Unemployment Rates and Starting Salaries: Are Australian Graduates at the Whim of the Wage Curve?

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Abstract

The existence of an inverse relationship between wage levels and regional unemployment rates, commonly referred to as the wage curve, is well established in the economic literature and was described by Card (1995) as being 'close to an empirical law of economics'. This microeconomic wage–unemployment relationship, first identified by Blanchflower and Oswald (1994), has since been observed in more than 40 countries, including Australia. While this body of evidence seems to support the existence of a near-universal wage curve, a number of studies have demonstrated that wage elasticity differs between subgroups in the overall labour market, based on factors such as age, gender and educational attainment. Based on individual-level earnings data from the 2009 Graduate Destination Survey, this article presents an empirical investigation into the relationship between graduate starting wages and regional unemployment rates in order to determine whether a wage curve exists for recent higher education graduates commencing their first full-time employment in the Australian labour market. While the main purpose of this article is to examine the unemployment elasticity of pay for recent higher education graduates, the results on the control variables (including enrolment, personal and employment characteristics) are also examined to provide further insights into the factors that serve as determinants of their labour market outcomes.

***Key Words*: wage curve, wage determination, unemployment, graduate earnings**

Disclaimer: The views expressed are the author's and not necessarily those of Graduate Careers Australia.

In early 2009, the unemployment rate in the Australian labour market reached a five-year high, increasing to 6.1% in March, up from a historic low unemployment rate of 3.9% recorded in August of the previous year (Australian Bureau of Statistics [ABS], 2010). Seemingly at odds with conventional wisdom—and a considerable body of economic theory—the starting salaries of bachelor degree graduates who completed their studies in 2008 and entered the full-time labour force at the height of the global financial crisis actually increased by an overall 6.7% compared with the starting salaries earned by graduates who entered the labour force in the previous year (Graduate Careers Australia [GCA], 2010).

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It is possible, however, that this aggregate-level perspective fails to account for differences between labour markets within Australia—rates of unemployment typically vary, for example, from one state or territory to another, and between male and female workers (ABS, 2010). By matching these detailed unemployment rates with earnings data for individual graduates in the full-time labour force, this article aims to conduct an empirical analysis of whether regional unemployment rates serve as a determinant of Australian university graduates' starting wages. For example, if Ms X, a recent bachelor degree graduate, is working full-time in Melbourne and earning a wage of $30 per hour in 2009, the corresponding unemployment rate for females in Victoria can be imputed into the dataset and analysed as a potential determinant of Ms X's hourly earnings. In addition, the results on the control variables used in this analysis are examined in this article, as they provide further insights into the factors that serve as determinants of graduates' initial earnings in the full-time labour force.

The remainder of this article is organised thus: Section I provides a brief overview of the theoretical relationship between wages and regional unemployment rates, commonly referred to as the 'wage curve', and a summary review of extant studies into this phenomenon. Section II presents a description of the data and econometric methodology used in this study. Section III provides a discussion of the empirical findings regarding the existence of a wage curve for recent graduates and an overview of other wage determinants. Limitations of this study and possible avenues for addressing them are discussed in Section IV, while Section V provides a summary of key findings.

I. Literature Review

Theoretical Perspectives

The notion of an inverse relationship between unemployment and wages is by no means recent. In his 1867 treatise on political economy, *Capital, Volume I*, Marx theorised a dampening effect of unemployment on wages. Marxian economics essentially views the surplus of unemployed workers (commonly referred to as the 'reserve army of labour') as a disciplining device that compels the labour force, fearful of their future job prospects, to work harder and for lower wages. From this perspective, the larger the so-called reserve army, the harder it is for workers to demand higher wages. As such, Marxian economics does not view unemployment as a market imperfection, but a necessary condition for the existence of the capitalist mode of production (Marx, 1867/1990).

More orthodox economic thought—in the form of the neoclassical supply and demand model of the labour market—also theorises a relationship between wages and unemployment, but with the causal relationship running from wages to unemployment, rather than from unemployment to wages as seen in the Marxian theory of unemployment. Under this model, if the going wage rate is set above the equilibrium rate due to non-market factors (minimum wage legislation, labour unions, etc.), then labour supply will exceed demand and unemployment will result. Critics have argued that the neoclassical model does not adequately explain the persistence of unemployment in all market economies (İlkkaracan & Selim, 2002); nor is the view inherent in neoclassical economics, that higher wages coincide with greater unemployment, consistent with empirical evidence (Townsend, 2005).

Due to these shortcomings in the neoclassical model, two 'imperfect competition models' have emerged as the most plausible explanations for the negative correlation observed to exist between unemployment and wages (Townsend, 2005). The first is based on a wage bargain model in which employers and workers negotiate over how to divide profits

(Carlin & Soskice, 1990). Under this theory, outside unemployment makes it more difficult for workers to find a job if wage negotiations reach an impasse, thus reducing their wage-bargaining power relative to that of their employer. The second is based on an efficiency wage model in which employers, who are unable to perfectly monitor workers' productivity, offer their employees a wage intended to discourage them from shirking (Shapiro & Stiglitz, 1984). Because the likely penalty for shirking is greater when it is harder for workers to find alternate employment, employers can offer a lower wage premium during periods of higher unemployment (Nijkamp & Poot, 2003). Both of these models predict a negative correlation between unemployment and wages for the same basic reason: higher unemployment shifts the balance of power in favour of employers, leading to lower wage levels (İlkkaracan & Selim, 2002). Although these two models appear to be consistent with empirical evidence, little research has been done to conclusively link the theory and the data (Townsend, 2005), so the question of why regional unemployment rates appear to affect wages remains unsettled (Card, 1995).

Empirical Evidence

Although several earlier empirical studies had observed a relationship between unemployment and wages (e.g., Blackaby & Hunt, 1992; Christofides & Oswald, 1992), it was the seminal work of Blanchflower and Oswald (1994) that introduced the concept of a 'universal wage curve'. Based on an analysis of data from 12 countries—the U.S., the U.K., Canada, South Korea, Austria, Italy, Holland, Switzerland, Norway, Southern Ireland, Australia and Germany—Blanchflower and Oswald concluded that the nature of the relationship appeared to be the same across different countries, with the regional employment elasticity of pay seeming to cluster around −0.1. Simply put, a doubling of the local unemployment rate (i.e., a 100% increase) is associated with an average drop in pay of 10%. Subsequent studies have presented evidence for a wage curve in a range of developed and developing economies, with an average wage curve elasticity of around −0.12 calculated on the basis of more than 200 empirically derived elasticities (Nijkamp & Poot, 2003). When examined across different groups of workers, however, wage curve elasticities have been shown to differ considerably (Barth, Bratsberg, Naylor ,& Raaum, 2002), with greater wage variability observed for, among others, younger workers (e.g., Blanchflower & Oswald, 1994; Card, 1995; İlkkaracan & Selim, 2002; Sanromá & Ramos, 2005), recent-hires (e.g., Card, 1995) and workers with a lower level of education (e.g., Card, 1995; İlkkaracan & Selim, 2002; Bucheli & González, 2007).

In the context of the Australian labour market, the regional unemployment elasticity of pay was originally determined by Blanchflower and Oswald (1994) to be −0.19, although Kennedy and Borland (2000), using more recent data and a more refined econometric methodology, calculated it to be around −0.07 to −0.09; corresponding closely with Blanchflower and Oswald's benchmark of −0.1. This present study aims to build upon this body of previous research by focusing on the starting wages of recent higher education graduates—that is, a fairly homogeneous group of highly educated yet relatively inexperienced individuals—in the full-time Australian labour force.

II. Data and Model Description

The earnings data for this study are drawn from the 2009 iteration of the Graduation Destination Survey (GDS), conducted by Graduate Careers Australia (GCA). The GDS, conducted annually since 1974, investigates the employment and further study outcomes of graduates from Australian higher education institutions approximately four months after

course completion. In 2009, 122,380 graduates responded to the GDS, representing an overall response rate of 55.9% (GCA, 2010). Although the GDS is conducted in the form of a national graduate census, whereby every member of the survey population is approached for the purposes of data collection, the extent of nonresponse to the survey means that it is appropriate to consider the resultant pool of responses to be a sample of the population and, as a consequence, statistical methods should ideally be used to analyse the resulting sample of data. While not strictly a random sample, Guthrie and Johnson (1997) concluded that GDS data are reliable indicators of the full-time labour market position of the overall graduate population.

The analysis presented in this article is based on graduates who completed either an undergraduate or postgraduate degree and were in their first full-time employment in Australia at the time of the 2009 GDS. Graduates who did not supply valid responses regarding their annual salary, average weekly working hours, level of award, age, gender, language background, residency status, sector of employment, self-employment status, occupation and industry of employment were excluded from the sample. The dependent variable for this study, nominal hourly wage, was calculated by dividing graduates' annual salary by 52 weeks and then dividing the result by their average weekly working hours. Extreme values of the dependent variable that would be likely to bias the analysis were identified by converting each hourly wage observation into a modified Z-score based on median absolute deviation. Modified Z-scores with an absolute value greater than 3.5 were classified as outliers (Iglewicz & Hoaglin, 1993) and, following inspection, were excluded from the sample. This lead to the exclusion of all individuals earning less than $13.73 per hour or more than $37.15 per hour, and resulted in a total analysable sample of 14,878 graduates.

The regional unemployment data for this study have been drawn from the Labour Force Survey (LFS), conducted on a monthly basis by the Australian Bureau of Statistics (ABS). The specific data utilised in this study are gender-specific unemployment rates for each of the eight Australian states and territories, which correspond to the specific state or territory in which a graduate of a particular gender was employed at the time of the 2009 GDS—a total of 16 gender-by-region unemployment observations. Because monthly unemployment data are likely to contain some error component (Kennedy & Borland, 2000), this analysis is based on the average rate of unemployment by gender and region over the 12 months from May 2008 to April 2009 (inclusive). These gender-by-region unemployment rates are presented in Table A1 in the appendix to this article, while summary statistics for all of the variables used in this analysis are presented in Table A2.

This analysis of the impact of regional unemployment rates on graduate initial earnings for the year 2009 is based on the standard log-linear cross-sectional regression used by Blanchflower and Oswald (1994). The general form of the estimated model specifies that the logarithm of hourly starting wages is a function of a vector of individual and job characteristics and the logarithm of the local unemployment rate. This model can be written thus:

$$\log w_{ir} = a \log U_r + b X_{ir} + e_{ir} \quad (1)$$

where w_{ir} is the hourly starting wage for graduate i observed in labour market r, Ur is the gender-by-region unemployment rate, Xir is a set of measured characteristics for graduate i in labour market r (such as gender, age, residency, education and employment), and e_{ir} is an error term. The results from estimating equation (1) are presented in the next section.

III. Results

As shown in the first row of Table 1, there is evidence of a statistically significant negative relationship between graduates' hourly starting wages and gender-specific regional unemployment rates in Australia—in other words, a wage curve does indeed appear to exist for recent graduates commencing their first full-time employment. The empirically derived unemployment elasticity of pay was estimated to be a relatively low −0.04; notably less than Blanchflower and Oswald's benchmark value of −0.1. This value implies that a hypothetical doubling of the regional unemployment rate would lead to a 4% decrease in graduates' average hourly starting wage. As with other wage curve studies, the focus of this article is to determine whether any wage curve in this context is statistically significant (i.e., significantly different from zero). The substantive ('real-world') significance of this finding, however, is a matter of subjective value.

Table 1

Regression Estimates of the Effect of Unemployment Rates on Hourly Graduate Starting Wages

Variable	Coefficient	t-statistic
Log gender-by-region unemployment rate	−0.040**	4.91
Age	0.005**	14.95
Female	−0.038**	11.41
Non-English speaking background	−0.014**	3.48
Australian citizen or permanent resident	0.055**	9.07
Postgraduate level of award	0.057**	13.28
Public/government sector	0.034**	8.50
Self-employed	−0.011	0.83
Occupation (omitted: non-professional/non-managerial)		
Managers	0.092**	11.20
Professionals	0.085**	21.48
Industry (omitted: financial and insurance services)		
Agriculture, forestry and fishing	−0.129**	5.75
Mining	0.175**	12.33
Manufacturing	−0.013	1.18
Electricity, gas, water and waste services	0.092**	5.75
Construction	−0.034**	2.75
Wholesale and retail trade	−0.194**	21.46
Accommodation and food services	−0.173**	12.13
Transport, postal and warehousing	−0.025	1.57
Information media and telecommunications	−0.143**	13.29
Rental, hiring and real estate services	−0.116**	6.01
Professional, scientific and technical services	−0.044**	6.06
Administrative and support services	−0.152**	11.24
Public administration and safety	0.042**	4.63
Education and training	−0.018*	2.28
Health care and social assistance	−0.030**	3.95
Art and recreation services	−0.136**	8.83
Other services	−0.086**	4.83
Constant	3.086**	198.23
Adjusted R-square	0.220	
F-statistic	156.51	
Degrees of freedom	14,877	

Note. Author's computations based on earnings data from the 2009 GDS and gender-by-region unemployment data from the LFS. The dependent variable is the logarithm of hourly starting wage.

*$p < .05$. **$p < .01$

While the primary aim of this article is to examine the unemployment elasticity of pay for recent higher education graduates commencing their first full-time employment in Australia, the results on the control variables in the estimated model also provide insights into the factors that serve as determinants of their labour market outcomes. The remainder of this section is dedicated to discussing these results,[1] which are also presented in Table 1.

Regarding personal characteristics, the positive coefficient on the age variable implies that average hourly starting wages were higher for older workers entering the full-time labour force for the first time, although, at around 0.5%, this annual return to age was minimal. Female graduates earned 3.8% less than their male counterparts, on average, which is broadly consistent with other research undertaken into graduates' initial earnings (e.g., Birch, Li, & Miller, 2009; GCA, 2010). Graduates from a non-English speaking background, regardless of their residency status, earned an average hourly starting wage 1.4% lower than that of comparable graduates who identified that they spoke English as their main language at home. Moreover, full-time employed graduates who identified themselves as Australian citizens or permanent residents at the time of the 2009 GDS earned an average hourly starting wage 5.5% higher than Australian-employed graduates who were not Australian citizens or permanent residents, ceteris paribus.[2]

The positive coefficient on the postgraduate variable reveals that, as may be expected, those individuals completing a postgraduate degree and embarking upon their first full-time job earned more on average than similar bachelor degree completers. Controlling for a range of other characteristics, the average hourly starting wage of those who had recently completed a postgraduate degree was 5.7% higher than those who had recently completed a bachelor degree.

Graduates employed in the public/government sector earned 3.4% more on average than similar graduates employed in private sector firms. This average earnings advantage for recent graduates employed in the public/government sector may be the result of private sector firms paying a relatively high premium for labour market experience (Gunderson, 1979), or may reflect private sector cost-cutting in the face of the global financial crisis. There was no statistically significant earnings differential apparent for self-employed graduates.

Hourly starting wages also varied notably based on occupation. Graduates employed in a managerial role could expect to earn 9.2% more on average than the benchmark group of non-professional/non-managerial workers, ceteris paribus, while graduates employed in a professional capacity could expect to earn 8.5% more on average than the same benchmark group.

All but three of the 17 industry variables included in the analysis were found to be statistically significant. Graduates employed in the top-ranked mining industry enjoyed an average earnings premium of 17.5% over the arbitrarily selected benchmark group of graduates employed in the financial and insurance services industry. Conversely, graduates employed in the bottom-ranked wholesale and retail trade industry suffered an average earnings disadvantage of 19.4% compared with the same benchmark group of graduates. This implies an earnings differential of nearly 37 percentage points across industries, ceteris paribus, thus establishing industry of employment as a key determinant of graduates' initial earnings.

IV. Limitations

A notable handicap of this analysis was its limitation to a single year cross-section of data. Aside from limiting the analysis to 16 gender-by-region unemployment observations, this cross-sectional approach also meant that regional effects could not be controlled for statistically. Currently, the gender-by-region unemployment rate is the only territorial variable included in the analysis, and thus does not adequately control for any systematic differences between states and territories (Ramos, Duque, & Surinach, 2009). This shortcoming will likely be addressed in a future study when additional GDS data with consistently coded occupation and industry variables become available.

Another potential limitation of this analysis is due to its basis on individual earnings as a dependent variable. The difficulty in this arises because this dependent variable—hourly starting wage—is defined at a lower level of aggregation (individual) than the regional unemployment rate (territorial), thus biasing downwards the estimated standard errors (Moulton, 1986). Although many wage curve studies have been based on individual earnings, including the original research conducted by Blanchflower and Oswald concerning the existence of the wage curve, subsequent authors (e.g., Card, 1995; Kennedy & Borland, 2000; Townsend, 2005) have recommended using average values over all the individuals in a particular labour market (commonly referred to as 'cell-means' estimation) instead of individual observations in order to address this discrepancy. This approach, however, introduces its own limitation. In the context of this present analysis, using gender-by-region cell means instead of individual observations would reduce the number of analysable cases from nearly 15 thousand to just 16—fewer than the number of explanatory variables in the current model! As in the case of controlling for regional effects, this limitation can be addressed as more years' survey data (and hence more gender-by-region cell means) become available.

In addressing these limitations, a revised model may take the following form:

$$\log w_{rt} = a \log U_{rt} + b X_{rt} + d_r + f_t + e_{rt} \quad (2)$$

where w_{rt} is the average hourly graduate starting wage in labour market r in period t, U_{rt} is the gender-by-region unemployment rate in period t, X_{rt} is the average of the observed characteristics for all graduates in labour market r in period t, d_r and f_t are fixed effects for different labour markets and time periods respectively, and e_{rt} is an error term. Estimation of equation (2) would potentially provide more robust evidence regarding the existence (or otherwise) of a wage curve for recent higher education graduates commencing their first full-time employment in Australia.

V. Conclusion

This study set out to determine whether graduates in Australia are at the whim of the wage curve or, in other words, whether regional unemployment rates serve as a determinant of Australian university graduates' initial earnings. Based on an analysis of microeconomic earnings data from the 2009 Graduate Destination Survey (GDS) and gender-by-region unemployment rates computed from the Labour Force Survey (LFS), a statistically significant wage curve does appear to exist. Consistent with a wide range of previous studies on labour markets throughout the world, it appears that recent graduates embarking upon their first full-time employment in Australia in a region with higher unemployment earn a marginally, but

significantly, lower average hourly wage than graduates in a region with comparatively lower unemployment. The empirically derived unemployment elasticity of pay for recent graduates was estimated to be −0.04; notably lower than the benchmark value of −0.1 popularised by Blanchflower and Oswald.

Moreover, this study sought to identify other factors that serve as determinants of graduates' initial earnings. In examining the results on the control variables, it was found that industry of employment and, to a lesser extent, occupation, are key determining factors. This study also identified earnings premiums for postgraduate degree completers, Australian citizens and permanent residents, and graduates employed in the public/government sector. In contrast, female graduates and graduates from a non-English speaking background were found to be at an earnings disadvantage, ceteris paribus.

This analysis could be enhanced by using consistent time-series earnings data, as this would allow for the control of regional effects and would facilitate estimation of the wage curve equation using a more robust cell-means approach. In sum, while this study has provided strong support for the existence of a wage curve for recent graduates commencing their first full-time employment in Australia, more empirical evidence is needed before definitive conclusions can be made about the role that regional unemployment rates play in the determination of graduates' initial earnings.

Endnotes

1. Regression coefficients in semilogarithmic models can be interpreted as the proportional change in the dependent variable associated with a unit change in the independent variable (Krautmann & Ciecka, 2006).

2. Literally, 'all other things being equal'.

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Appendix

Table A1 presents gender-by-region unemployment rates averaged over the period May 2008 to April 2009. Table A2 presents summary statistics for all of the variables used in this analysis.

Table A1

Average Gender-By-Region Unemployment Rates for the Period May 2008 to April 2009

State/territory	Male	Female
New South Wales	5.2	5.6
Victoria	4.6	5.1
Queensland	4.1	4.1
South Australia	5.3	5.4
Western Australia	3.2	3.8
Tasmania	3.9	5.1
Northern Territory	3.7	3.5
Australian Capital Territory	2.9	2.4

Note. Computed from *Labour Force, Australia, 2010*, Canberra: Australian Bureau of Statistics.

Table A2

Summary Statistics for Model Variables

Variable	Mean	Variable	Mean
Log hourly starting wage[a]	3.127	Electricity, gas, water and waste services	0.011
Log gender-by-region unemployment rate[a]	1.529	Construction	0.019
Age[ab]	5.202	Wholesale and retail trade	0.063
Female	0.614	Accommodation and food services	0.017
Non-English-speaking background	0.207	Transport, postal and warehousing	0.011
Australian citizen or permanent resident	0.916	Information media and telecommunications	0.031
Postgraduate level of award	0.188	Rental, hiring and real estate services	0.007
Public/government sector	0.392	Professional, scientific and technical services	0.238
Self-employed	0.014	Administrative and support services	0.016
Managers	0.042	Public administration and safety	0.080
Professionals	0.732	Education and training	0.153
Agriculture, forestry and fishing	0.005	Health care and social assistance	0.229
Mining	0.016	Art and recreation services	0.013
Manufacturing	0.031	Other services	0.009

Note. N = 14,878. Individuals earning less than $13.73 per hour or more than $37.15 per hour are excluded.

[a] = Continuous variable.

[b] Age was centred to 19 years; the minimum age recorded in the 2009 GDS.