



Report commissioned
by the Australian Fair
Pay Commission, 2006.

Minimum wages and employment

P Lewis, Minimum wages and
employment, Centre for Labour
Market Research.

Introduction

The purpose of this paper is to provide a succinct overview of the employment effects of minimum wages. It summarises the evidence from research in Australia and overseas and provides a framework in which this research and policy on minimum wages can be discussed. The structure of the paper is as follows: an overview of Australian and international evidence from selected countries is followed by a discussion of the theoretical context in which these results can be evaluated; and, finally, gaps in the literature and some suggestions for future research are presented.

Overview of Australian and International Research

Employment and Wages

The debate on the impact of minimum wages has tended to focus on research into the responsiveness of demand for labour to changes in wages. The technical term used by economists is the *elasticity of demand for labour*, the percentage change in demand for labour due to a 1 per cent rise in wages. It is argued that if this elasticity is high then an administered rise in wages, such as a minimum wage, would cause demand for labour, and hence employment to fall. Although it will be shown later that such a simplistic view is somewhat misplaced, by both supporters and opponents of minimum wages, the research on labour demand does provide a useful starting point for an understanding of the minimum wage debate.

Most studies implicitly adopt what is called a ‘neoclassical framework’ for the formulation of the demand for labour. The total demand for labour and output of the economy is assumed to be negatively related to average real wages. As the real wage rises previously marginally profitable activities for firms now become unprofitable. Hence firms reduce output and employment simultaneously. The impact of a 1 per cent rise in real wages on demand for labour is known as the *elasticity of demand for labour*. It depends on the degree to which labour can be replaced by other inputs, the *elasticity of substitution*, labour’s share of total costs and how responsive is demand for output to changes in prices, the *elasticity of demand for goods and services*. The

precise formula (which sheds a lot of light on the relationship between wages and demand) for the elasticity of demand can be shown to be:

$$e = (1-s) \sigma + s \eta$$

where

e is the elasticity of demand for labour

s is the proportion of labour costs in the total cost of production

σ is the elasticity of substitution between labour and other inputs

η is the elasticity of demand for output.

In words what this formula says is that when wages rise this causes an increase in costs which firms must adjust to. The bigger the share of total costs which are labour costs then the larger the impact on firms. Firms will attempt to replace higher cost labour with other inputs and demand for labour will fall. Their ability to do this will depend on how easily labour can be replaced by other inputs, the *elasticity of substitution*, and how labour intensive the production process is (*labour's share of total costs*). Firms also attempt to pass on the increased costs to buyers of their products. If demand for these products is very price sensitive (high *elasticity of demand for output*) then even small cost increases cause large falls in demand for output and demand for labour. Output demand tends to be elastic where there is a high degree of competition and consumers regard goods and services as relative luxuries like restaurant meals and hotel accommodation. If demand for these products is relatively insensitive to price (low *elasticity of demand for output*) then relatively small cost increases cause only small falls in demand for output and demand for labour. Low elasticity of demand is usually found where there is little competition and consumers regard goods and services as relative necessities such as food and shelter. Nevertheless, whatever the size of the response, wage rises always cause a fall in demand for labour.

The Evidence on the Demand for Labour

There is considerable empirical research on the labour market in Australia and the effect of rises in *average* wages on *total* employment (see, for instance Lewis and Seltzer 1996, Lewis and MacDonald 2002).

In empirical work the 'demand for labour' or *total* employment has typically been expressed as a function of *average* real wages and output. The dependent variable is usually total employment or hours worked. The independent variables are either average weekly or hourly earnings expressed in real terms by dividing by an index of prices such as the Consumer Price Index (or some other measure such as real unit labour costs), and real gross domestic product. A time trend is also usually included as a proxy for technical progress (that is, over time firms can produce more output per unit of input). In practice, most studies take employment to be equal to the demand for labour. Thus, employment, measured in term of total employment or hours worked, is related to a number of variables including real wages, output and time. The relation is often referred to interchangeably as an 'employment equation' and 'demand for labour equation'.

Hamermesh (1993) provides an extremely comprehensive overview of the international estimates of the elasticity of substitution between labour and capital. On the basis of his analysis of these studies he concludes that the best estimate of the elasticity is that it lies between -0.2 and -0.8.

The 1970s

The first studies of the employment relationship in Australia were conducted in the 1970s and were primarily concerned with assessing whether unemployment was classical, in the sense of being the result of wages that were too high, or Keynesian, in the sense of being the result of output levels that were too low. In general, the methodology adopted was to estimate a relationship between employment, wages and output. The conclusion from such studies (e.g., Higgins & Fitzgerald 1973, Clark 1976, Gregory & Duncan 1979, Sheehan, Derody & Rosendale 1979, Valentine 1980)

was that the coefficient on real wages was either insignificant or relatively small in magnitude. Output was of far greater importance in explaining employment. It follows from this that an expansionary policy was preferred to wages policy in reducing unemployment. The fundamental flaw with this argument is that if unemployment is, indeed, Keynesian, then employment is “too low”, does not lie on the demand curve and the elasticity of demand with respect to wages and output is indeterminate. In the Keynesian framework firms will not employ anymore workers no matter how low the wage since there is a recession and they cannot sell the output they are already producing. The demand curve is said to be ‘unidentifiable’ in the sense that the combinations of wages and employment data are not on the demand curve and cannot be used to trace out the non observable demand for labour curve.

Although in the minority, a few studies did find evidence of a real wage overhang, a term used to describe the excessive growth of real wages relative to productivity. Freebairn (1977), although not estimating any of his own parameters, concluded that the long-run elasticity of employment with respect to output was about 0.7 and with respect to real wages was about -0.5. Johnston, Campbell and Simes (1978) tried several specifications using employment, unemployment and investment, respectively, as dependent variables, with the real wage overhang among the explanatory variables. The real wage overhang was insignificant in the employment equation although it was significant in the unemployment and investment equations.

The Accord Years

More recent studies have been undertaken by Lewis and Kirby (1988), Lewis and MacDonald (2002), Pissarides (1987), Russell and Tease (1991), Dungey and Pitchford (1998), Debelle and Vickery (1998) and Bernie and Downes (1999).

Lewis and Kirby (1988) estimated labour demand as part of a study designed to investigate the impact of the Prices and Incomes Accord on wages and employment. They found that the Accord had brought about a reduction in real wages of 10 per cent below what would have been the case without the Accord and a rise in employment of 8 per cent implying an employment elasticity with respect to real wages of -0.8.

Pissarides (1991) constructed a model of the Australian labour market and estimated an employment real wage elasticity of -0.8. Russell and Tease (1991) estimated a range of employment equations using a variety of real wage measures. They estimated an 'employment elasticity' of about -0.6 with respect to real wages and of 0.7 with respect to output. Technical progress was estimated to be labour saving in the order of 1 per cent per year. The results did not differ greatly if the number employed was replaced by total hours worked. Dungey and Pitchford (1998), using more recent data estimate an elasticity with respect to real wages of -0.4. Debelle and Vickery (1998), suggest an employment elasticity with respect to real wages of -0.7 for the period 1969 to 1997 and somewhat lower, -0.4 for the period from 1979. Bernie and Downes (1999) suggest that the differences are due to definitional and data problems. Their results using the Australian Treasury's TRYM model suggest an employment elasticity of about -0.6 with respect to real wages.

Webster (2003) provides summaries of dominant theories from Australia and overseas empirical studies of the relationship between aggregate employment and real wages. She concludes that Australian and overseas estimates of the elasticity of demand for labour for constant output is in the range -0.2 to -0.8. Higher elasticities are found for estimates without constant output.

Post Workplace Relations Act

In the most recent study Lewis and Macdonald (2002) restate the theory of the aggregate demand for labour making clear the interpretations of the coefficients. They use the most up to date appropriate techniques to estimate the elasticity of demand for labour. They find that the output constant elasticity of demand for labour with respect to real wages is -0.2 and the total elasticity of demand for labour with respect to average real wages is approximately -0.8.

Implications

In summary, the results for Australia suggest an elasticity of *total* employment with respect to average real wages of about -0.2 to -0.8, at the higher end of the scale of elasticities estimated for other countries (Hamermesh 1993).

These results suggest that overall wage moderation would have a significant impact on employment growth. This arises from the effects of wage restraint on both output and substitution between labour and capital. Research indicates that a 10 per cent increase in *average* wages reduces employment by about 8 per cent. Thus, moderation in *average* wages increases employment and, with the usual caveat that all other things are equal, unemployment will fall. The responsiveness of employment to wage changes is beyond doubt.

Despite this evidence there are still a number of critics who still hold the view that this is not the case citing the numerous international empirical studies showing little impact of changes in *minimum* wages on *total* employment or unemployment. As discussed later in the paper there is considerable confusion in the minimum wages debates and most of this arises because of the misunderstanding regarding substitution between labour and capital, which is relevant for the whole economy, and substitution between labour and labour, which is relevant for the minimum wage debate.

These results for employment in the whole economy say nothing about substitution between different groups of labour such as youth/adults or unskilled/skilled. It is this substitution that is of importance. There is evidence that considerable labour/labour substitution exists in Australia (Lewis 1985, Daly et al 1999) which implies that relative wage changes can significantly improve employment of particular groups such as youth or the long term unemployed. These results will be discussed later in the paper.

Evidence on the Impact of Minimum Wages on Employment

Minimum wage setting overseas

In the US Federal minimum wages are established under the Fair Labor Standards Act, and affect all full-time and part-time workers in the private sector and in Federal, State and local governments. Covered non-exempt workers are entitled to a minimum wage of no less than \$5.15 per hour, with an overtime pay rate of 1.5 for work hours

in excess of 40 for a given week. Exceptions may apply to certain full-time students, student learners, apprentices, and workers with disabilities, where lower wages may be paid under special certificates issued by the Department of Labor.

Many states also have minimum wage laws. Where an employee is subject to both state and federal minimum wage laws, the employee is entitled to receive the higher of the two rates. Some workers are exempt from minimum wage coverage including – commissioned sales employees, computer professionals, drivers, farmworkers, salesmen and more. Workers covered include – employees of enterprises that do at least \$500,000 in business each year, employees of smaller firms engaged in interstate commerce, employees of federal, state or local government agencies, hospitals and schools. (Source: www.dol.gov).

In Canada minimum wages vary by province and territory, with some provinces and territories also setting different wage rates for workers in particular sectors and age groups (younger workers). Certain groups of workers are also exempt from minimum wage law. Commonly excluded sectors are professionals, managers, supervisors, farm workers, commercial fishers, loggers, home care givers and home-based workers. All minimum wages are determined by provincial legislation, so for workers under federal jurisdiction, the wage rate is the same as that designated by the province or territory in which they work. (Source: www.workrights.ca)

The national minimum wage first came into force in the UK on 1st April 1999. The rates of pay are based on the recommendations of the independent Low Pay Commission, and cover almost all workers above compulsory school leaving age. A different minimum wage rate applies to different groups of workers, according to age. These groups are divided as those aged 22 and above, 18 to 21 and 16 to 17.

- The main rate for workers aged 22 and over is currently set at £5.05 an hour. On 1 October 2006 this will increase to £5.35
- The development rate for 18-21 year olds is currently set at £4.25 an hour this will increase to £4.45 on 1 October 2006

- The development rate for 16-17 years olds. This rate is £3.00 an hour. This will increase on 1 October 2006 to £3.30 an hour.
- On 1 October 2006 the rate of the accommodation offset will increase to £29.05 per week (£4.15 per day). The current rate is £27.30 per week (£3.90 per day).

Minimum wages in New Zealand are governed by the Minimum Wage Act, which specifies that all employees aged 16 years or more must be paid the statutory minimum wage. The current rates came into force on 27 March 2006 and are set at \$8.20 for a person between 16 and 17 (youth rate and training rate), and \$10.25 for persons aged 18 and over. The statutory minimum wage does not apply to people who hold an exemption, or those undertaking recognised industry training, doing at least 60 credits per year. In the latter case the person will be paid the training rate/youth rate. The statutory minimum wage applies even if an employee is paid partly or wholly by commission or by piece rate. It applies to all types of jobs and employees, including homeworkers, casual, temporary and part-time employees. Labour Inspectors can grant an exemption from minimum wages to a person with a recognised disability that significantly slows his or her work and makes him or her incapable of earning the minimum wage. (Source:www.ers.govt.nz).

The French system of statutory national minimum wage was introduced in 1970 ("salaire minimum interprofessionnel de croissance" or SMIC) and is pegged to one of the consumer price indices. It may also be raised by decree of the Council of Ministers, through the application of a review procedure. The SMIC is an hourly rate of pay but since 1972 it has been complemented by a minimum monthly pay level for all employees whose working hours are at least equal to the statutory working week (39 hours). In addition, it is the traditional role of collective agreements at industry level to fix minimum rates of pay for each occupational category.

Table 1 shows the minimum wage and average hourly earnings for Australia and selected countries. In summary, the UK, France and Australia have relatively high minimum wages compared to the US and Canada. This suggests that Australia, together with France and the UK would have high truncation effects. The evidence of high unemployment suggests that the truncation effect is high.

Table 1: Minimum Wages and Average Hourly Earnings.

	US	UK	Canada	France	Australia
Minimum Wage	\$US5.15	£4.85	\$Can6.74	€8.03	\$A12.75
Average Hourly Earnings	\$US16.68	£10.58	\$Can16.69	€11.64	\$A26.84
Ratio	31%	46%	34%	69%	48%

Sources: Bureau of Labor Statistics, US Dept of Labor, <http://www.dol.gov/> April 2006, UK National Statistics, Private Sector. <http://www.statistics.gov.uk> Winter 2005/06, Statistics Canada, <http://www.statcan.ca>, National Institute for Statistics and Economic Studies, France, 2005 Private Sector, <http://www.insee.fr/en/>, Australian Bureau of Statistics, <http://www.abs.gov.au/>, February 2006.

International Evidence

The international empirical evidence shows that the impacts of minimum wages on *total* employment and unemployment are small (Brown, Gilroy and Kronen 1982). In an early study Brown et al (1982) seek to determine what generalisations on employment and unemployment effects are supported by US studies, and to find causes of the most important disagreements. Time series studies on teenagers typically find that a 10 per cent increase in the minimum wage reduces teenage employment by between 1 and 3 per cent. Cross-section studies on teenage employment effects produce a wider range from 0 to 0.75. Employment effects on young adults (20-24 years) are negative and smaller than that for teenagers. Less can be said about the effect on low wage industries, partly due to a smaller number of studies.

Kaufman (1989) estimates the employment effects of setting wage minimums above their equilibrium levels in Britain. He estimates the elasticities of substitution in relevant industries to be between 0.45 and 0.85. The elasticity of the average wage with respect to the minimum is zero for men and between 0.07 and 0.15 for women. The gender difference, also observed in Australian studies (Lewis, 1985 and Daly et al, 1999) may be due to different skills levels, occupations or industries. The approximate total employment elasticity is -0.06. This estimate is close to estimates from the US and Canada.

Seltzer (1997) examines the literature on the employment effects of the minimum wage in the US, Canada and Britain. The US and Canada are similar in that there is a single minimum rate, whereas Great Britain was similar to Australia, with a range of minimum rates set by industry-specific wage councils. Seltzer (1997) examines cross-sectional and time-series studies in America from the 1970s and 1980s and recent critiques of these studies; the more recent American micro-case study literature; and summarises recent literature from Canada and Britain. He concludes and relates these international findings to Australia.

For France most econometric studies using time-series data have been unable to identify any substantial impact of the national minimum wage on unemployment. As will be explained in a later section, this is most likely due to the fact that minimum wages make little difference to *average* wages and *total* employment. However, Bazen and Slourias (1997) analyse what happened to the employment of young persons using sectoral data following the 10 per cent increase in the minimum wage that took place in June 1981. It is found there was a statistically significant, negative effect on youth employment.

Abowd and Kramarz (1999) used longitudinal individual wage and employment data in France and the US to investigate the effect of changes in the real minimum wage on an individual's employment status. It is found that movements in both French and American real minimum wages are associated with mild employment effects in general and very strong effects on workers employed at the minimum wage. For France a 1 per cent increase in the real minimum wage decreases the future employment probability of a person currently employed at the minimum wage by 1.3 per cent for males and 1 per cent for females. For the US a 1 per cent increase in the real minimum wage decreases the future employment probability of a person currently employed at the minimum wage by 0.4 per cent for males and 1.6 per cent for females.

Hyslop and Stillman (2004) analyse the effects of a large reform in the minimum wages affecting youth workers in New Zealand since 2001. Data from the New Zealand Household Labour Force Survey are used to compare average outcomes of

18-19 year olds and 16-17 year olds, who experienced wage falls relative to 20-25 year olds who were unaffected by the reform. This study finds no robust evidence of adverse effects on youth employment or hours worked. There was stronger evidence of positive employment responses for both teenage groups, with 16-17 year olds increasing their hours worked by 10-15 per cent following the minimum wage changes. A significant increase in labour earnings and total income of teenagers relative to young adults was found. However there is some evidence of a decline in educational enrolment and an increase in unemployment and inactivity although results depend on the specification adopted.

Mangan and Johnston (1999) present international findings on the relationship between youth wages and employment and compared them to empirical findings for Australia and Queensland. The results are used to examine the likely impact of the introduction of the training wage on the youth labour market in Australia and to provide further generalisations on the issue of employment and youth-specific wages. The result of the introduction of the training wage in Australia will be to maintain youth-specific wages below that of adult award wages and to further widen the youth/adult wage differential. Empirical results from this study and European studies offer some support to the concept of a junior/adult wage differential in terms of maintaining youth employment, although the inverse relationship between wages and employment in the youth labour market is small.

Literature from overseas has followed similar debates on the adverse employment effect of minimum wages: whether it is small or large, whether it is existent at all. OECD (1998) reports that the coefficient on the minimum wage variable is significant for teenagers, close to zero for young adults and insignificant for adults. The employment-to-population ratio used was one including all adults, while only a small proportion of adult employees actually receive the minimum wage. Thus the OECD's findings do not imply minimum wages have no impact or that the elasticity of demand is low for these workers.

The value of the minimum wage in France (salaire minimum interprofessionnel de croissance or SMIC) is higher as a proportion of average earnings (up to 2/3) than in

the US (less than 1/3). The purpose of this paper is to re-examine the empirical evidence on the impact of the SMIC on the French youth labour market.

The few studies of the effects of the SMIC on youth employment in France have not been conclusive. According to Bazen and Martin (1991) results suggest that real increases in the SMIC have exerted significant upward pressure on real youth earnings. No satisfactory results have been established on whether real youth labour cost increases have had a negative impact on youth employment. The estimated youth minimum-wage elasticities lie between -0.1 to -0.2 which spans the consensus values found in the North American and British literature. The adult employment elasticity appears to be 0.

Swindinsky (1980) uses a two-equation model to estimate the impact of minimum wages on teenage (14-19 years) unemployment in Canada. Minimum wages in Canada are primarily a matter of provincial jurisdiction and prior to the late 1960s were set on the basis of sex, occupation, industry or geographic zone. Several provinces have recently abolished youth differentials, and the existing youth differentials are quite small. In the provinces where they exist, they apply to employees under 18 years although the target age groups have varied considerably over time. Some provinces have legislated different youth minimums for teenagers in different age groups as well as for students, non-students and apprentices.

This study finds that female employment is far more sensitive to minimum wage changes than is male employment. The greater impact on female unemployment is due primarily to a relative weaker female labour force response. That is, that as the minimum wage rises young males are more likely than young females to enter the labour force. Therefore, while demand for both young males and females falls supply of young males rises more and creates higher unemployment than for females. In aggregate, (weighted average) the elasticity of teenage employment with respect to the minimum wage index is -0.17. This analysis has not taken into account potentially significant minimum-wage-induced shifts from full-time to part-time employment or from high to lower quality jobs. The estimated aggregate teenage labour supply elasticity is -0.13. These elasticity estimates assume that youth differentials have remained constant during the period analysed.

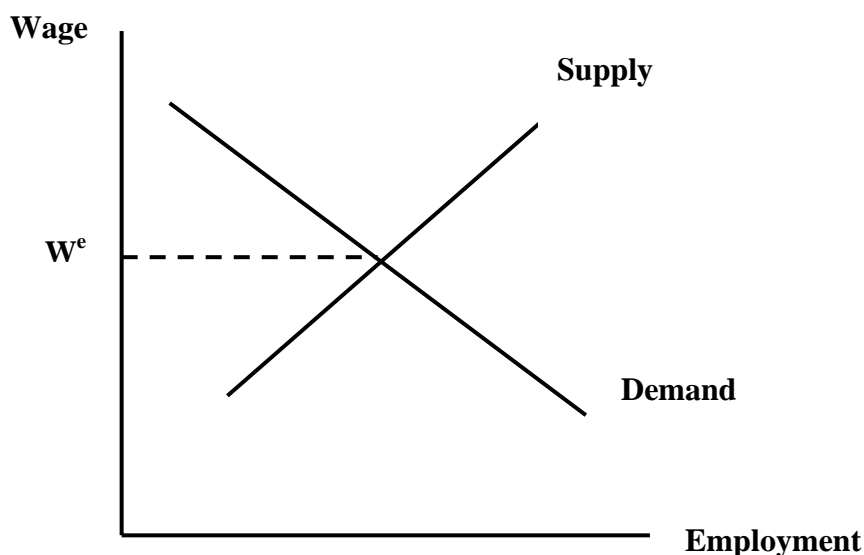
Neumark and Wascher (1992) evaluate evidence on the effects of a minimum wage on employment, using data on state minimum wage laws and economic conditions for the US for the years 1973-89. They estimate that a 10 per cent increase in the minimum wage causes a decline of 1-2 per cent in employment among teenagers and a decline of 1.5-2 per cent in employment for young adults. The authors also find evidence that youth subminimum wage provisions enacted by state legislatures moderate the disemployment effects of minimum wages on teenagers.

Issues

Theory Foundations: Wages and Employment

The clue to understanding the minimum wage debate is the nature of the labour market. The concept of *the labour market* is an abstract one but is nevertheless useful for analysing issues such as the overall level of employment and unemployment. The standard textbook treatment is represented by Figure 1 below.

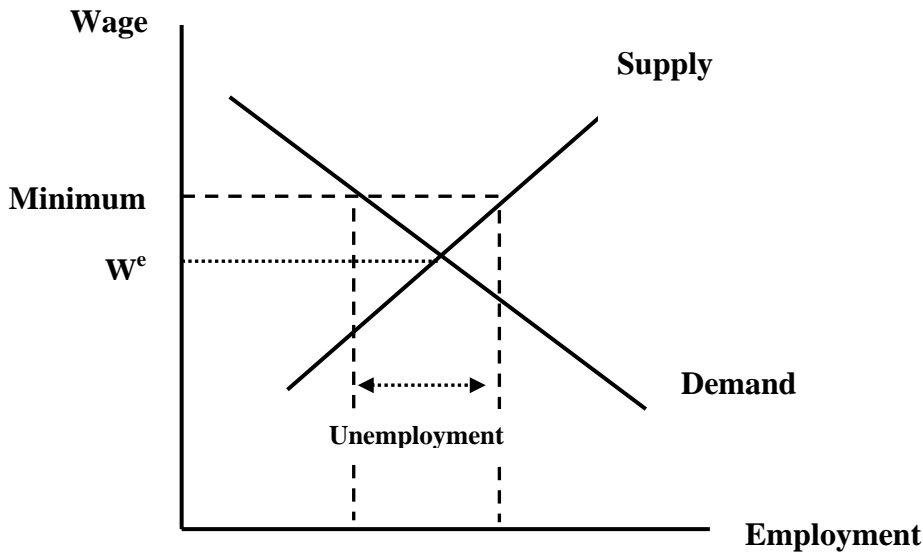
Figure 1: The Aggregate Labour Market



The demand for labour (the amount firms wish to employ) is taken to fall and supply (the amount households wish to work) is taken to rise as real wages rise. There is

overwhelming evidence from Australia and overseas that demand and supply of labour behave in this way (see, for instance, Norris and Wooden 1996). If wage determination were left to the market the wage would be W^e where demand equals supply.

Figure 2: The Effect of a Minimum Wage



If the wage is set above the minimum then supply exceeds demand and unemployment is created. Reducing the minimum wage brings demand closer to supply, employment rises and unemployment falls. There is considerable empirical research on the labour market in Australia and the effect of rises in average wages on employment (see, for instance Lewis and Seltzer 1996, Lewis and MacDonald 2002). Several commentators have used the above to argue for cuts or moderation of the growth of minimum wages (see, for instance Dawkins 1999 and 2000).

The Fallacy of the Inflated Denominator

It is tempting to use the above analysis to examine the effects of imposing a minimum wage for the lower paid. However, the above analysis is *not* appropriate. Since most workers would obtain a wage higher than the minimum anyway, the effect of imposing a minimum wage is to increase the wages only of those who would

otherwise receive the lowest wages. The effect on the *average* wage is small and, thus, the impact on total employment and unemployment is also small.

James, Wooden and Dawkins (2001) address the common misunderstanding known as the “fallacy of the inflated denominator” which distorts the debate on the relationship between minimum wages and employment both in Australia and other countries. They outline the fallacy, then illustrate its impact on the debate on the setting of Australian award wage rates and conclude with comments on the evidence policy makers should consider when setting award wages in Australia. The majority of minimum wage studies are based on time-series data and use an employment-to-population ratio as the dependent variable. The majority of studies focus on teenagers, but because most teenagers earn substantially higher rates than the minimum wage, total teenage employment does not vary much with changes in the minimum rate.

The “fallacy”, first identified by Brown (1988) explains that the small estimated employment impact from minimum wage increases is due to incomplete coverage and the fact that most workers earn more than the minimum wage. Thus the effect on any group’s employment is proportionally smaller than it would be if impacts on those directly affected could be isolated. James et al (2001) say that this point is commonly misinterpreted by commentators and could lead to serious policy implications.

The Economics of the Minimum Wage

It is worth restating that there is no conflict between there being relatively high elasticity of demand for labour and little impact of minimum wages on total employment. Total employment is responsive to changes in *average wages* and the minimum wage does not affect average wages substantially. In answer to the critics of conventional economics, or marginal productivity theory (MPT), it is worth spelling out what exactly MPT is. First, MPT assumes that a firm’s decisions about how much output to produce and how much labour to hire are made *simultaneously*. Firms hire extra labour when the value of the extra output produced is greater than the wage. Firms will only increase output if activities which were not previously profitable are made profitable. Second, MPT relies on one of the corner-stones of *all* economics,

namely the Law of Diminishing Returns. This states that each extra worker employed produces less output than the worker previously employed. Therefore, extra output and extra employment requires a fall in wages.

The empirical “evidence” used to discredit MPT is along the following lines- between 1994 and 2004 the minimum wage rose by 40 per cent while employment also rose, by 30 per cent (Hristodoulidis, Belchamber and Watson 2004). However, far from refuting MPT this observation, when put in proper context, supports a traditional economic analysis of the minimum wage.

To get to grips with the effects of a minimum wage it is necessary to dig deeper into the operations of the labour market. In reality there is not a single labour market but rather very *many labour markets* each with their own supply and demand. An important characteristic of the multitude of labour markets is *substitutability*. Although it is common, particularly in the professions, to think of occupations being rigidly defined, in practice there is a great deal of substitutability between workers.

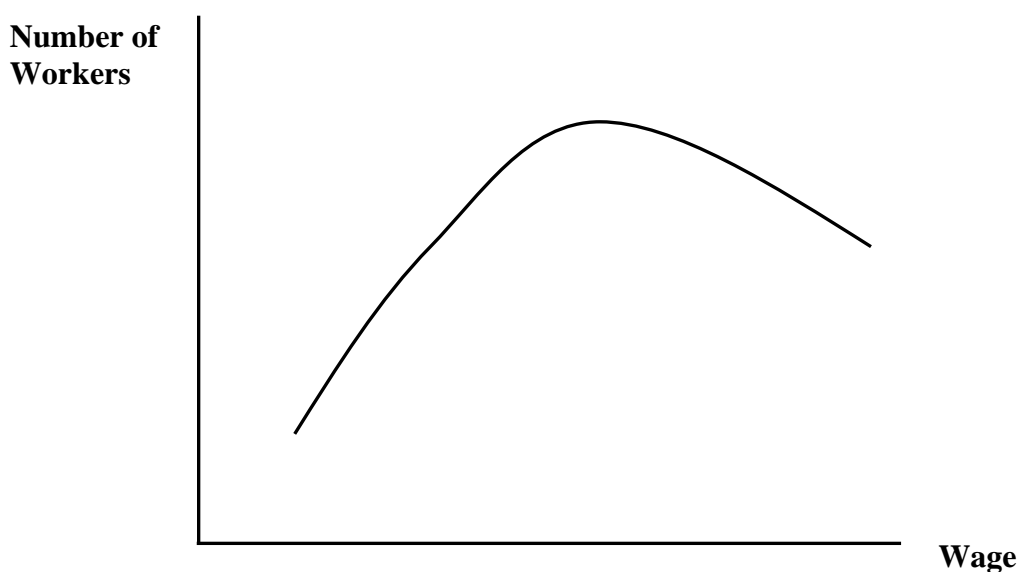
Lewis (1997) uses the example of a hospital. Employment in a hospital will be determined by markets for specialists, doctors, nurses, clerks, cleaners etc., each with different amounts of required skills and characteristics resulting in different wages. Intuitively, tasks would seem to be quite segmented according to the degree of skill and specialisation of employees. However, at various times relatively junior doctors can perform duties of specialists, registered nurses often perform duties which would well be the domain of doctors, particularly in rural areas. TAFE-trained enrolled nurses can be substituted for university trained registered nurses and, increasingly, particularly in aged care, relatively unqualified ‘carers’ perform duties which were once the province of nurses.

Most empirical studies of individual labour markets point to the high degree of substitutability, with respect to demand, between types of labour. There is also strong evidence that, given the degree of substitutability, the demand for labour in these more narrowly defined labour markets is highly responsive to *relative* wages (Hamermesh 1993, Lewis 1985, Daly *et al* 1999). Also, generally, the lower skilled

the worker then the more responsive is demand to relative wages. In addition to demand being highly responsive to relative wages research shows that labour supply is also responsive to relative wages (Kenyon and Wooden 1996).

In the absence of legislated minimum wages the distribution of workers by wage would look similar to Figure 3 below.

Figure 3: The Distribution of Workers by Wage in a Free Market

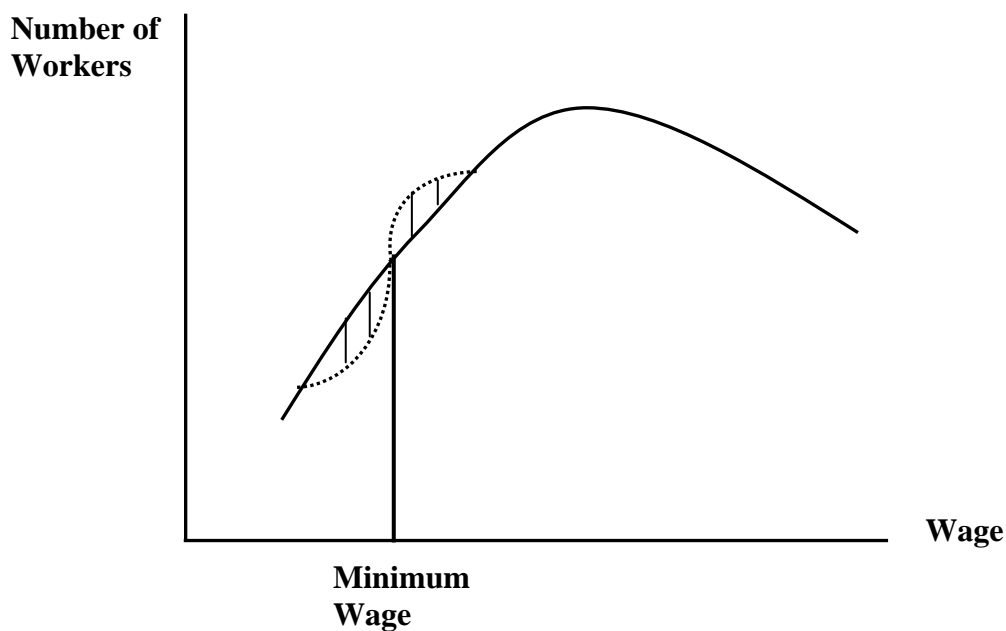


Lower skilled workers receive low wages and are at the left of the distribution. Higher skilled workers receive higher wages and are to the right of the lower paid. The majority of workers are located around the median.

Given the above framework it is relatively easy to understand the impact of minimum wages on employment and unemployment. The imposition of minimum wages affects only those in low skilled, low paid jobs. These individuals are, generally, very poor substitutes for the majority of the workforce and, therefore, minimum wages have little impact on the wages and employment of most workers. However, those workers earning just above the minimum wage are highly substitutable for those who would otherwise earn below the minimum. This is because although there is still a skill differential between them the jobs are still, relatively, unskilled.

After the imposition of a minimum wage the distribution of workers looks like that below in Fig 4.

Figure 4: The Distribution of Workers by Wage After the Imposition of a Minimum Wage



The dotted line shows the new distribution after the imposition of a minimum wage. If the minimum is completely binding no one is now employed below the minimum wage. However there is likely to be some leakage as employers and workers find ways to enter into illegal employment relationships to circumvent the legislation. The lower shaded area represents the loss of employment of workers now priced out of the labour market and the upper shaded area represents the increase in employment of workers substituted for those displaced. The upper area is less than the lower area since the higher wage results in some substitution of capital for labour and reduced output with higher production costs.

Firms employ less of those who would have earned below the minimum wage and, therefore, unemployment among this group rises. However, these workers are substituted by more workers earning just above the minimum wage. Those who manage to get a job are better off but those who would otherwise have a job but are

unemployed are worse off. The net effect on *total* employment may be difficult to detect. However, there is a large fall in employment of workers who could otherwise have earned below the minimum wage. Minimum wages are all about *distribution*. Jobs and income are redistributed away from the worst off.

In summary, the impact of the minimum wage on total employment may be proportionately small but the impact on low skilled, low paid workers is disproportionately high.

The impact of the minimum wage on employment depends on four effects- the *truncation effect*, *substitution effect*, *leakage effect* and the *output effect*.

The truncation effect relates to the extent to which the imposition of the minimum cuts into the distribution of jobs. The larger the minimum wage relative to what the market wage would otherwise be the larger the truncation effect (the loss of jobs). Of course because Australia has long had a minimum wage we cannot tell what the market wage would be if there were no minimum. However, it can be deduced from the characteristics of the unemployed, particularly the long-term unemployed, namely that they are low skilled, that their market wage would be low (Lewis 2005).

In summary, the characteristics of the unemployed plus the magnitude of the number unemployed suggests that the substitution and truncation effects are very high. Therefore, the minimum wage is clearly well above the wage which would equate demand and supply.

With regard to the leakage effect there is little evidence except casual empiricism that ‘cash out of the till’ payments are common for many employers of minimum wage labour such as cafés and restaurants. The high preponderance of students and overseas backpackers in these industries may also be some indication of the willingness of people to supply labour in these jobs.

Finally, with respect to the substitution effect, the output effect depends on how large labour is as a proportion of total costs and how sensitive is consumer demand to increases in prices resulting from wage rises. Minimum wage jobs are generally in

labour intensive industries with high responsiveness to prices and therefore we would expect that the output effect is relatively large.

The empirical work for Australia on the degree of substitution between different types of labour has largely arisen out of the debates regarding the appropriate rates for junior wages. In an early study for the then Bureau of Labour Market Research Lewis (1985) estimated the elasticities of substitution between young and adult workers by gender. He concluded that there was a very high degree of substitutability between different categories of labour and hence a high negative effect of wages on employment.

A well-known Australian study undertaken for the Productivity Commission (Daly et al 1998) uses econometric analysis of a large cross sectional data set (the Australian Workplace Industrial Relations Survey 1995) to isolate the influence of wages from the influence of other factors affecting youth employment. It finds there is a significant substitution between youth and adult labour and hence a negative relationship between youth employment and youth wages. The best estimates suggest that a 1 per cent increase in youth wages would lead to a decrease in youth employment of 2-5 per cent in industries employing a relatively high proportion of youth.

Lewis and McLean (1999) carried out a simulation exercise on the effects of the 'adults at 18' proposal to abolish junior rates of pay for those over 18 proposed by the ACTU in the last junior wage case. Assuming elasticities of substitution of 1 between workers (a number far more conservative than those estimated by Lewis, 1985 and Daly et al, 1998) they found that the effects of the proposal would have been to reduce employment of 15, 16 and 17 year olds .

It is very difficult to estimate the impact of minimum wage changes on labour demand since there are factors operating in the whole economy. In particular the economy has been growing very strongly for 15 years and this would also increase demand in minimum wage jobs even with increasing minimum wages. Lewis (2005) attempted to measure the impact of minimum wage changes by controlling for the changes in labour demand and wages in the economy as a whole. Table 2 below shows the

percentage changes in wages and employment in the minimum wage sector and the economy as a whole over the ten years 1994 to 2004. The minimum wage sector is that used in the ACTU submission to the safety net wage case, namely accommodation, cafes and restaurants, health and community services.

Table 2: Changes in Minimum Wages, Average Weekly Earnings and Employment, 1994-2004, per cent

	Wages	Real Wages	Employment
Min wage sector	40.2	7.7	29.9
Total all sectors	53.9	18.2	22.4
Difference	-13.7	-10.5	7.5
Implied elasticity	-0.55	-0.72	

Source: Lewis, P. (2005), “Low Pay or No Pay?”, *Policy*, Vol 21, No 3, pp14-20.

Over the period wages rose by 40.2 per cent in the minimum wage sector or 7.7 per cent in real terms while employment rose by 29.9 per cent. In the economy as a whole wages rose by 53.9 per cent (18.2 per cent in real terms) and employment by 22.4 per cent. Looking at the differences between the growth rates in the two sectors, wages grew by 13.7 per cent less in the minimum wage sector while real wages grew by 10.5 per cent less. That is, minimum wage labour became *cheaper relative to labour generally*. Standard economic theory would predict an increase in demand for minimum wage labour relative to labour generally and this is precisely what we observe. Demand for minimum wage labour rose by 7.5 per cent more than for the economy as a whole. This evidence suggests elasticities of employment for the minimum wage sector of -0.55 and -0.72 with respect to wages and real wages, respectively.

On the basis of these elasticities if the minimum wage had been kept constant in real terms between 1994 and 2004 about 290 thousand extra jobs would have been created and if the minimum wage had been kept constant in nominal terms about 650 thousand extra jobs would have been created.

Leigh (2003) also makes use of comparisons between the whole economy and a particular segment of the labour market where wage changes have been different to the rest of the economy. Specifically he estimates the impact of raising the minimum wage on employment using the Western Australia statutory minimum wage increases during the period 1994-2001. The timing and magnitude of these increases differed somewhat from the rest of Australia. His results suggest that the elasticity of labour demand with respect to the WA statutory minimum wage is -0.13.

The Card and Krueger Debate

In recent years there has been a concerted campaign to challenge the economic orthodoxy and suggest that labour markets are somehow different to other markets. Essentially, proposals of this view try to argue that demand curves for labour do not slope downwards and even that some slope upwards- it is possible for wages and labour demand to both rise! In Australia the attack has taken the form of a dismissal of Marginal Productivity Theory (MPT), the standard economics and various empirical observations showing simultaneous increases in minimum wages and employment (see Hristodouli, Belchamber and Watson 2004). The foundation for these ideas is the work of Card and Krueger (1995). Card and Krueger's analysis is based almost exclusively on empirical studies of the impact of changes in minimum wages in the fast food industry in the United States. Others have provided empirical evidence for other countries (see Seltzer 1997).

Briefly, their research shows little impact of minimum wage increases on teenage employment - they even find, in some cases, *increases* in employment. They go on to examine previous studies showing negative effects of minimum wages and maintain that they do not hold up to serious scrutiny.

Card and Krueger (1995) first suggest an explanation based on the concept of *monopsony*. Monopsony power is where an individual employer is able to exert control over the level of wages due to their market power. This situation can arise where there is a single employer of a certain type of labour, or where the employees are in an isolated area and only have the choice to work for a single employer, etc.

Whereas in the competitive model there is a going wage for the job, under monopsony a firm must offer a higher wage to acquire additional employees. Because the firm must also pay existing workers the higher wage, the cost of employing one extra worker is greater than the wage.

In the case of a pure monopsony, a firm can reduce its wages and only lose part of their workforce. This occurs because some portion of the workers are either unable or unwilling to leave. This is not the case in a perfectly competitive labour market where all employees would leave to maintain the higher wage. Firms will reduce wages, because even though they are losing workers, which reduces their output and hence revenue, they have also lowered their wage bill for their remaining workers, and have hence lowered their production costs. A firm will continue to lower wages until the reduction in revenue exceeds the reduction in costs.

Imposing a minimum wage can in theory, result in an increase in employment, under certain conditions. If a minimum wage is introduced it means that the firm will now have to pay higher wages for all the remaining employees, increasing the wage bill. This will result in the firm expanding employment, to increase production and hence revenue until the increase in revenue offsets the increase in costs. Card and Krueger argue that under monopsony power a small increase in the minimum wage will result in an increase in employment. The increase in wages effectively transforms the behaviour of low wage firms into that of high wage firms.

A number of researchers have attempted to replicate the work of Card and Krueger in the European context.

Stewart (2001) uses individual-level longitudinal data from three contrasting datasets (Labour Force Survey, British Household Panel Survey and New Earnings Survey) to estimate the impact of the introduction of the UK minimum wage (in April 1999) on the probability of subsequent employment among those whose wages would have had to be raised to comply with the new minimum. The estimated effect is not significantly different from zero for all four demographic groups considered. The evidence is consistent across the three datasets and is robust to an extensive range of modifications considered.

Machin and Manning (1994, 1996) have been at the forefront of Card and Kruger supporters in the UK. In Machin and Manning (1994) they examine the impact of mandated minimum wages on wage dispersion and employment in the UK in the 1980s, using data from the UK New Earnings Survey. Evidence was found that a decline in the level of the minimum wage relative to the average wage through the 1980s significantly contributed to widening wage dispersion over those years. There is, however, no evidence of an increase in employment resulting from the weakening of minimum pay rates. Instead, consistent with several US studies, the findings suggest that the minimum wage had either no effect or a positive effect on employment. Manning (1996) examines the impact of the UK Equal Pay Act on female employment. He claims that the failure of female employment to fall as relative wages rose supports the view that the female labour market is at least partly monopsonistic but was made less so by the Equal Pay Act. His view is that the Equal Pay Act did not eliminate monopsony in the female labour market, as it raised female wages most where unionisation was strong and these are not the sections of the labour market where monopsony power is most prevalent.

Dickens et al (1999) maintain that work on minimum wage effects have stressed that the standard economic model is not supported by empirical evidence in some labour markets. This article presents a general theoretical model whereby employers have some degree of monopsony power, which allows minimum wages to have the conventional negative impact on employment but which also allows for a neutral or positive impact. Studying the industry-based British Wages Councils between 1975 and 1992, they find that minimum wages significantly compress the distribution of earnings but do not have a negative impact on employment.

Critique of Card and Kruger

Welch (1993) has cast doubt, after examining the original data and methodology, on the validity of the studies by Card and others. Further strong criticism of Card and Krueger is contained in Ehrenberg (1995). Robson (2004) provides a lively Australian contribution. The major problem for exponents of Card and Krueger in Australia is to explain why employers of the lowest paid workers would have

monopsony power, as there are numerous employers of the same class of labour, and there are limited barriers to entry. In a monopsony labour market you would expect to see few employers and numerous barriers to entry to new firms.

Relatively low minimum wages in a well-functioning labour market can transfer wealth to working poor with low administrative costs. Establishing a 'living wage' in Australia would not necessarily produce equitable or efficient outcomes. Australian minimum wages are not low in comparison to America and conclusions by Card and Krueger cannot be applied. Australian average unemployment duration is considerably longer than in the US thus those losing jobs as a result of the minimum wage will find it harder to get back into the workforce.

Also, if monopsony power existed, we should observe a fall in output prices as the minimum wage increases. This is because an increase in the wage will increase employment, which would expand production. For the firm to be able to sell this additional output it would have to decrease the price to encourage consumers who initially thought that the good was too expensive, to consume the extra output.

Even if there is monopsony power, minimum wage can only rise within a certain range before it starts having a negative effect on employment, assuming that it initially had a positive one. This will vary across industries making minimum wage a fairly useless tool for this problem.

Minimum Wages and Supply-side Policies

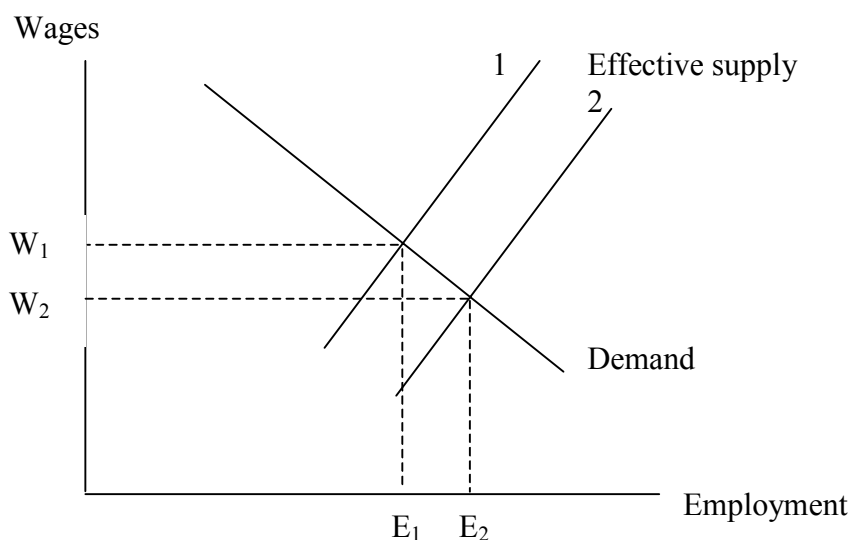
One of the major problems with the current system of setting awards is that there is no lobby group for the unemployed with most welfare groups arguing for higher wages for the lowest paid. It is widely recognised among a number of researchers concerned with equity issues that policy should be aimed at raising the incomes of *low income households* rather than of *low wage workers*. There is substantial evidence that many low wage workers are in relatively high income households and that poor households are usually poor because members of the households are out of work. Under this view facilitating jobs growth should take preference over raising wages of those in work.

Unfortunately, the inflexibility resulting from awards is compounded by the social security system. Lewis (2005) presents some interesting comparisons between the maximum social security benefits entitlements and the minimum wage. He shows that while social security entitlements are only just above the poverty line they certainly compare favourably with the minimum wage. When income tax on wages and the other benefits and discounts available are included, the incentives to work are low or negative. Even with work tests and other disciplinary measures (mutual obligation) it is difficult to see the government depriving families with children by removing benefits from those unwilling to work. Recently policy debate has begun to focus on the need for supply side policies such as major reform of the social security and tax systems

Lewis (2002) argues that most unemployment is due to lack of ‘effective supply’ (see Birtless, 2002 for an international perspective). That is, given the current wage and institutional structures there are no jobs for which the unemployed are willing to work or profitable activities which employers can find for them to do. Raising education participation and achievement among the most disadvantaged Australian would assist in addressing effective supply problems. This is no small task involving considerable expenditure on education and social policy (Lewis 2002) plus widespread reform of social security, taxation and income support for low income households. However, supply side policies can only work if there are flexible wages.

This is illustrated in Figure 4 below. The policy shifts the effective supply curve to the right. People who were previously unemployable now enter employment as the real wage falls for people at the margin. Jobs are created because at the lower wage firms can undertake activities which are now profitable but which would have previously been unprofitable. That is, there is an *output effect*. There is also a *substitution effect* whereby some workers are displaced by the new labour supply. However, the net effect on jobs is positive.

Figure 4: Creating Jobs Through Labour Supply Policies



Notice that the effectiveness of supply side policies depends on the size of the elasticity of demand for labour. Burtless (2001) has presented an excellent summary of the role of supply side policies. In the Australian context these include social security reform, labour market programs, education and training.

In summary, reducing unemployment is not easy and requires a whole range of labour market, welfare, social and education policies. However, part of any package of measures would be incompatible with downward flexibility of minimum wages.

Evaluation and the Need for Future Research

What Does Research Tell Us?

The above research might appear to provide a somewhat bewildering array of contradictory theory, evidence and heated argument on the employment effects of minimum wages. This has allowed some to argue that in the absence of definitive evidence it should be concluded that minimum wages have no effect on employment

and unemployment. However, the Australian and international evidence is very clear on one thing- rises in wages reduce the demand for labour. It has been argued above that this is not inconsistent with little or no observed response of employment to minimum wages in many international studies. The reason for the apparent contradiction is that *total* employment is responsive to changes in *average wages* and the minimum wage does not affect average wages substantially. The relevant issue is: are low skilled workers and the unemployed highly substitutable or not and this has been hardly addressed in empirical research. Therefore, much of the specific research on the impacts of minimum wages is of little value to policy debate in Australia.

The question which needs to be asked is what does the above research tell us about the employment effects of minimum wages generally in Australia and, in particular, can it tell us the impact of a specific change, say a dollar an hour or 1 per cent, in the minimum wage in Australia. With respect to the first part of the question the answer is that a rise in the minimum wage in Australia will reduce employment of the most disadvantaged Australians. With respect to the second part of the question, the answer is that the existing research is not capable providing even rough estimates of the actual numbers of employment arising from a specific cut to the minimum wage.

There is overwhelming evidence that employment is negatively related to wages. People are unemployed because, given the minimum wage, firms cannot find profitable activities for them to be employed to do. Lower wages make activities which were previously unprofitable now profitable.

For some the wage at which they can carry out profitable work might be very low. Nevertheless, the experience in the US has been that:

“...jobless workers with few qualifications can apply to temporary employment agencies for short-term work. Although the employment is uncertain and irregular, workers who are persistent can usually obtain temporary work assignments, and many eventually find permanent jobs if their work performance impresses a manager who has provided a short-term job assignment. Other job opportunities for less qualified workers can be found in low-wage retailing, cleaning and landscape services, agriculture, manual labour, and informal child care. With relatively little training, less educated job seekers can find work as home health aides for the elderly and disabled...” Burtless (2002)

Burtless (2002) also points out that the US experience is different to that of most of the OECD and attributes this to regulations in both the product and labour markets.

The Sustainability of Outcomes, a report by the Department of Employment and Workplace Relations has shed light onto the experience of new entrants into the employment market. The central, relevant, finding is that low paid casual employment can lead to higher paying permanent employment (DEWR 2004). This study confirms findings by the ABS, *Employment and Work Place Patterns* (Carino-Abello, Pederson & King, 2001; Dunlop, 2000) and research by FaCS in their *Department of Family and Community Services Longitudinal Data Set* (Flatau & Dockery, 2001). This concludes:

- a substantial number of low paid job seekers do move to higher paying jobs over time;
- movement from low pay to higher pay is often associated with transitions from part-time to full- time work; and,
- a substantial number of job seekers in low skilled jobs move to higher skilled jobs over time: (DEWR 2004).

This phenomenon, of moving away from low skilled, low paid employment to higher paid, higher skills, better wages and hours of employment, is called the “Stepping Stone” hypothesis.

Thus, cuts in minimum wages would create jobs for the most disadvantaged in both the short-run and the long-run.

Future Research

The robustness of the estimates of the elasticity of demand for labour with respect to wages allows policy makers to make more informed judgements regarding the efficacy of alternative policy prescriptions. Although of significance from a policy perspective the relevant parameter is the extent of substitution between different types of labour (labour/labour substitution). The reason why so many studies come up with

only a small or no effect of minimum wages on employment is because they are using the wrong tools of analysis for the question in hand. The relevant parameter is the elasticity of substitution between types of labour not the elasticity of demand for labour of the workforce as a whole.

Lewis and Mclean (1999) show that once the degree of substitution between different groups of labour, in this case the employed on minimum wages and the unemployed, is known it is fairly easy to simulate the likely employment effects of a change in minimum wages. The limited evidence for Australia (Lewis 1985 and Daly et al 1999) suggests the degree of 'labour/labour' substitution is high but the actual magnitude of the relevant parameter is imprecise.

In order to estimate substitution parameter it is necessary to observe considerable variation between workers, workplaces, industries etc with respect to those on minimum wages and those on market-based wages. In the past this was difficult to observe given the relative inflexibility in relative wages in Australia but variability has grown as the Australian labour market has become more flexible. This suggests that the time is right to revisit the issue of labour/labour substitution. Not only is the time right but there is also a pressing need for a research program to provide empirical evidence on labour/labour substitution in order to allow better policy-making to help the most disadvantaged in Australia.

References

- Abowd J, Kramarz F, Margolis D. (1999). 'Minimum Wages and Employment in France and the United States', Working Paper 6996, National Bureau of Economic Research, Cambridge, Massachusetts.
- Argy, F. (2005) 'An Analysis of Joblessness in Australia', *Economic Papers*, Vol 24, No1, pp 61-74.
- Bazen S, Skourias N. (1997). 'Is There a Negative Effect of Minimum Wages on Youth Employment in France?' *European Economic Review*, Vol. 41, no. 3, pp723-732.
- Brown, C., Gilroy, C., and Kohen, H. (1982) 'The Effect of the Minimum Wage on Employment and Unemployment', *Journal of Economic Literature*, Vol. 20, pp487-528.
- Brown C. (1988). 'Minimum Wage Laws; are they overrated?', *Journal of Economic Perspectives*, Summer, no. 3, pp. 133-45.
- Bernie, K. and Downes, P. (1999), 'The Macroeconomics of Unemployment in the Treasury Macroeconomic (TRYM) Model', TRYM Related Paper No. 20, paper presented in the RBA seminar series, 27 January, Reserve Bank of Australia, Sydney.
- Burtless, G. (2002), 'How Can Supply Side Policies Reduce Unemployment?', *Australian Journal of Labour Economics* Vol. 5, No. 2, pp 115-142.
- Carino-Abello, A., Pederson, D. & King, A. (2001). *Dynamics of Earned Income in Australia*, Catalogue No. 6293.0.00.007, Australian Bureau of Statistics, Canberra.

- Card, D. and Krueger, A.B. (1995) *Myth and Measurement: The New Economics of the Minimum Wage*, Princeton University Press, New Jersey.
- Clark, C. (1976), 'Wages, Profits and the Substitution Function', *Economic Papers*, No. 52, pp16-30.
- Daly, A, Nguyen-Hong, D., Eldridge, D. Gabbitas, O., McCalman, P. (1998) *Youth Wages and Employment*, Productivity Commission Staff Research Paper, Ausinfo, Canberra, October.
- Dawkins, P. (1999) 'A Plan to Cut Unemployment in Australia: an Elaboration on the Five Economists' letter to the Prime Minister, 28th October 1998', *Mercer Melbourne Institute Quarterly Bulletin of Economic Trends*.
- Dawkins, P. (2002), 'The Five Economists Plan: the Original Ideas and Subsequent Developments', *Australian Journal of Labour Economics*, Vol. 5, No. 2, pp 203-230.
- Department of Employment and Workplace Relations (DEWR 2004), *The Sustainability of Outcomes, Jobs Searching Training, Intensive Assistance and Work for the Dole*, March 2004, Canberra.
- Dickens R, Machin S & Manning A. (1999), 'The Effects of Minimum Wages on Employment: theory and evidence from Britain', *Journal of Labor Economics*, vol. 17, pp. 1-22.
- Debelle, G. and J. Vickery (1998), 'The Macroeconomics of Australian Unemployment' in G. Debelle (ed) *Unemployment and the Australian Labour Market: Proceedings of a Conference*, Reserve Bank of Australia and Centre for Economic Policy Research ANU.

- Dungey, M. and J. Pitchford (1998) 'Prospects for Employment and Output Growth with Steady Inflation' in G. DeBelle (ed) *Unemployment and the Australian Labour Market: Proceedings of a Conference*, Reserve Bank of Australia and Centre for Economic Policy Research ANU.
- Dunlop, Y. (2000). *Labour Market Outcomes of Low Paid Adult Workers*, Catalogue No. 6293.0.00.005, Australian Bureau of Statistics, Canberra.
- Flatau, P. & Dockery, M. (2001). *How Do Income Support Recipients Engage with Labour Market?*, Policy Research Paper Number 12, Department of Family and Community Services.
- Ehrenberg, R.G. (1995) 'Review Symposium on Myth and Measurement: The New Economics of the Minimum Wage', *Industrial and Labour Relations Review*, Vol. 48, No. 4, pp827-828.
- Freebairn, J.W. (1977), 'Do Wages Matter? The Effect on Aggregate Employment', *Australian Economic Review*, No. 39, pp25-35.
- Gregory, R.G. and Duncan, R.C. (1979), 'Wages, Technology and Jobs', *Australian Economic Review*.
- Higgins, C.I. and Fitzgerald, V.M. (1973), 'An Econometric Model of the Australian Economy', *Journal of Econometrics*, 1(3), pp229-265.
- Hamermesh, D.S. (1993) *Labour Demand*, Princeton University Press, New Jersey.
- Hristodoulidis, D., Belchamber, G. and Watson, A., 'The Impact of Safety Net Adjustments on Wages and Jobs of Award-reliant Workers', paper presented to the Australian Labour Market Research Workshop, The University of Western Australia, Perth, 6-7 December 2004.

- Hyslop D & Stillman S. (2004) 'Youth Minimum Wage Reform and the Labour Market', Working Paper 04/03, New Zealand Treasury, Wellington.
- James M, Wooden M & Dawkins P, 'Minimum Wages and the Fallacy of the Inflated Denominator', *Economic Papers*, 20, pp 59-70.
- Kaufman, R. (1989). "The Effects of Statutory Minimum Rates of Pay on Employment in Great Britain", *The Economic Journal*, vol. 99, pp1040-53.
- Kenyon, P. and Wooden, M. (1996) 'Labour Supply' in Norris, K. and Wooden, M. *The Changing Australian Labour Market*, AGPS, Canberra.
- Leigh, A. (2003) 'Employment Effects of Minimum Wages: Evidence from a Quasi-Experiment', *Australian Economic Review*, Vol 36, No 4, pp 361-373.
- Lewis, P.E.T. (1983), 'Disequilibrium in the Australian Aggregate Labour Market', *Economics Letters*, Vol. 11, pp185-189.
- Lewis, P.E.T. (1985) 'Substitution Between Young and Adult Workers', *Australian Economic Papers*, Vol. 24, No. 44, pp115-126.
- Lewis, P.E.T. (1997), 'The Economics of the Minimum Wage', *Australian Economic Review*, Vol. 30, No. 2, pp 204-7.
- Lewis, P.E.T., (2002), 'What Do We Know About Job Creation?', *Australian Journal of Labour Economics*, Vol. 5, No. 2, pp 279-288.
- Lewis, P. (2005), "Low Pay or No Pay?", *Policy*, Vol 21, No 3, pp14-20.
- Lewis, P.E.T. and Kirby, M.G. (1988), 'A New Approach to Modelling the Effects of Incomes Policies', *Economics Letters*, 28, pp81-95.
- Lewis, P.E.T. & McDonald, G. (2002), 'The Elasticity of Demand for Labour in Australia', *Economic Record*, Vol. 78, No. 240, pp 18-30.

- Lewis, P.E.T. & Mclean, B. (1999), 'The Adult at 18 Alternative', *Australian Bulletin of Labour*, Vol. 25, No. 3, pp 275-280.
- Lewis P.E.T. and Seltzer, A. (1996) 'Labour Demand' in Norris, W.K. and Wooden, M. *The Changing Australian Labour Market*, AGPS, Canberra.
- Machin S & Manning A. (1994). 'The Effects of Minimum Wages on Wages Dispersion and Employment: Evidence from the UK wages councils', *Industrial and Labor Relations Review*, vol. 47, pp. 319-29.
- Machin, S & Manning, A. (1996), "Employment and Introductions of a Minimum Wage in Britain", *The Economic Journal*, vol. 106, pp667-76.
- Mangan J & Johnston J. (1999) 'Minimum Wages, Training Wages and Youth Employment', *International Journal of Social Economics*, vol. 26, pp. 415-29.
- Manning, A. (1996), "The Equal Pay Act as an Experiment to Test Theories of the Labour Market", *Economica*, vol. 63, pp. 191-212.
- Neumark, D & Wascher, W. (1992), "Employment Effects of Minimum and Subminimum Wages: panel data on state minimum wage laws", *Industrial and Labor Relations Review*, vol. 46, no. 1, pp55-81.
- Norris, K. and Wooden, M. *The Changing Australian Labour Market*, AGPS, Canberra.
- Osterman, P. (1995) 'Review Symposium on Myth and Measurement: The New Economics of the Minimum Wage', *Industrial and Labour Relations Review*, Vol. 48, No. 4, pp827-828.
- Pissarides, C. (1991), 'Real Wages and Unemployment in Australia', *Economica*, Vol. 58, pp35-55.

- Robson, A. (2004), 'A Labour Market Fable', *Policy*, Vol 20, No4, pp25-30.
- Russell, B. and Tease, W. (1991), 'Employment, Output and Real Wages', *Economic Record*, 67(196), pp34-45.
- Seltzer, A. (1997) 'An Evaluation of the International Evidence on the Employment Effects of Minimum Wage Legislation' *Australian Economic Review*, Vol 30, No 2, pp 208-214.
- Sheehan, P.J., Derody, B. and Rosendale, P. (1979), 'An Assessment of Recent Empirical Research Work Relevant to Macroeconomic Policy in Australia', *Australian Economic Review*, No. 45, pp33-61.
- Stewart M, (2001). 'The Impact of the Introduction of the UK Minimum Wage on the Employment Probabilities of Low Wage Workers', in *Royal Economic Society Annual Conference 2002*, Economic Paper no. 169, www.warwick.ac.uk/res2002>
- Swidinsky R, (1980). 'Minimum Wages and Teenage Unemployment', *Canadian Journal of Economics*, no. 13, pp. 158-71
- Valentine, T. (1980), 'The Effects of Wage Levels on Prices, Profits, Employment and Capacity Utilisation in Australia: An Econometric Analysis', *Australian Economic Review*, No. 51, pp13-28.
- Webster, E. 2003, 'The Effects of Wages on Aggregate Employment: A brief summary of empirical studies', *Australian Economic Review*, vol. 36 no. 1, pp134-42

© Commonwealth of Australia 2006

This work is copyright. Apart from any use as permitted under the Copyright Act 1968, no part may be reproduced by any process without prior written permission from the Commonwealth. Requests and inquiries concerning reproduction and rights should be addressed to the Commonwealth Copyright Administration, Attorney General's Department, Robert Garran Offices, National Circuit, Barton ACT 2600 or posted at <http://www.ag.gov.au/cca>.

The views expressed in this paper are those of the author(s) and do not necessarily represent the views of the Australian Fair Pay Commission.

ISBN 0 9802919 5 X