

A Panel Data Investigation of the Relationship Between Graduate Job Search and Employment Outcomes

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Abstract

The transition from study to work is an important one. The jobs that graduates secure after completing their studies may very well shape the trajectory of their future careers, so an understanding of how job search influences employment outcomes has significant implications for theory and higher education practice. This article specifically examines the monetary outcomes associated with different job search methods in the context of the Australian graduate labour market, based on a rich panel data sample of bachelor degree graduates from the 2011 Beyond Graduation Survey. The use of panel data allows us to control for the effect of unobserved individual fixed effects, which might otherwise confound our wage estimates. Five broad types of job search method are investigated: advertisements, university-based methods, networking, direct employer contact, and other methods not specifically addressed in the survey. This article concludes by discussing the implications of the results and methodology for practice.

Keywords: job search; graduate labour market; wages; panel data; fixed effects

The full-time labour market is a common destination for recent higher education graduates in Australia. In all, 65% of recent bachelor degree graduates considered themselves available for full-time employment shortly after course completion in 2007, with 76% of these having found work by the time of the 2011 Australian Graduate Survey (AGS) (Graduate Careers Australia [GCA], 2012a). With one in every two graduates employed in full-time jobs within four months of course completion, and evidence suggesting that initial employment conditions persist for many, for at least the medium term after graduation (Carroll & Tani, 2012), their labour market outcomes are of interest to higher education policymakers, university leaders and administrators and, of course, the students and the graduates themselves. In spite of this interest, the process by which graduates find their jobs has received comparatively little attention from researchers. This is no small oversight for two reasons. First, nearly all of these graduates, save perhaps those who are self-employed, must have engaged in job search to locate their current jobs. This might have included *formal*

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job search methods, such as responding to job advertisements or visiting the university careers service, or *informal* job search methods, such as using personal contacts to identify job vacancies or approaching potential employers directly. Second, an expanding body of research suggests that job search can influence labour market outcomes, such as earnings. This article seeks to address this gap in the graduate employment outcomes literature.

Although questions concerning how individuals find jobs are among some of the most underresearched topics in labour market research (Try, 2004), a number of studies have shown a significant relationship between job search methods and earnings. Huffman and Torres (2001), using U.S. data from the early 1990s, found that the use of newspaper advertisements, school placement officers and private employment agencies (all formal job search methods) was associated with increased earnings; whereas answering help-wanted signs was associated with far reduced earnings, even after controlling for a range of demographic and job characteristics. They also found that the positive wage effect of school placement officers was relatively stronger for males, and that the negative wage effect of help-wanted signs was relatively weaker for females. Other studies by Falcon (1995) and Green, Tigges and Diaz (1999) reported that Latino jobseekers who used personal contacts to find work ended up in lower-paying jobs than those who did not. The latter study also found a similar negative wage effect for Blacks who used personal contacts to find work, but identified a positive wage effect for Whites. Dockery and Strathdee (2003), using data from the 1995 Longitudinal Survey of Australian Youth (spanning 1995 to 2000), identified higher hourly earnings for young workers who obtained their jobs through personal contacts, and for those who approached employers directly (both informal job search methods). They noted, however, that these higher hourly earnings may reflect, in part, the tendency for jobs obtained using these search methods to be part-time. Additional evidence on the inconsistent relationship between informal job search methods and earnings is presented in the review by Mouw (2003). Using Portuguese labour market data, Addison and Portugal (2002) concluded that jobs obtained through the public employment service (analogous to *Centrelink* in Australia) tend to pay less. In contrast to all of these studies, Weber and Mahringer (2008), using Austrian data, did not find any earnings differences attributable to different job search methods after controlling for a wide range of observed covariates. Although the literature is sparse and difficult to compare due to differences in study populations and job search definitions, we feel that there is sufficient evidence of an association between job search methods and earnings to warrant an investigation on this topic in the context of the Australian graduate labour market.

The purpose of this study was to investigate whether the full-time earnings of recent Australian higher education graduates differ on the basis of job search method used, net of potential confounding factors. This investigation was based on panel data from the 2011 Beyond Graduation Survey (BGS), which has two observations for each graduate: one gathered shortly after course completion and another three years later. The findings of this study have relevant theoretical and practical implications. From a theoretical standpoint, this study provides new insights into the factors influencing the labour market outcomes of recent graduates, adding to the somewhat limited body of empirical work in this area (e.g., Birch, Li, & Miller, 2009; Carroll, 2010; Chia & Miller, 2008). From a practical standpoint, this study may provide careers service professionals with evidence on the usage of and relative returns to different job search methods, which might be useful in the provision of careers advice and guidance. This study advances the literature on job search methods and employment outcomes in two ways. First, this study focuses on the Australian graduate labour market, which is a previously unresearched context. Second, the use of panel data

allows for omitted variable bias to be addressed, which is important if we wish to make causal inferences about the relationship between job search methods and earnings.

The remainder of this article is organised as follows. Section 1 describes the data and variables used in this study. Section 2 gives an overview of the estimation methodology. Section 3 presents the results and discussion and Section 4 concludes.

1. Data and Variables

This study is based on novel panel data drawn from the 2011 BGS. Since the early 1970s, graduates from Australian higher education institutions have participated in a national survey of their outcomes and activities four months after course completion. The current incarnation of this national graduate survey is the Australian Graduate Survey (AGS), conducted by Graduate Careers Australia in conjunction with participating higher education institutions. The BGS was developed as a cohort-style follow-up to the AGS, whereby graduates who completed the AGS were invited to respond to a survey concerning their work and study activities three years after graduation. Responses to the 2011 BGS were merged with data from the 2008 AGS based on a unique identifier. Of the 49 institutions that participated in the 2008 AGS, 31 also participated in the 2011 BGS, thus providing a nationally representative sample from a wide range of institutions. Graduates were invited to complete the BGS by email. The survey response rate was 17%, and the sample of secured responses was found to be representative of the overall graduate population (GCA, 2012b). While using email likely reduced the potential for bias stemming from graduate mobility (i.e., moving house after graduation and failing to leave a forwarding address), it should be noted that graduates who achieved labour market success may have been more disposed to respond to a follow-up survey (Dolton & Vignoles, 2000), which would impact on the generalisability of our results. Earnings estimates are given with standard errors so that readers may draw their own conclusions on the robustness of our findings.

Graduates who were not in full-time paid work in Australia in 2008 and 2011 were removed from the sample. The sample was further restricted to include only domestic bachelor degree graduates aged 35 years or less at the time of the 2008 AGS, to ensure a large sample that is relatively homogenous with respect to ability and background. Self-employed graduates were excluded as they are not relevant to an analysis of job search methods. Hourly earnings figures above the 99th percentile were removed as outliers, as were those below the Australian minimum wage in 2008 and 2011 respectively. This resulted in a strongly balanced panel of 3,104 observations for 1,552 graduates. A limitation of both the AGS and BGS is that neither survey captures the sum total of an individual's labour market experience. This is addressed in the analysis by using age as a proxy for potential experience. Table 1 gives the means of all the variables used in our analysis, stratified by gender.

Table 1

Sample Means for Males and Females

Variable	Name	Gender	
		Male	Female
Hourly earnings in logarithmic form ^a	lnhwage	3.355	3.270
Age in years ^a	ageyrs1	25.717	25.118
Sciences major	majora	0.076	0.083

Information technology major	majorb	0.121	0.015
Engineering or related major	majorc	0.225	0.062
Health major	majord	0.081	0.216
Education major	majore	0.055	0.133
Society and culture major	majorf	0.157	0.216
Creative arts major	majorg	0.028	0.070
<i>(Omitted: Management and commerce major)</i>			
Paid work in final year of study	fywork	0.871	0.909
University-based method	jobscha	0.255	0.194
Networking	jobschb	0.231	0.195
Direct employer contact	jobschc	0.137	0.143
Other job search method	jobschd	0.136	0.156
<i>(Omitted: Advertisement)</i>			
Managerial/professional job	manprof	0.860	0.824
Permanent job	permjob	0.848	0.730
Employed in Vic	empsta	0.299	0.329
Employed in Qld	empstb	0.177	0.173
Employed in SA	empstc	0.077	0.077
Employed in WA	empstd	0.074	0.083
Employed in Tas	empste	0.015	0.021
Employed in NT	empstf	0.012	0.017
Employed in ACT	empstg	0.064	0.066
<i>(Omitted: Employed in NSW)</i>			
<i>n</i>		1,210	1,894

Note. ^a = Continuous variable

The job search variables of interest in this article were constructed on the basis of survey items that ask graduates to indicate how they first found out about their main paid job. The 12 response categories from the AGS and BGS were combined into five broad job search categories to avoid overly low cell sizes. These five broad categories are defined thus: ‘university-based method’ (careers services, careers fairs, lecturers), ‘advertisement’ (internet, print media), ‘networking’ (family, friends, work contacts), ‘direct employer contact’, and ‘other’ (not specifically listed on the survey). The method identified by graduates in response to these survey items can be considered their primary method of job attainment. The methods used by male and female graduates to find their current jobs are illustrated in Figure 1. Males tended to be more likely than females to use a university-based search method or networking, whereas females were more likely to find their jobs through advertisements. Similar proportions of males and females contacted employers directly or used some other job search method, both of which were less common among the graduates in the analysis sample.

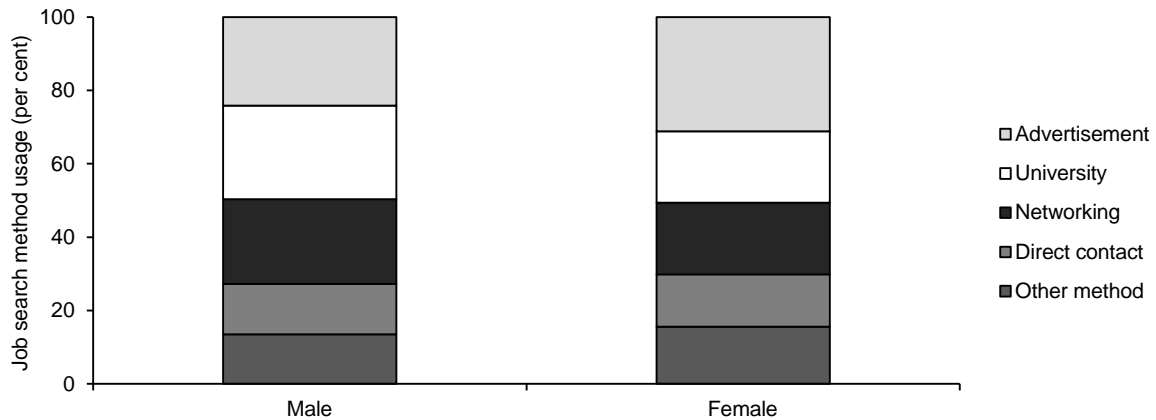


Figure 1

Use of job search methods by male and female bachelor degree graduates.

2. Estimation Methodology

The analysis begins by using pooled ordinary least squares (OLS) regression to estimate the following earnings function:

$$\ln Y_{it} = \alpha_0 + \beta X_{it} + \delta_t + u_{it} \quad (1)$$

In this equation, $\ln Y_{it}$ is the log of the graduate's hourly earnings; X_{it} is a row vector of personal, educational and occupational individual characteristics that includes age, major field of study, work status in final year of study, job search method, broad occupation type, contract type and location of employment. A time-specific dummy for year 2011 is signified by δ_t and u_{it} is an error term. A time-specific effect was included in the model because of the likelihood that there are time-specific factors that impact on all individuals in our sample in the same way, such as the condition of the Australian labour market at the time of each survey wave. A shortcoming of OLS is that it may not account for unobserved individual fixed effects that are correlated with the variables in our model, such as inherent ability or motivation. This problem is often referred to as omitted variable bias, and can lead to inconsistent estimates if not addressed. This study controls for possible omitted variable bias using a fixed-effects model, in which each individual serves as their own control. This model takes the following form:

$$\ln Y_{it} = \alpha_0 + \beta X_{it} + \delta_t + c_i + u_{it}, \quad (2)$$

where c_i is the time-invariant individual fixed effect. Other terms are as previously defined. By nature, fixed-effects models do not provide estimates for variables that do not change across time.

3. Results and Discussion

Table 2 gives log hourly earnings estimates, where the coefficients are approximately equal to percentage differences relative to the omitted categories or, in the case of the age variable, equal to the percentage difference associated with a one-unit change. Considering first the pooled OLS estimates [Eq. (1)], male graduates who obtained their jobs through a

university-based search method earned 4% more, on average, than those who obtained their jobs by answering a job advertisement. Males who obtained their jobs through some other method not listed on the survey received a 6% earnings premium. It is difficult to interpret this finding without further information on the particular search methods in this ‘other’ category, which encapsulates 14% of all responses for males. This, in itself, implies that a more detailed set of response categories may be required to accurately capture current trends in job search behaviour. There were no significant earnings differences for female graduates on the basis of their job search methods after controlling for a range of other observed factors.

Table 2

OLS and Fixed-Effects Estimates of the Factors Influencing Graduates’ Hourly Earnings

Variable	Male		Female	
	OLS	FE	OLS	FE
Age in years	0.0272** (0.008)	b	0.0249** (0.006)	b
Age in years squared/100	-0.0526 (0.044)	b	-0.0711* (0.034)	b
Sciences major	-0.0098 (0.036)	b	-0.0046 (0.022)	b
Information technology major	0.0332 (0.029)	b	0.0493 (0.045)	b
Engineering or related major	0.0260 (0.023)	b	0.0998** (0.030)	b
Health major	-0.0111 (0.031)	b	-0.0016 (0.019)	b
Education major	-0.1201** (0.038)	b	-0.0795** (0.020)	b
Society and culture major	-0.0882** (0.027)	b	0.0050 (0.019)	b
Creative arts major	-0.1827** (0.042)	b	-0.0957** (0.026)	b
Paid work in final year of study	0.0266 (0.025)	b	0.0252 (0.019)	b
University-based method	0.0433* (0.018)	0.0413 (0.026)	-0.0004 (0.014)	-0.0208 (0.020)
Networking	-0.0010 (0.022)	-0.0077 (0.026)	-0.0177 (0.015)	-0.0227 (0.019)
Direct employer contact	0.0303 (0.022)	0.0104 (0.025)	-0.0130 (0.017)	-0.0224 (0.021)
Other job search method	0.0559* (0.024)	0.0452 (0.026)	0.0271 (0.017)	0.0070 (0.021)
Managerial/professional job	0.0665** (0.020)	0.0124 (0.022)	0.0536** (0.014)	0.0251 (0.018)
Permanent job	0.0582**	0.0234	0.0165	-0.0267

	(0.021)	(0.023)	(0.011)	(0.015)
Employment location	Included	Included	Included	Included
Survey year	Included	Included	Included	Included
<i>n</i>	1,210	1,210	1,894	1,894
<i>p</i> > <i>F</i>	0.000	0.000	0.000	0.000
<i>R</i> ²	0.450	0.721	0.448	0.678

^a Standard errors clustered at the individual level are in parentheses.

^b Coefficients of time-invariant regressors are not estimable under a fixed-effects model.

* significant at 5%; ** significant at 1%

Because OLS estimation may not properly take into account that the use of particular search methods may be associated with unobserved characteristics, such as ability or motivation, this unobserved heterogeneity is controlled for using the fixed-effects model shown in Eq. (2). The results from this model are presented in Table 2, alongside the corresponding OLS estimates. An important finding from this is that the significant earnings premia for males associated with the use of university-based and other job search methods are no longer statistically significant after unobserved individual fixed effects are accounted for. This result suggests that male graduates who use these job search methods may tend to possess certain unobservable characteristics that contribute to higher earnings, such as a higher level of inherent ability or motivation, or greater social capital.

The results on the control variables in the estimated models provide further evidence on the factors that influence graduate earnings. The positive association between age and earnings suggests that previous experience translates into higher earnings; however, the significant negative coefficient on the age-squared variable for females suggests that returns to age fall as age increases for graduates of this gender. This could reflect labour market discrimination, and/or it could be due, at least in part, to women spending less time (on average) in the labour force due to pregnancy and childcare.

Compared to the benchmark category of management and commerce, both male and female graduates from the study fields of education and creative arts tended to earn lower hourly wages, all else being equal, with these wage penalties relatively stronger for males. Additionally, male society and culture graduates were at an earnings disadvantage compared to their peers from management and commerce degrees, whereas female graduates from engineering and related disciplines earned higher hourly wages than female management and commerce graduates. Paid employment in the final year of study did not result in higher mean hourly wages in the graduate labour market. This is somewhat counterintuitive, considering that graduates who were employed in their final year of study would presumably have more experience in the workplace than those who were not. A plausible explanation for this finding could be that employers do not pay a premium for experience gained in low-skilled roles, which would likely describe the jobs held by many graduates in their final year of study.

In support of earlier findings from Birch, Li and Miller (2009), and Carroll (2010), the OLS estimates show that graduates employed in managerial and professional roles earn more, on average, than graduates employed in other lower-skilled positions. Interestingly, once unobservable individual fixed effects are accounted for (in the ‘FE’ columns in Table 2), the earnings premia associated with managerial and professional employment become smaller and no longer statistically significant. This result suggests that the earnings advantage for graduates in managerial and professional roles can be attributed largely to their superior

ability or motivation. A similar interpretation can be given for the earnings premium for males in permanent (non-temporary) positions.

4. Conclusions

Using a novel panel dataset on recent Australian bachelor degree graduates, this study investigated the relationship between job search methods and full-time earnings. In contrast to much of the extant literature on job search, no significant earnings differentials attributable to job search methods was apparent after accounting for unobserved individual fixed effects and a range of demographic, educational and employment characteristics. The earnings premia initially observed for males who utilised university-based and other search methods to find their current jobs appear to be explained by their possessing unobservable characteristics that contribute to higher earnings, such as higher ability or motivation. A like interpretation can be given for the earnings premia associated with professional and managerial employment, and permanent employment for male graduates. A positive return to age was observed for both males and females; however, females appear to suffer decreasing marginal returns to age as age increases. Education and creative arts graduates of both genders earn less than their counterparts from management and commerce degrees, as do male society and culture graduates. Female graduates from engineering and related disciplines enjoy relatively higher hourly wages.

From a practical standpoint, these results may provide careers service professionals with new evidence on the type of students that utilise their services. The results suggest that male graduates who found their jobs through a university-based search method tend to possess unobserved characteristics that contribute to higher earnings; however, there was no evidence that the same is true for female graduates. This may encourage university leaders to consider ways of enticing males with less ability or social capital to make use of the campus careers service office when searching for work. In addition, the fact that a substantial proportion of graduates located their current jobs through a method not listed on the survey suggests that a revised set of response categories may be warranted. Moreover, this would ensure that the options presented to survey participants reflect the current state of job search, which has changed markedly in recent years due to technology. In 2011, for example, more than a quarter of new Australian graduates in full-time work found their jobs through an internet advertisement (GCA, 2012c). A more detailed set of response categories could provide useful information about this large group, such as the relative proportions who found their jobs through job seeker websites, listings on company websites and via social media.

Finally, this study has also emphasised the importance and value to researchers of addressing omitted variable bias when repeated measures data are available. This study used graduate labour market data to model employment outcomes; however, a similar panel estimation approach could be used to address a multitude of pertinent questions in institutional research, drawing on data that are either commonly available in student data systems or easily obtainable through surveys. A researcher could, for example, use semesterly grade point average data to investigate the impact of participation in peer-assisted learning on academic performance while controlling for unobserved innate academic ability, which would otherwise be a serious confounding factor. The results from this type of analysis would have strong implications for educational policy at the institution in question.

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