response for a wage shock that is introduced quarter after quarter over three years. The return of consumption to control is much quicker for a one off wage shock. For a detailed description see the Macroeconomics of the Treasury (TRYM) Macroeconomic Model at <http://www.treasury.gov.au/contentitem.asp?NavId=016&ContentID=235> , and Table B3 in the accompanying Users’ Guide. Consumption is unchanged in the first year despite falling wages. [↑](#footnote-ref-30)
31. Work by NATSEM indicates that 10 per cent of low paid employees have effective marginal tax rates(emtrs) higher than 50 per cent, compared to 9 per cent with higher than 50 per cent emtrs for all employees (Harding et al 2006). So this may not be a particularly significant point. Again the detail required to settle these issues is not contained in the models. [↑](#footnote-ref-31)
32. For example a key requirement for macroeconomic stability is that the Reserve Bank responds to an increase in underlying inflation by raising short term interest rates by at least as much as the increase in inflation. This applies whether the inflation increase is 1 per cent or 0.1 per cent. A 0.1 per cent increase in the short term interest rate can be viewed as an increased probability of a 0.25 of a percentage point discrete increase in the official cash rate. (The relevant variable in the model is the 90 day bill rate which attaches probabilities to future moves in the cash rate.) [↑](#footnote-ref-32)
33. For an early example see Brooker and Murphy, 1988. [↑](#footnote-ref-33)
34. For example an increase in manufacturing output prices would feed through to the price of durable consumer goods (via the same input output coefficients) leading consumers to substitute away from durables towards other goods and services. This in turn would lead to a lower demand term for manufacturing output. This is one mechanism for the price effect. However the main one is via direct substitution between sources of supply (for example manufacturing versus imports). [↑](#footnote-ref-34)
35. It is the aggregate wage response to slightly lower unemployment which brings, interest rates the aggregate real wage and the economy back to baseline. [↑](#footnote-ref-35)
36. Accounting for less than 2 per cent of the wage bill. The number covered of course depends on the numbers in the labour force with minimal skill levels and little in the way of education or training. That in turn depends on the extent and quality of the education and training system and other social factors. In Australia very few workers, only around 1 per cent, are dependent on the federal minimum, (or around 5 per cent of award-dependent employees ABS Cat No 6206.0 ) even though it is much higher than the US minimum wage when benchmarked against median earnings. [↑](#footnote-ref-36)
37. Note that this abstracts from mis-match and search effectiveness effects which in AUS-M would show up in a changed level of equilibrium vacancies, and hence a difference between labour demand and employment. These mis-match and search effectiveness effects are not endogenous to the model and plausibly could go either way. (For example, a decrease in the minimum relative to the level of unemployment benefits might lead to a reduction in the search intensity of the low skilled unemployed and hence a rise in the equilibrium level of vacancies. Alternatively a reduction in the distortions introduced by the award system might lead to better matching of workers to jobs and a reduction in vacancies.) [↑](#footnote-ref-37)
38. As Stewart, 2004, notes this is a controversial area with rival efficiency wage, job search and training incentive theories pointing in different directions. For most countries the coverage of minimum wages is relatively small so macroeconomic implications are not usually thought of as a large implication of a minimum wage change. In fact cross country analysis tends to suggest that relative minimum wage levels have little effect on aggregate unemployment (relative to such things as job protection legislation, union density, etc – see for example Bassanini and Duval, 2006, and the recent studies updating the OECD’s NAIRU estimates for member countries). The interest in macroeconomic effects in Australia lies in the fact that in the past the coverage of the award system has been very large leading to significant impacts from award changes on inflation and macroeconomic variables more generally. Also the extent of the system arguably had an impact on bargaining and reservation wages, potentially raising the level of the NAIRU particularly in a sharp downturn (see Tulip, 2000 for an extended discussion along these lines for the US). [↑](#footnote-ref-38)
39. One interesting theory as to why minimum wage studies tend to find little in the way of employment effects depends on the high turnover of minimum wage employees, (Lang and Khan, 1998). Forced to pay higher wages employers respond by spending a little more time screening the job que for higher aptitude workers. At the same time the higher wages on offer attract more interest from workers with higher abilities (students, or high school graduates for example rather than high school drop outs.) Consequently, the minimum wage increase simply shifts the employers’ choice a little along the ability spectrum without any necessary significant impact on employment by the firm. While the employment level is unchanged the distribution of employment is changed to the disadvantage of those with lower ability. The aggregate macroeconomic models such as AUS-M, TRYM or Monash simply do not have the level of detail required to test this theory or any of the myriad other theories that explain the diverse results found in minimum wage studies. For a recent survey focussing on the US experience see Neumark and Washer, 2008. Quiggen and Dowrick, 2003, and Lewis 2006 provide discussion in an Australian context. [↑](#footnote-ref-39)
40. See McGuiness et al., 2007. [↑](#footnote-ref-40)
41. For teenagers the inflow into unemployment is around four times that of adult workers. If teenagers have the same probability of finding employment as an adult worker then their unemployment rates will be a fairly constant multiple of the adult unemployment rate. (The teenage unemployment rate has been around 3 to 4 times that of the adult unemployment rate over the last twenty years, rising from 13 per cent in 1989 to 25 per cent in 1992. The increase had little to do with relative wages.) [↑](#footnote-ref-41)
42. With wages rising relative to an equilibrium rate of growth set by underlying inflation plus underlying productivity growth. [↑](#footnote-ref-42)
43. The wage equation is non-linear and hence an increase in unemployment at a high level of unemployment has a smaller effect than an equivalent increase at a low rate of unemployment. [↑](#footnote-ref-43)
44. As outlined in the Updated Economic and Fiscal Outlook. The first focussed on providing a spending boost via pre Christmas payments to pensioners and low-income households (in combination with an increase in the first-home owners grant), while the second mainly concentrated on increased infrastructure investment for 2009-10, combined with further immediate increases in payments to households via family allowances, and the introduction of other inter-temporal measures such as a 30 per cent temporary investment allowance. Note the estimates do not include the effect of additional measures announced in the 2009-10 Budget. [↑](#footnote-ref-44)
45. This is assuming a normal monetary response to a fiscal stimulus - that is interest rates are higher as a result of the stimulus, offsetting some of its effect. Employment effects would be larger and longer lasting if no change in interest rates were assumed. [↑](#footnote-ref-45)
46. From a 1 percentage point reduction in the NAIRU assuming no discretionary change in fiscal policy (public expenditure or tax rates). A roughly similar relationship was found in the less detailed TRYM model in the 1990s (see the NAIRU shock table in the TRYM Users’ Guide at the web address cited above). [↑](#footnote-ref-46)
47. These aggregate results do not depend on capital for labour substitution at the enterprise level, although that is present in the model simulations, but rather largely result from the macroeconomic response to the small reduction in inflation pressures that would have resulted from the absence of increases in minimum wages. Where the Commission’s main effect is felt is at the disaggregated levels with the decisions over time shifting wage and price relativities between firms, industries and occupations. [↑](#footnote-ref-47)
48. Almost all of whom rely on spreadsheet approaches in forecasting the economy. [↑](#footnote-ref-48)
49. See charts A.1 and A.13. [↑](#footnote-ref-49)
50. It also is consistent over time. Whereas numbers in spreadsheet systems can be changed at the whim of the forecaster, the model numbers only change if there is an explicit change in an exogenous variable or the judgement being applied by the model user. It therefore provides a systematic way by which a forecaster can learn from his or her errors over time. [↑](#footnote-ref-50)
51. Net terms subtracts off imported inputs. For Australian around a fifth of the value of manufactured exports is sourced from imports. [↑](#footnote-ref-51)
52. Consequently the large fall in imports by our trading partners have little effect on the volume of our mining exports which will continue to grow as the lagged effects of the extraordinary boom in mining investment continue to come through. Rio Tinto and to a lesser extent BHPB scaled back iron ore production in late 2008, but production levels and exports bounced back in January. With $A prices still way above marginal costs of production, and with debt to pay down these companies have significant incentives to pump out as much iron ore and coal as they can. [↑](#footnote-ref-52)
53. Note that the Treasury forecasts are based on an unchanged exchange rate assumption which other things being equal should lead to a larger net export contribution than in the model where the exchange rate appreciates over the projection period. [↑](#footnote-ref-53)
54. That is the Mundell-Fleming results hold for confidence effects on domestic demand in the same way as they do for fiscal policy effects on demand. This would only be invalidated if interest rates were at the zero bound, but currently with interest rates at 3 ¼ per cent there is still room for the RBA to move. [↑](#footnote-ref-54)
55. The consequent collapse in commercial property prices led to the collapse of many highly leveraged firms and the financial institutions – such as the State Bank of Victoria – which had lent to them. This in turn led to a contraction of credit that added to the depth and duration of the recession. The subsequent regulatory response with the establishment of the twin peaks model of financial regulation, with the RBA dealing with monetary policy and systemic risk, and APRA dealing with prudential regulation is an important reason our financial system has been able to weather the current financial storm [↑](#footnote-ref-55)
56. A degree of double counting might be involved here, as part of the exchange rate fall can be attributed to the fall in interest rates. The normal transmission mechanism would involve a 2 to 3 per cent fall in the exchange rate for every percentage point cut in the cash rate following from the uncovered interest parity condition. However in this case global short term interest rates have fallen to the similar extent so that there is no UIP effect. [↑](#footnote-ref-56)
57. For other OECD countries e.g. Japan the opposite tends to be the case. Hence the manifestation of the business cycle in Australia is very different to that overseas. Consequently, while confidence and risk aversion shocks have been felt in common across the OECD, the response through 2009-10 will differ markedly across countries. [↑](#footnote-ref-57)
58. [↑](#footnote-ref-58)
59. It seems likely that the ABS labour force survey population numbers, which are based on projections by ABS demographers, do not yet fully incorporate the latest arrivals numbers. (Nor will they as the LFS population numbers will not be revised until the next Census re benchmarking in 2013.) Hence the LFS estimates may understate a little the true rate of employment growth. [↑](#footnote-ref-59)
60. In the absence of data on federal pay-scale-reliance by state the model simulations assume that the proportions within occupations and industries are the same as for the national level. This probably leads to an underestimate of the effects for Victoria, the ACT and the Northern Territory and a slight overestimate for the other states. [↑](#footnote-ref-60)
61. In comparison RBC models are usually closed by price and generate pareto optimal cyclical fluctuations via random technology shocks and time to build driven stock adjustment cycles. Dynamic stochastic general equilibrium models on the other hand now usually incorporate price stickiness in the form of Calvo pricing leading to similar short term movements in utilisation. [↑](#footnote-ref-61)
62. However it was not this that led to the decline of these models, but their simple lack of internal coherence. This became fatal as more ad hoc detail was added over time. They ultimately became very difficult to run, maintain or understand. [↑](#footnote-ref-62)
63. The one from the origin in level terms, the one tangential to the relationship in change terms. Arguably the equilibrium in change terms abstracts from possible measurement biases in the level variables. On the basis of the Western Australian experience this would suggest a full employment equilibrium unemployment rate (or an equilibrium level of mis-match and search unemployment) of around 3 ½ per cent, a level of unemployment we have not seen at the national level since the early seventies. [↑](#footnote-ref-63)
64. There are some small differences in the way the direct effects of the award change are estimated with Econtech allowing for a small pass on to other wages [↑](#footnote-ref-64)
65. Of the three simulations that the authors run (see below) this one seems the most comparable given that some increase [↑](#footnote-ref-65)
66. In both cases the estimates are relative to the Joint Governments’ position in each case. [↑](#footnote-ref-66)
67. In a similar way to which lowering a tax or a tariff on one good might lead to a fall in the price of close substitutes as demand moves from one to the other. [↑](#footnote-ref-67)
68. Due either to a lower wages or increased demand for output. [↑](#footnote-ref-68)
69. The seven occupations are an aggregation of the nine 1-digit ASCO occupational groups and the 17 sectors are the ANZSIC level 1 industries [↑](#footnote-ref-69)
70. More detailed information about the MMRF can be found in Productivity Commission (2006) and Adams, Horridge and Wittwer (2002). [↑](#footnote-ref-70)
71. In technical terms this is referred to as the model closure. Model closure is used to refer to the assignment of the model’s variables between those determined outside the model (that is, exogenous variables) and those determined by the model (that is, endogenous variables). [↑](#footnote-ref-71)
72. In an insider outsider world responsiveness to the level of unemployment would be very low leading to the potential for a very high equilibrium level of unemployment. [↑](#footnote-ref-72)