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Do You Need a Job to Find a Job?

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DISCUSSION PAPER SERIES

IZA DP No. 1211

Do You Need a Job to Find a Job?

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July 2004

Forschungsinstitut
zur Zukunft der Arbeit
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Do You Need a Job to Find a Job?

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ABSTRACT

Do You Need a Job to Find a Job?*

This paper investigates whether job offers arrive more frequently for those in employment than for those in unemployment. To this end, we take advantage of a unique Australian data set which contains information on both accepted and rejected job offers. Our estimation strategy takes account of the selectivity associated with the initial employment state and we allow for individual heterogeneity in the probability of obtaining jobs. Our results reveal that, across the wage range, individuals are about equally likely to obtain a job offer in employment as in unemployment. This implies that encouraging unemployed (rather than employed) search through the provision of unemployment benefits does not improve the speed of a job match.

JEL Classification: C41, C14, J64

Keywords: job-offer arrival rates, reservation wages, wage-offer distribution, directed search

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1 Introduction

Who receives more acceptable job offers, the unemployed or the employed? Answering this question is important for several reasons. First, if unemployed search is more effective than employed search a case can be made that risk aversion amongst the unemployed or externalities in the search process warrant the subsidising of unemployment. The argument – made at least as early as Burdett (1979) – is that if job offers in employment arrive infrequently then an initial 'bad choice' cannot be easily corrected resulting in less efficient outcomes. Marimon and Zillibotti (1999), for example, argue that individuals who accept unsuitable jobs reduce the availability of such jobs for others who are better suited. Consequently, bad job matches made by the unemployed out of financial necessity should be avoided. These views have led many to advocate using unemployment benefits to subsidise unemployed job search as a means of increasing efficiency in the labour market (for example, Marimon and Zilibotti, 1999; Acemoglu and Shimer, 1999).

At the same time, if the employed receive at least as many job offers as the unemployed, then arguments in favour of unemployment benefits as a search subsidy become less valid. Indeed, if job offers arrive more frequently during employment then subsidising unemployment may lead to higher unemployment levels and be counterproductive.

Second, there are also theoretical reasons to be concerned about relative job offer arrival rates. Assumptions about the relative frequency of job offers during employment and unemployment form a key component of many job search models. The standard Burdett and Mortensen (1998) model of wage heterogeneity amongst homogeneous individuals presumes for example that employed and unemployed job-offer arrival rates are the same. Empirical applications of

this model, such as in Bontemps et al. (2000) depend upon the plausibility of this assumption as does the theoretical framework in Ljungqvist and Sargent (1998). On the other hand, Van den Berg (1990), Frijters and Van der Klaauw (2001), and Flinn and Heckman (1982) assume that the job-offer arrival rate for the employed is zero and applications of these models rest heavily on this assumption.

Despite the importance of the issue, the empirical evidence is limited. Early results for US youth suggest that search intensity is higher in unemployment than in employment resulting in more job offers while unemployed, although the estimated wage returns to unemployed search are not necessarily higher (see Kahn and Low, 1982; 1984; Holzer, 1987). At the same time, employed search is significantly more efficient than unemployed search for Dutch students (Van der Klaauw et al., 2004), while Pissarides and Wadsworth (1994) show that twice as many workers in the UK choose on-the-job search rather than quitting into full-time search indicating that workers themselves see a relative benefit in searching on the job. Moreover, Jackman et al. (1989) argue that in the UK the efficiency of job search by the unemployed declined relative to the efficiency of employed job search in the decades leading up to 1989.

Our objective is to shed new light on these issues by investigating whether 'acceptable' job offers occur more frequently in employment than in unemployment. We avoid the selectivity associated with initial employment state by utilising information on rejected job offers for individuals who are observed searching for jobs both in employment and in non-employment. Using this identification strategy, we then non-parametrically estimate separate employed and non-employed wage-offer distributions taking advantage of unique data from a large panel survey of job seekers in Australia. Unlike alternative data sources, these data provide information over a period of three years about monthly (as opposed to annual) job offers, the beginning and

end dates of both employed and non-employed search spells, and annual reports of reservation wages. Detailed information about search outcomes (including rejected job offers) for large samples of employed and unemployed job seekers is fairly uncommon and allows us to account for selectivity associated with initial employment state as well as the endogeneity of search effort.

Our results indicate that offer arrival rates in employment and unemployment do not differ significantly. Employed and unemployed job seekers in Australia are essentially equally likely to receive acceptable job offers. In this respect, the Australian labour market appears to be more similar to that of Northern Europe – where the unemployed are less likely to receive job offers – and less like the United States where unemployed job search is perhaps more efficient than employed search.

The outline of the paper is as follows. In the next section, we set out our theoretical framework and derive our estimation equations. In Section 3, we describe the data and focus on the unconditional ratio of employed to unemployed job-offer arrival rates. Following that, we present our estimation results paying particular attention to placing our results in the context of the wider international literature. Conclusions and suggestions for future research are given in Section 5.

2 The Model

2.1 Theoretical Framework

Our goal is to develop a theoretical framework which captures the essence of the job search process, exploits the relative strengths of our data (see the discussion below), and provides a sensible backdrop against which to interpret our results. To this end, we develop a semi-structural model which allows us to deal with the selectivity of those in employment, fixed-effects in wage-offer distributions, and unobserved heterogeneity in job-offer arrival rates.

We begin by taking a simplified stationary job-search environment in which individuals undertake directed (or systematic) search in order to find jobs (see for example, Kahn and Low, 1988; 1990; Gregg and Petrongolo 2000). While undirected (or random) search would result in job offers periodically arriving from randomly encountered employers, directed search implies that an unemployed individual i only applies for jobs that pay a wage higher than or equal to his or her individual-specific reservation wage ($\breve{w}_i$). This directed search framework seems reasonable given the self-reported nature of job offers in our data. In fact, nearly all unemployed job seekers have latent job offers to become self-employed street vendors or floor sweepers at the nearest fast-food restaurant. These latent, low-paid job offers are clearly not what people mean when they report to have had a job offer. Reported job offers are in some sense 'serious' offers, and hence better fit a directed search view of the labour market. Moreover, empirical evidence suggests that directed search is quite common (Kahn and Low, 1988; 1990).

An observed job offer for an unemployed individual consists of a relative wage offer drawn from a distribution $F^{UN}(\frac{w}{\breve{w}_i})$ where w is the offered wage. In other words, the probability of

obtaining a specific wage offer w depends on the level of w relative to the individual-specific reservation wage $\breve{w}_i$. Our directed search framework implies that $F^{UN}(\frac{w}{\breve{w}_i}) = 0$ for $\frac{w}{\breve{w}_i} < 1$.[1] Additionally, each individual is assumed to have an individual-specific job-offer arrival rate λ_i and job offers are assumed to be rejected with an exogenous probability γ.[2] Job offers may be rejected, for example, because the non-monetary aspects of the job turn out to be unsatisfactory or family circumstances prevent a change of job.

An employed job seeker is assumed to obtain job offers with arrival rate $\lambda_i * \delta$ from a distribution $F^E(\frac{w}{\breve{w}_i})$. We can think of δ as capturing the relative search intensity of employed individuals in comparison to their unemployed counterparts, while disparity between $F^E(\frac{w}{\breve{w}_i})$ and $F^{UN}(\frac{w}{\breve{w}_i})$ stems from the possibility that the job pools to which individuals have access may depend on their employment status. An obvious alternative to this approach would be to capture differences in employed and unemployed job search by allowing the reservation wage itself to depend on whether an individual is currently employed or unemployed (as in Frijters and Kalb, 2003). Our preliminary estimation, however, suggests that individuals' reservation wages do not change substantially when they either gain or lose jobs (see Appendix Table A.1). Similarly, we also do not observe significant wage increases as a result of job changes. These findings may stem from the fact that our sample is dominated by low-skilled individuals for whom the main reason to change jobs is related to travel, family, and job security considerations. Given this, we model reservation wages as individual-specific and independent of current employment status.

[1] In Section 3 we discuss the extent to which this assumption holds in our sample.

[2] In particular, Devine and Kiefer (1991) note that differences in job search outcomes are mainly due to differences in arrival rates rather than to differences in the probability of rejecting offers.

2.2 Estimation Strategy

We are interested in estimating whether job offers occur more frequently in employment than in unemployment. The theoretical framework outlined above suggests that the relative frequency of job offers is a function of both relative search efficiency in the two labour market states (δ) and divergence in wage offer distributions ($F^E(\frac{w}{\breve{w}_i})$ and $F^{UN}(\frac{w}{\breve{w}_i})$). Consequently, our empirical strategy centres around estimating the relative arrival rate of jobs that pay at least $\frac{w}{\breve{w}_i}$ in employment versus unemployment which we denote as $R(\frac{w}{\breve{w}_i})$. Specifically,

$$R(\frac{w}{\breve{w}_i}) = \delta(1 - F^E(\frac{w}{\breve{w}_i}))/(1 - F^{UN}(\frac{w}{\breve{w}_i})) \tag{1}$$

where equation (1) can be evaluated across the range of relative wage offers ($\frac{w}{\breve{w}_i}$).

Various econometric issues need to be addressed in the estimation of equation (1). The most important is the selectivity associated with initial employment state. Individuals observed in jobs at the start of the data period are not a random sample of all individuals: individuals with extremely low λ_i are less likely to be observed in employment than those with high λ_i. Kahn and Low (1982) find, for example, that estimates correcting for the selectivity bias associated with initial employment state suggest that unemployed job seekers receive more offers than employed job seekers do, though uncorrected results demonstrate the opposite. In order to circumvent this initial conditions problem, we restrict the estimation sample to those individuals whom we observe both in employment and unemployment. We can then compare the search efficiency of individuals in employment with their own search intensity in unemployment.

This sample restriction – while useful in dealing with unobserved heterogeneity – makes it difficult to generate estimates of the unconditional, relative search efficiency in employment

versus unemployment across the entire sample of job seekers. In effect, the sample support includes only those individuals who have received at least one acceptable job offer whilst unemployed. Without additional structure regarding the form of individual heterogeneity it would be difficult to recover unconditional estimates from the restricted sample if we were to base the estimation on accepted job offers.

Consequently, we adopt a multi-step estimation strategy. We first estimate the relative efficiency of employed versus unemployed search (δ) disregarding accepted job offers and instead using only data on the arrival rate of rejected job offers in employment versus unemployment. Rejected job offers do not suffer from the same truncation problem because the sample selection rule is not based on rejected job offers.

More specifically, rejected job-offers arrive at a rate $\widetilde{\lambda}_i = \gamma\lambda_i$ for the unemployed and a rate $\delta\widetilde{\lambda}_i = \delta\gamma\lambda_i$ for the employed. For each individual i we observe a sequence $\{d_{i1}, .., d_{iT}\}$ whereby d_{i1} is an indicator function for the existence of a rejected job offer in period $t = \{1...T\}$. Here, time runs only over those periods in which an individual reports active job search and may hence contain disjoint periods. The set of relevant time periods is denoted as S_i. For each individual, we also define a sequence of indicators $\{E_{i1}, .., E_{iT}\}$that denote whether an individual is in employment or not.

We use maximum likelihood estimation to generate an estimate of the relative efficiency of employed versus unemployed search, δ. The likelihood of the observed sequence of rejected job offers in terms of the model parameters is given by

$$L_i = \int \left(\prod_{t \in S_i} \left(\widetilde{\lambda}_i \delta^{E_{it}} \right)^{d_{it}} \left(1 - \widetilde{\lambda}_i \delta^{E_{it}} \right)^{1-d_{it}} \right) dG(\widetilde{\lambda}_i) \tag{2}$$

where $G(\widetilde{\lambda}_i)$ denotes the distribution of $\widetilde{\lambda}_i$ and the integral should be read in the Lebesque sense.[3] We will allow for heterogeneity in the rejected job-offer arrival rate through our choice of distributions for $\widetilde{\lambda}_i$ (see Section 4).[4]

In the second step, we use information regarding accepted wage offers to identify the wage offer distributions $F^E(\frac{w}{\breve{w}_i})$ and $F^{UN}(\frac{w}{\breve{w}_i})$ assuming that reservation wages are individual-specific and stationary over time. Basing the estimation on accepted wage offers does not generate a sample selection problem here, because any wage offer exceeding the reservation wage is assumed to be rejected with an exogenous probability γ. This leads wage offers to be independent of the probability that serious wage offers (i.e., those exceeding the reservation wage) will be accepted implying that the sample selection rule is independent of the outcome of interest. Estimated wage distributions $\hat{F}^E(\frac{w}{\breve{w}_i})$ and $\hat{F}^{UN}(\frac{w}{\breve{w}_i})$ are computed non-parametrically by taking $\hat{f}^E(\frac{w}{\breve{w}_i})$ and $\hat{f}^{UN}(\frac{w}{\breve{w}_i})$ to be piece-wise constant.

Using estimates derived in these two steps, we then construct our measure of the relative arrival rate of acceptable job offers, $R(\frac{w}{\breve{w}_i})$, given in equation (1). Specifically,

$$\hat{R}(w) = \hat{\delta}(1 - \hat{F}^E(\frac{w}{\breve{w}_i}))/(1 - \hat{F}^{UN}(\frac{w}{\breve{w}_i})). \tag{3}$$

Because there is some unknown degree of measurement error in wages, we can only derive a lower bound for the error in this estimate of $R(\frac{w}{\breve{w}_i})$. That is, the error is at least as high as that caused by the uncertainty in $\hat{\delta}$ and by the finite-sample uncertainty in $\hat{F}^E(\frac{w}{\breve{w}_i})$ and $\hat{F}^{UN}(\frac{w}{\breve{w}_i})$ in the absence of measurement errors. To be more precise regarding this latter source of

[3] In other words, when $G(.)$ is a discrete distribution, the integral becomes a simple sum over all mass-points.

[4] In particular, we use both discrete mass-point and lognormal distributions to approximate the distribution of $\widetilde{\lambda}_i$.

uncertainty, suppose n_1 out of N individuals accepted a wage higher than a certain $\frac{w^*}{\breve{w}_i}$ during employment. Standard asymptotic distribution theory then tells us that

$$Std.Error\left[\hat{F}^{UN}(\frac{w^*}{\breve{w}_i})\right] = \frac{\sqrt{\frac{n_1}{N} * \frac{N-n_1}{N}}}{\sqrt{N}}. \tag{4}$$

Confidence intervals can be constructed for $\hat{R}$ by means of bootstrapping from the separately estimated confidence intervals around $\hat{\delta}$ and $\hat{F}^E(\frac{w}{\breve{w}_i})$ and $\hat{F}^{UN}(\frac{w}{\breve{w}_i})$.

3 Survey of Employment and Unemployment Patterns

We utilise data derived from the Australian Bureau of Statistics' (ABS) Survey of Employment and Unemployment Patterns (SEUP), which detail the work and job-seeking experiences of individuals over the three-year period 1994 - 1997.[5] The public use sample includes 7572 respondents, the majority of whom were either actively seeking work or likely to be entering the labour market at the time of recruitment.[6] Consequently, our focus will be on the job-offer arrival rates of a relatively homogenous, disadvantaged group at risk of unemployment. Given our interest in understanding the nexus between job offers, reservation wages, and search

[5] The SEUP sampling frame consists of three separate random samples from the wider Australian population aged 15 to 59 residing in private dwellings: 1) individuals seeking jobs; 2) a population reference group; and 3) individuals participating in a labour market program. The public-use data include information about the first two samples only and consequently, individuals participating in labour market programs have been excluded from the analysis. For more detailed information about the SEUP data see ABS, (1997; 1998).

[6] The Jobseeker group comprises those who, at the time of recruitment (April-June 1995), were: unemployed, underemployed (working less than ten hours per week and looking for a job with more hours), discouraged from job search or not in the labour force but likely to enter the labour force in the near future. Thus this group is sampled from a stock of unemployed/underemployed individuals rather than the inflow of unemployed and as a result they are selected to be more disadvantaged than the average person entering unemployment.

behaviour, we have excluded full-time students, family workers and self-employed individuals from the sample, so that 5223 individuals remain.[7] The SEUP data can be combined to form sequences of work and non-work spells. Periods of job search are also recorded so that a job search indicator can be constructed for each work/non-work spell. Of the 2315 individuals who are observed to engage in job search at some point in the period, we selected the 1577 individuals who are observed in both employment and unemployment. These individuals constitute our estimation sample.

For each of the work spells identified in the SEUP data, job information such as earnings, hours of work, occupation and industry is available. Wage-related information in the data includes reservation wages for all individuals seeking work (independent of their current employment status), acceptance wages in new jobs that occur after a non-working spell, and wages in current jobs.[8] Finally, individuals seeking work reported the timing of any job offers along with an indication of whether the offer had been accepted or rejected.

This information is used to construct the main variables of interest. In particular, we constructed a monthly indicator variable for the arrival of at least one job offer as well as indicators of whether specific job offers were accepted or not. We also constructed a measure of acceptance wages. This information is directly reported for new jobs that follow a spell of nonwork. For new jobs that follow employment spells, the acceptance wage equals the first reported wage after the new job begins. In both cases, we replaced the relevant categorical wage with a prediction based on all available individual information (including, for example,

[7] Full-time students are excluded because for them full-time study provides an additional alternative to work and non-work. Self-employed individuals and family workers are excluded because a participation decision based on reservation and market wages is not relevant for them in the same way as it is for wage and salary earners.

[8] SEUP wage information is reported categorically using 28 possible categories.

education, occupation, hours of work and experience) and the reported wage category.[9] This procedure may generate measurement errors and we consider this issue further below. Similarly, we constructed individual reservation wages by estimating a model of reservation wages (including fixed individual-specific effects), and calculating a predicted reservation wage for individuals who have just become unemployed (see Table A1).

Although the SEUP data also contain limited information on individuals' socio-demographic characteristics, we do not use it in our estimation. These data are collected on an annual basis and there is no information about the monthly timing of changes in these characteristics. As a result, the use of these characteristics is somewhat limited (see Frijters and Kalb, 2003, for a full exposition). We treat this missing information as unobserved heterogeneity.

In order to highlight the underlying patterns in the data, summary statistics for the main variables of interest are given in Table 1 by gender, employment status, job-search status and disability status. Interestingly, the raw data reveal only slight differences in job-offer arrival rates between employed and unemployed job seekers. While the employed who are searching for new jobs receive an offer every 151 days on average, the unemployed receive job offers every 141 days. There also appears to be little difference in job-offer arrival rates for unemployed men and women. On average, unemployed men in the sample receive a job offer every 179 days, while unemployed women receive job offers on average every 167 days. The gender gap in offer arrival rates amongst the employed is even smaller.

Moreover, the reservation wages of employed searchers ($11.39 in the first job) are slightly higher than for unemployed searchers ($11.06), but the difference is small. Men have both

[9] Specifically, each individual is assigned the expected value from his or her predicted wage distribution conditional on the reported wage interval.

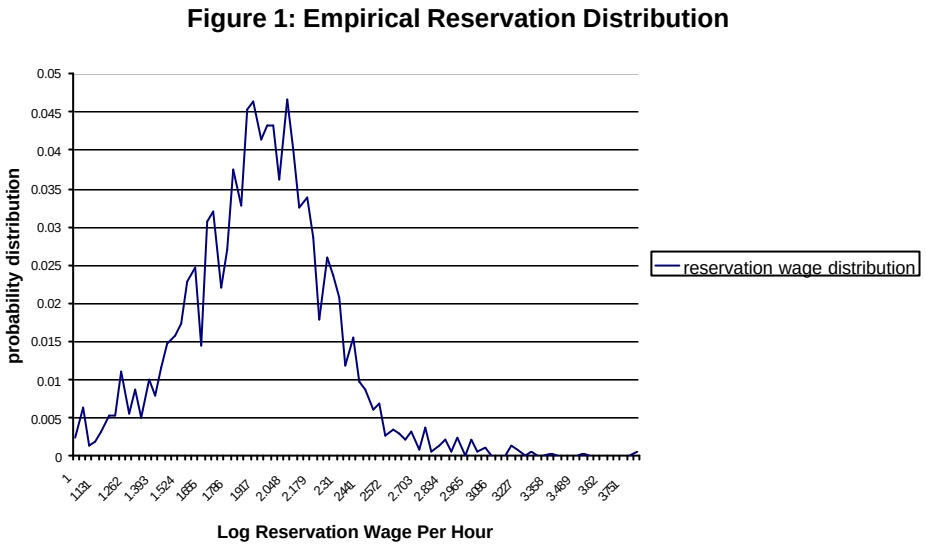
higher reservation wages and higher actual wages than women. There is surprisingly little difference in the wages of those who continue searching while employed and those who stop searching. Taken together these results indicate that the differences between employed and unemployed job seekers in our sample may be quite small.

Table 1: Summary Statistics for the Dependent Variables

	wage	res. wage 1	res. wage 2	res. wage 3	# job off. per day	Expected # days before an offer
number of obs.	7852	1102	2740	2493	18257	18257
not in employment		11.06	10.82	11.15	0.0058	172
out of the labour force					0.0032	312
unemployed		11.06	10.82	11.15	0.0071	141
by gender						
man		11.54	10.82	11.35	0.0056	179
woman		10.60	10.82	10.90	0.0060	167
by disability						
yes		11.09	10.94	11.06	0.0047	213
no		11.04	10.77	11.21	0.0064	156
in employment	13.73	11.39	11.33	11.97	0.0038	263
work, no search	13.69				0.0026	385
work and search	13.85	11.39	11.33	11.97	0.0066	151
by gender						
man	13.99	12.34	11.64	12.49	0.0037	270
woman	13.46	10.50	10.99	11.41	0.0038	263

Finally, we ascertain the degree of variation in the data by examining the estimated distribution of the reported reservation wage (see Figure 1). The distribution of reservation wages appears to be lognormal, with approximately 95 per cent of the probability mass between 1.2 and 2.6 implying a standard deviation of roughly 0.35.

Figure 1: Empirical Reservation Distribution



4 Results

4.1 Job-offer Arrival Rates

The likelihood function we are seeking to maximise is given in equation (2). We begin by noting that several alternative specifications can be used to approximate the distribution of the arrival rate of rejected job offers across individuals, $G(\widetilde{\lambda}_i)$. The most flexible possibility is to take a discrete distribution for $G(\widetilde{\lambda}_i)$ with K points of support. In other words,which for large K can approach any distribution function. We considered a range of values for K including K=20, K=5, K=3, and K=2. Surprisingly, in all cases there was convergence of all K points towards a single point θ_k indicating very little heterogeneity in rejected offer arrival rates

$$
\begin{aligned}
P[\widetilde{\lambda}_i &= \theta_k] = p_k \\
1 &\geq p_k \geq 0 \\
1 &> \theta_k > 0 \\
\sum_{k=1}^{K} p_k &= 1
\end{aligned}
$$

$(\widetilde{\lambda}_i)$.[10] Additionally, we considered a lognormal distribution for $\widetilde{\lambda}_i$ with a mid-point of θ and a standard deviation of σ_θ. The results for the discrete distribution (K=2) and the lognormal specification are presented in Table 2.[11]

Table 2: Estimation Results for the Distribution of Rejected Job-offer Arrival Rates G($\widetilde{\lambda}_i$), and Relative Search Intensity δ

	2 Discrete-points		Lognormal	
Variables	coef.	t-val	coef.	t-val
p_1	0.951	0		
θ_1	0.649	0		
θ_2	0.649	0		
δ	0.863	0	0.863	8.3
θ			0.649	41.8
σ_θ			0.119	1.4
N	1577		1577	
Average Likelihood	-6.2684		-6.2683	

[10] We validated the program by testing it on artificial data with 2 and 5 points of support, all with equal mass-weight, $\delta = 1$, geometrically spaced hazard rates (a factor of 2 between each successive point), and N=1577. There were no convergence problems and the estimates were all within 1 per cent of the actual values.

[11] When using the lognormal distribution, we truncate the distribution to avoid values of λ_i greater than 1. This did not turn out to be important however, because of the negligible probability mass in that region.

We begin the discussion by noting that the likelihoods are virtually the same for the two models. The discrete-point model has clearly become unidentified (which resulted in t-values of 0). However, the estimates for relative search efficiency in the two employment states (δ) and the midpoint of the arrival rate of rejected job offers ($\widetilde{\lambda}_i$) are the same for both models.

What do these results tell us about rejected job-offer arrival rates for employed and unemployed workers? First, it is interesting that the discrete distribution results indicate little evidence of heterogeneity in arrival rates. In part, this reflects the homogeneity of the sample itself. Individuals in our sample are in general job seekers with limited labour market prospects.[12] Homogeneity in arrival rates also reflects the fact that we focus on self-reported, rejected job offers in a directed search environment. This implies that the results do not include the usual heterogeneity across individuals for job offers with an absolute wage w. It is certainly the case that some individuals are more likely to receive a high-wage job offer than others are. However in this model, reported job offers for different individuals do not come from the same wage distribution. Therefore, most heterogeneity is captured in the different reservation wages.

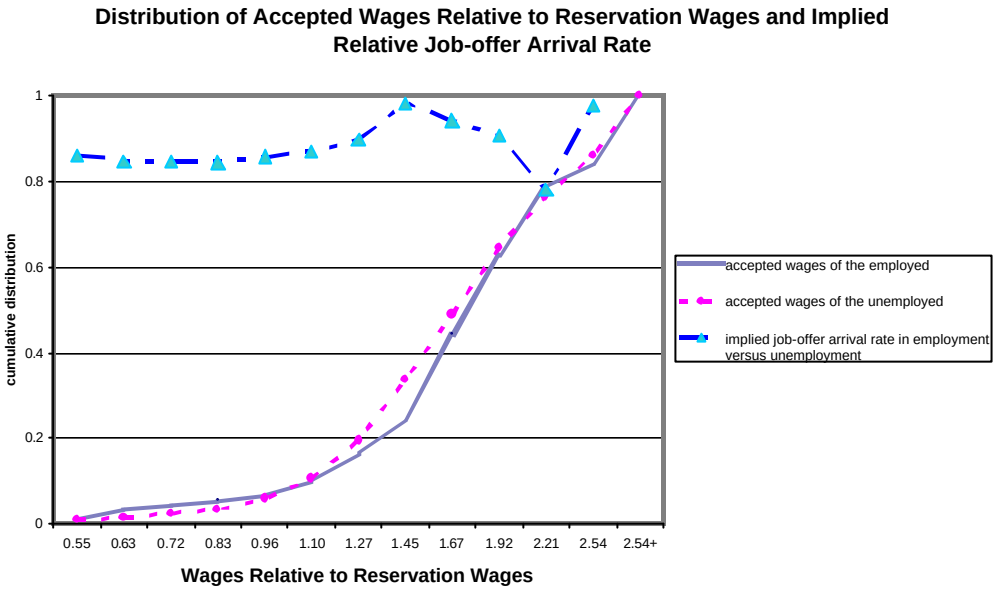
More importantly, the 95 per cent confidence interval for δ is [0.68,1.09] when using the lognormal distribution (see Table 2). Thus, this confidence interval includes 1 indicating that we cannot reject the possibility that the search intensity or efficiency is the same in employment and unemployment.

In order to understand how the frequency of job offers varies with employment status, however, we also need to focus on the nature of the job-offer distributions themselves. In

[12] In fact, the predicted rate of rejected job offers is only once every 15 months, while the rate of accepted job offers is once every 9.5 months.

Figure 2, the estimated wage distributions $\hat{F}^E(\frac{w}{\breve{w}_i})$ and $\hat{F}^{UN}(\frac{w}{\breve{w}_i})$ are presented along with the estimated relative arrival rate of jobs that pay at least $\frac{w}{\breve{w}_i}$ in employment versus unemployment ($\hat{R}(w)$). The first thing to note is that – contrary to theoretical predictions – observed wages are

Figure 2: Distribution of Accepted Wages Relative to Reservation Wages and Implied Relative Job-offer Arrival Rate



higher than reported reservation wages in only 94 per cent of cases. This finding is consistent with other empirical evidence and may indicate the presence of measurement error in actual and/or reservation wages.[13]

Figure 2 also demonstrates that the estimated distributions $\hat{F}^E(\frac{w}{\breve{w}_i})$ and $\hat{F}^{UN}(\frac{w}{\breve{w}_i})$ are very close. Most importantly, $\hat{F}^E(\frac{w}{\breve{w}_i})$ does not stochastically dominate $\hat{F}^{UN}(\frac{w}{\breve{w}_i})$, which is contrary

[13] Holzer (1987), for example, finds for the US that on average the hourly wages of offers accepted by the employed are less than the average reservation wages amongst those employed individuals with job offers.

to expectations. Indeed, only in the region $1.4 < \frac{w}{\breve{w}_i} < 1.6$ are the two distributions significantly different at the 95 per cent confidence level. In that range, offered wages are clearly higher in employment, as expected. Over much of the range, however, there is little difference in the wages offered to employed and unemployed job seekers. In part, this may reflect the fact that many individuals in our sample who search while employed have unnattractive or insecure jobs and hence do not necessarily search for higher paying jobs.

Finally, we discuss the point estimates for $R(\frac{w}{\breve{w}_i})$. The most important aspect of this graph is that across most of the relevant wage range, the point estimates of $R(\frac{w}{\breve{w}_i})$ are larger than $\hat{\delta}$ and indicate that $(1 - \hat{F}^E(\frac{w}{\breve{w}_i}))/(1 - \hat{F}^{UN}(\frac{w}{\breve{w}_i})) > 1$.This implies that job offers in employment are slightly though not significantly higher than in unemployment. Most importantly, across the entire range of possible values for $\frac{w}{\breve{w}_i}$ it is the case that $\hat{R}(\frac{w}{\breve{w}_i})$ is not significantly different from 1 at the 90 per cent confidence level.[14] Its point estimate for the mid-point of the $\hat{F}^E(\frac{w}{\breve{w}_i})$ distribution (when $\frac{w}{\breve{w}_i} \approx 1.91$) is 0.99 which is extremely close to 1. Consequently, the overarching conclusion from this analysis is that there is no evidence for differential job-offer probabilities in employment versus unemployment.

4.2 Discussion

In Australia, the probability of receiving a job offer is largely independent of current employment status. Consequently, searching while unemployed does not generate an efficiency gain for the economy as a whole through a quicker matching of vacancies and job searchers. In this respect the Australian labour market is like that of Northern Europe, where the unemployed are less

[14] The standard deviation of $\hat{R}$ is about 0.2.

likely to obtain job offers than are the employed[15], and unlike the United States where the unemployed seem more able than the employed to search for new jobs.[16]

While unemployment in the US could be argued to improve the matching function of the labour market, the same cannot be claimed for unemployment in Australia or Northern Europe where unemployment is better seen as a sheer production loss.

It is difficult to know whether these disparities in research findings stem from differences in the institutional arrangements for administering unemployment benefits or from the specifics of the data sample, analysis period, and estimation strategy. Results based upon a group of disadvantaged job seekers looking for work in a period of relatively high unemployment may not readily translate to other groups operating under other labour market conditions. At the same time, differences across countries in the relative efficiency of employed versus unemployed search are likely to be due in part to institutional differences. In Australia, unlike many other countries, unemployment benefits are non-contributory, funded from general revenue, and comprise one component of a broader system of income-support payments administered by the Australian government. Payment levels are uniform across the country, do not depend on previous work history, and are not time limited. This stands in sharp contrast to the social insurance model operating in the United States. Moreover the easier dismissal procedures in the United States – which might make employers less reluctant to employ people who are currently unemployed (i.e. employers are more prone to ignore the signalling aspect of unemployment in cases where dismissal is easier) – may also play a role. Finally, it is also possible that there are

[15] Some evidence for this is found by Boeri (1999). He shows that an increase of workers on short-term jobs, who are likely to be on-the-job searchers, reduces the flow from unemployment to employment using information from a number of countries. See also Pissarides and Wadsworth (1994) and Jackman, et al. (1989).

[16] See an overview of a few articles in Devine and Kiefer (1991: pp. 254-255).

equilibrium effects driving this difference. In particular, it is possible that to be a (short-term) unemployed individual searching for a job is not taken to be a bad signal in the United States whereas it is in Australia and Europe.

5 Conclusions

The relationship between current employment status and the efficiency of job search has implications for theoretical models of job search behaviour and for public policies targeting the unemployed. If unemployed search is more effective than employed search, a case can be made that subsidising unemployment may improve labour market efficiency. At the same time, if the employed receive at least as many job offers as the unemployed, then subsidising unemployment may lead to higher unemployment levels and be counterproductive.

We investigated the relative efficiency of employed versus unemployed job search using unique data from a panel survey of job seekers in Australia. Unlike other standard data sets, these data provide information about both accepted and rejected job offers. Using a semi-structural estimation model, we found that job-offer arrival rates in employment and unemployment are not significantly different.

In this respect, the Australian labour market is like that of Northern Europe where unemployed job search is less or equally efficient, and unlike the United States where there are efficiency gains to searching while unemployed. Unemployment benefits in Australia, therefore, have no effect on the efficiency of job search, but rather serve a redistributive function. This finding lends empirical support to the Burdett and Mortensen (1998) model and others like it which allow for employed job search and assume the job-offer arrival rate in employment to be

equal to that in unemployment.

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Appendix 1
Results from the Fixed-Effect Reduced Form Estimations

Table A.1 presents the reduced-form, fixed-effect analyses of wages and reservation wages. These first difference models shed light on the variation in wages and reservation wages across time and individual characteristics. Note how the low standard deviation in reservation wage changes (0.039) compares to the much larger standard deviation in the levels of reservation wages (about 0.3), implying that over 90 per cent of the variation in reservation levels is due to constant individual-specific factors.

Table A.1: Fixed-effect Analyses of Starting Wages $\tilde{w}_{it}$ and Reservation Wages $\tilde{\phi}_{it}$ Using the Australian SEUP Data

	$\triangle \ln \tilde{w}_{it}$		$\triangle \ln \tilde{\phi}_{it}$	
Variables	coef.	t-val	coef.	t-val
Individual characteristics:				
intercept	0.022	1.4	-0.011	0.9
$\triangle$t	0.00011	2.8	0.00015	3.8
first employment spell			-0.07	0.6
currently employed			0.035	1.8
current unemployment duration			-0.000023	1.2
cumulative unemployment duration	0.00013	2.5	-0.000011	0.4
current employment duration	0.00007	4.1	0.000035	0.9
(cum. unem.dur.)*(30$\leq$age<40)	-0.00014	3.0	-0.00011	2.1
(cum. unem.dur.)*(40$\leq$age<50)	-0.00015	2.7	-0.000002	0.0
(cum. unem.dur.)*(50$\leq$age<60)	-0.00016	2.2	-0.00012	1.9
$\sigma_{m,\phi}$			0.039	
Number of observations	5267		3713	
Number of individuals	1892		1576	
R^2	0.02		0.02	

The other available time-varying regressors were: previous wage, duration of last employment/unemployment spell, part-time studying, # children, have a partner, disability, hours of work,education levels, and urban housing. The shown specification includes the most relevant and significant variables: none of the other variables added significantly to the explained variance.