

Job Search Over the Business Cycle: The Case of Young Australians*

Denise Doiron[†] Tue Gørgens[‡]

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Abstract: This research investigates how the job search behaviour of young Australians adjusts to a severe economic downturn. We estimate several alternative models and use several different measures of search. We find in all cases that jobless young people who have finished their education increase their search activity in a slack labour market. This suggests that the discouraged worker effect does not dominate among the younger cohorts.

Keywords: job search, business cycle, recession, unemployment, discouraged workers.

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[†]Address: School of Economics, University of New South Wales, Sydney NSW 2052, Australia. E-mail: d.doiron@unsw.edu.au.

[‡]Address: SPEAR Centre, Research School of Social Sciences, Australian National University, Canberra ACT 0200, Australia. E-mail: tue.gorgens@anu.edu.au.

1 Introduction

This paper analyses the job search behaviour of young Australians and how it responds to unfavourable labour market conditions. At the time of writing, the Australian economy, and indeed the world at large, is in or entering a recessionary period. In Australia, this follows 18 years of sustained expansion. Our study is based on panel data for 1989–1994. This period covers the previous recession in Australia, which can be dated between the peak of the business cycle in February 1990 and the trough in October 1991 (e.g. Melbourne Institute, 2008). We focus on the behaviour of nonemployed youths who have finished their education and study how the use of different methods of search as well as the overall incidence of search vary over the business cycle.

The behaviour of jobless youths is important for several reasons. First, it is well-documented that unemployment has detrimental effects on psychological well-being and life satisfaction (e.g. Banks and Ullah, 1988; Oswald, 1997). Moreover, the effects are not limited to current well-being, an experience of joblessness continues to affect people in later years. For example, Goldsmith et al. (1996) found that previous spells of unemployment and time spent out of the labour force have clear, and similar, negative effects on the current self-esteem of young Americans. For Germans aged 25 to 55, Clark et al. (2001) found that both men and women report lower life satisfaction when unemployed, and a past experience of unemployment has a stronger negative effect on current well-being than past time spent out of the labour force.

Second, previous experiences affect future labour market outcomes and we expect these effects to be more substantial for young persons as they have more to gain from job shopping and on-the-job human capital acquisition. In one of the first papers in this area, Ellwood (1982) found that time spent not working in one year leads to a small decrease in the time spent working in the following year for young men in the US. Further results show that this impact is due to time spent out of the labour force as unemployment has no effect. He also found that early joblessness has long-lasting negative effects on wages. More recently, Doiron and Gørgens (2008) studied labour force transitions for Australian youths, and their simulation exercises suggest that maintaining a labour force attachment

(employed or looking for work) is important for later outcomes. In particular, a strong labour force attachment appears to be beneficial, and being out of the labour force is associated with higher unemployment rates in the future.

Third, joblessness represents an underutilisation of resources and as such is a loss to society more generally. The search behaviour of the jobless has implications for the expected duration of joblessness and hence for the size of the loss. Theoretically, the relationship between individual search intensity, unemployment and efficiency is ambiguous, although in equilibrium search intensity is always too low (e.g. Pissarides, 2000, Chapter 8).

Finally, there is the long-standing issue in economics of whether official unemployment figures accurately measure the degree of underutilisation of the work force. One source of mismeasurement is the omission of the potential labour supply of the so-called discouraged workers; that is, workers who want jobs (at the going wage rate) and are available for work, but are not actively looking for work because of the (perceived) low probability of finding a job. Such hidden unemployment may lead to weak policy responses. In particular, if some demographic groups are more likely than others to be discouraged or if discouragement is countercyclical, as is generally found (e.g. Finegan, 1981; Blundell et al., 1998), policy initiatives to improve labour market efficiency or the well-being of the jobless may prove inadequate.

Previous studies of worker discouragement using micro data have generally been based on married women (e.g. Blundell et al., 1998; Cullen and Gruber, 2000; Başlevent and Onaran, 2003).¹ In regard to labour supply, young people share many characteristics with married women: they are often partly supported by their family and they exhibit high levels of mobility across labour force states (e.g. Topel and Ward, 1992). There may also be interesting differences: new entrants in the labour market are not entrenched in particular occupations or industries and hence may search more broadly. Also many of them have the possibility of trading-off time in the labour market and time in education, and they may place more weight on career concerns.²

¹Some recent papers study older workers, see e.g. Maestas and Li (2006).

²Several recent papers on job search among young people in the US have focussed either on search among the employed (e.g. Keith and McWilliams, 1999; Keith and Williams, 2002) or on estimation of structural parameters of equilibrium search models (e.g. Bowlus, 1998; Bowlus and Eckstein, 2002). The

Our study contributes to the literature by focusing on job search by young people and the effect of the business cycle. An additional contribution of this study lies in the analysis of different measures of search. These measures are based on information about methods of search and distinguish between active and passive search.³ Finally, as far as we are aware, this paper is the first study of worker discouragement using Australian micro data.⁴

We use reduced-form models to look at the search incidence among nonemployed youths over the business cycle.⁵ Our results suggest that nonemployed young people who have finished their education search more during a downturn. On average, the probability of search increases by 9 percentage points (ppt) for a 1 percent reduction in the vacancy rate. Hence we do not find the dominant discouraged worker effect which is usually found for the general population. Our results show an increase in search activity during the recession for all search methods as well as an increase in the intensity of search as measured by the number of method used. There are some differences across methods. In particular, we find that direct or active search is more sensitive to labour market activity than other methods such as registering at employment centres.

Variation over the business cycle in the selection into the sample of the nonemployed nonstudents is a possible source of bias. To investigate this issue we estimate models that account for a larger part of the heterogeneity in the selected sample. Specifically, these models include measures of previous labour market experience among the explanatory variables. Labour market histories have proven to be very useful in controlling for selection effects in other contexts,⁶ and it is reasonable to believe that omitted individual characteristics which drive selection into the sample of nonemployed nonstudents would

latter papers do not distinguish between unemployment and nonparticipation, partly because the search information is incomplete in most data sets. One exception is van der Klaauw et al. (2004), which we return to in the Conclusion.

³For studies of the choice of search methods, see e.g. Holzer (1988), Jones (1989), Lindeboom et al. (1994), Heath (1999), and Addison and Portugal (2002).

⁴For evidence based on Australian time series data, see e.g. Lenten (2001) and Wooden (1996). The evidence in these papers supports a dominant discouraged worker effect in the general population.

⁵Tractable structural search models are less appropriate when the economic environment is not stable (e.g. Bowlus, 1998).

⁶For example Heckman and Smith (2004) argue that labour force dynamics play a central role in the selection into labour market programs.

also be correlated with previous labour market experiences. The finding of increased search in slack labour markets is slightly strengthened when controls representing labour market histories are included but, overall, the results from the main model are robust both qualitatively and quantitatively. The results are also robust to the inclusion of the duration of the current spell in addition to the history variables.

To further investigate potential selection bias, we estimate standard selection models which rely on a normality assumption for identification. We consider selection into the sample of nonstudents, the sample of nonemployed persons, and the sample of nonemployed nonstudents. The results suggest that young people tend to stay in education longer during a recession. However, the effects are small and the overall conclusions on search behaviour remain. This is consistent with recent results by Raaum and Røed (2006) based on Norwegian data

The paper is organised as follows. The next section briefly describes the policy environment and the labour market in general over the period of analysis. This is followed by a discussion of the data and raw statistics on search in Section 3. Section 4 presents the econometric results. The last section offers concluding comments.

2 Institutional and Economic Environment

2.1 Labour Market Context

Our analysis is based on the Australian Youth Survey (AYS), a panel data set with six waves of interviews covering the period 1989–1994 and involving a representative sample of Australians aged 16–24. The AYS is well suited for this research as it contains detailed information on search activity, labour force status, and the characteristics of the young adults. Moreover, these data cover periods of markedly different macroeconomic conditions. The period 1989–1990 was the peak of the business cycle, 1991–1992 was characterised by a severe downturn in the labour market, and 1993–1994 was a period of recovery.

Figure 1 shows three labour market indicators over the period 1985–2002. The vertical

lines indicate the period covered by the AYS. The labour market indicators are national averages of the quarterly series of the unemployment rate, the youth unemployment rate and the vacancy rate. The series are taken from the Australian Bureau of Statistics's (ABS) website. The vacancy rate is based on a large quarterly survey of businesses. Employers are asked to report the number and rate (per total paid positions) of employee job vacancies available for immediate filling on the survey reference date, excluding vacancies for jobs based outside Australia.

The figure shows that the vacancy rate fell from 14.4 in the first quarter 1989 to a third of its value (4.8) by the middle of 1991. The recovery in the vacancy rate began in the middle of 1992 and by the last quarter 1994, it had reached a value of 12.1. The unemployment rates followed a similar path in the opposite direction with a lag in turning points of around one year. For example, the youth unemployment rate achieved a minimum point of 9.2% in the last quarter of 1989 followed by an increase of over 100% to a maximum value of 20.6% by first quarter 1993. This was followed by a slow decline to a value of 13.8% in the last quarter 1994. The total unemployment rate and the youth unemployment rate followed very similar paths.⁷

2.2 Policy Context

Another advantage of the AYS is that there were no substantial policy changes in the provision of unemployment and job search benefits over the sample period. In this section of the paper, we briefly describe the main policies that were in place in Australia at the time.

The Commonwealth Employment Services (CES) provided the main employment services.⁸ Two government programs provided benefits for unemployed youth: the Job Search Allowance targeted at 16- and 17-year-olds and the unemployment insurance program available to the population in general. Both programs had a similar structure. Importantly, there was no maximum duration in the receipt of benefits. Evidence of job

⁷The correlation coefficient between the two series over the period illustrated in the graph is 0.97.

⁸This government program has since been replaced by a competitive employment services market, the Job Network, overseen by Centrelink. The change was phased in starting in 1998.

search had to be provided to receive benefits and in practice registration at a CES office was treated as sufficient proof of active search. Penalties for invalid receipt of benefits were introduced in 1990 as part of the Active Employment Strategy; however, in practice these penalties were not enforced until late in the decade. Benefits were means-tested, and parents' income was included in household income for young people living at home. Reductions in the benefit levels were implemented in 1986–1987 to make the benefits comparable to the income support payments for students (see below), but no major changes were made to the programs from 1989 to the mid-1990s.

A wage subsidy program, Jobstart, was implemented in 1989. This program was targeted to the population as a whole, and although there was some expansion in the early 1990s in response to the recession, major changes to the program were not announced until 1994.⁹

The final program relevant to youth participation in the labour market was AUSTUDY, the student income support program implemented in 1986–1987. This program provided an increase in support to students over previous policies. Benefits were means-tested and available to full-time students in higher education and to secondary school students in their final two years. Payments were increased in 1992, but changes were fairly small. No structural changes were made to this program over the sample period.

3 Data and Descriptive Statistics

The universe sampled in the AYS was the Australian population, excluding those living in sparsely populated areas, aged 16–19 in September 1989 supplemented with the 16 year old population in October in each of the years from 1990 to 1994. The initial sample cohort numbered 5,300. By 1994, the respondents were aged 16–24 and numbered 8,350. This

⁹The new labour market initiative announced in the government's White Paper in 1994 was called the Job Compact and was targeted towards the long-term unemployed. The new program was meant to be implemented in 1994 with main changes coming into effect in 1995. It basically consisted of an expansion of the wage subsidy program with a publicly funded job guarantee and a reduction in award wages for firms providing on-the-job training. For more information on these programs, see Chapman and Piggott (1995). The ultimate implementation and effect of this program is a matter of debate, but for the purpose of our study, it is unlikely that the planned initiative had a serious impact in youth participation behaviour in 1994.

number is the net product of attrition and the annual refresher samples of 16-year-olds. Face-to-face interviews were carried out annually from 1989 to 1994.¹⁰

Our analysis is based on the annual information about labour force status and job search methods used around the time of the interview. We focus on individuals who were nonemployed and had finished their formal education at the time of the interview. The AYS respondents provided detailed information about their educational undertakings, and we define the end date of their formal education as the last day they reported to be studying.¹¹

In the annual interviews, the respondents were also asked to provide week-by-week information about their jobs and their search activity since the last interview (since 1 January for first interviews). From this calendar information, we construct a history of labour market experience for all individuals in the sample. This information is used to construct a set of explanatory variables which are used in some of the models.

Table 1 provides information on search behaviour at the time of the interview for individuals who have finished their education. Information is provided by survey wave. In this and all future tables, we use “year” to indicate the survey wave for ease of interpretation.¹² For convenience, we refer to the observed labour force state at the time of the interview as a “spell”. The left-hand panel in Table 1 presents the distribution of spells across the three labour force states: employed, unemployed (i.e. nonemployed and searching), and out of the labour force (i.e. nonemployed and nonsearching).¹³ These states are mutually exclusive since we do not consider the search behaviour of individuals who are employed. The proportion of employment spells declines substantially from 1989

¹⁰Although no additions were made to the sample after 1994, telephone interviews were conducted in 1995 and 1996 for those already selected. Unfortunately only partial job and search history information was collected, and we cannot construct all of our main variables for these two additional years. We consider only the 1989–1994 sample period.

¹¹Thus, respondents who were studying at the time of their last interview are excluded from the nonstudent analysis sample. Students who interrupt their education and are observed returning during the sample period are considered students for the whole period, including the interruption. We do not distinguish between studying part-time and full-time.

¹²Since the interviews are normally held between September and January, we are including interviews held in January in the previous year’s group. This seems preferable since interviews held in January in a given year are closer in time to those held in the last quarter of the previous year than to interviews held during the last quarter of the same year.

¹³We classify individuals not employed but waiting to start a job and apprentices as employed.

to 1991 and recovers from 1992 to 1994. This is as expected given the trends in labour market indicators reviewed above. The increase in nonemployment spells is not equally distributed across search and nonsearch spells. The proportion of search spells increases more than proportionately and in fact the proportion of nonsearch spells falls from 1989 to 1991.

Further evidence of increased search activity among the nonemployed over the recession is provided in the right-hand panel of Table 1. The incidence of search among the nonemployed increases from 63% in 1989 to 69% in 1991. The average number of methods of search increases from 4.5 in 1989 to 5 in 1991 and 1992. The self-reported reservation wage (deflated to 1989 dollars using the CPI) among searchers falls slightly from 1990 to 1991. This wage lies substantially below a linear trend over the period. Finally we report the proportion of individuals who are nonemployed and nonsearching, yet claim they want to work.¹⁴ This measure fluctuates considerably, but falls from 87% in 1990 to 83% in 1991. In short we do not find evidence of an increase in the incidence of discouraged workers over the recession in the raw data.¹⁵

We now turn to the search behaviour in our analysis sample: nonemployment spells ongoing at the time of the interview for individuals who have completed their education. This sample consists of 3106 observations involving 1885 individuals.¹⁶ Table 2 presents the frequency of use of the various search methods included in the survey questions. In each interview the respondents are asked whether or not they have: 1) contacted an employer directly, 2) looked in newspapers, 3) answered a newspaper advertisement, 4) checked factory or Commonwealth Employment Service notice boards, 5) registered with the Commonwealth Employment Service, 6) contacted friends or relatives, 7) registered with employment agencies other than CES, advertised or tendered for work, 8) contacted a union, 9) joined or contacted unemployed persons groups, or 10) used other

¹⁴This information is based on the answers to the following question: “If there was nothing to stop you, would you like to have a full time or part time job?” This was asked only of those individuals who were not employed and not searching. This could be interpreted as direct evidence on discouraged workers, however there are other ways of defining discouraged workers, see e.g. Blundell et al. (1998).

¹⁵Due to the large number of missing values in the reservation wage and the incidence of nonsearchers wanting to work, we use this information for illustrative purposes only. The variables are not incorporated into the analysis presented below.

¹⁶One observation is later excluded because of missing values in the specific search methods used.

methods. Because few people use methods 7–10 we collapse them into a single “other” method. This leaves seven different methods. Note that these methods are not mutually exclusive and in fact most searchers use more than one method.¹⁷ Our classification of methods for young Australians is consistent with that used by Lindeboom et al. (1994) for the general population of nonemployed individuals in the Netherlands.

Search methods are grouped into two categories: direct (direct contact with employers, answering advertisements, contacting friends and relatives) and nondirect (looking in newspapers, registering at CES, looking at notice boards, other). The direct methods tend to be more active and have been identified by other researchers as the more effective methods of search in that they lead to more job offers (e.g. Holzer, 1988; Jones, 1989; Addison and Portugal, 2002). Indicator variables are constructed for each group as follows: total direct (nondirect) equals one if and only if at least one of the direct (nondirect) methods is used.

Table 2 shows that looking in newspapers and registering at the employment centres are the most common methods used in each year and over the whole sample. In 62% of nonemployment spells, the individual searched by looking in newspapers. The corresponding frequency for registering at CES is 60%. These are followed by direct contact with employers (54%), looking at notice boards (52%) contacting friends or relatives (43%) and answering advertisements (37%). The incidence of search (using any method) over the period is 67%. The use of a nondirect method is found in 66% of spells while the use of a direct method is found in slightly fewer spells (62%).

For all single methods as well as for the aggregate indicators, the incidence of search rises from 1989 to 1991 and drops from 1991 to 1994. For example, compared to an average incidence of 62% over the survey period, a direct method was used in 66% of spells in 1991, a substantial increase. These raw indicators suggest that all methods are used more frequently during the downturn. Table 2 also shows the sample size for each year. The sample size increases considerably from 286 in 1989 to 813 in 1994. This reflects

¹⁷Methods such as answering advertisements almost imply the use of other methods such as looking in newspapers or looking at notice boards. Clearly the choice of using the various methods is not independent across methods.

the aging of the sample over the period; more and more individuals have completed their education in the latter part of the survey.

The AYS contains detailed geographic information on the state and the neighbourhood in which the respondent lives at the time of the interview.¹⁸ With this geographic information, we can utilise information from other sources in order to capture variations in local labour markets. Specifically, we link the state-specific vacancy rate to the state of residence of the AYS respondents. The vacancy rate is described earlier in the paper.¹⁹ Table 3 presents the annual vacancy rate by state. Although there are variations in the magnitude of the rate across states, the downturn in economic activity from 1989 to 1991 and the recovery from 1992 to 1994 is evident for all states.

We also linked a local unemployment rate to the location of residence. The unemployment rates are produced by the ABS for geographical areas known as “statistical regions”. The statistical regions are smaller than the states, and the local unemployment rate may therefore reflect labour market conditions closer to the respondents than the vacancy rate. However, we found that adding the local unemployment rate did not contribute to the explanation of search behaviour of the sample over and above the vacancy rate.

Other characteristics of the sample of nonemployment spells are presented in Table 4. These variables are used in the empirical analysis described below. The first set of variables represents personal characteristics (age, sex), human capital (language, highest qualifications), household composition (marital status, living with parents, living with own children), income (spouse’s earnings, other family nonlabour income, receipt of family allowances, receipt of invalid or sickness pension), socio-economic background (two indicators for father and mother having a professional or managerial occupation when the survey respondent was 14 years old conditional on the respondent living with the parent at the time), and location (an Australian Capital Territory (ACT) indicator).²⁰

¹⁸The neighbourhood information is based either on census collector’s districts (1989–1990) or on postcodes (1991–1994).

¹⁹The ABS has published quarterly vacancy rates by state for the period under study. Annual averages are used in this paper since most of the interviews occur in the last quarter and since individuals’ perception of the labour market is likely to reflect observation over a longer period of time. For example, spells ongoing during interviews in the last wave of the survey (September 1994 to January 1995) are associated with the average vacancy rate for the calendar year 1994.

²⁰The labour market in the ACT is different from other jurisdictions, since it involves mostly federal

A second set of variables represents individual histories of labour market experience in the three labour force states (employed, unemployed, out of the labour force). The early history information is missing for respondents who left secondary school before the year of their first interview, and there are also gaps in histories for respondents who missed an interview but later returned to the survey. In order to include individuals with missing periods in their history, we treat missing information as a separate, fourth state. The first history variable is an indicator variable which is equal to one if and only if the spell being analysed is the person's first spell following secondary school (in this case all other history variables are equal to zero). Four variables measure the number of previous spells, until the beginning of the spell under analysis, in the four states. Further four variables measure the cumulative previous duration in the four states. The last variable measures the elapsed duration of the current spell of nonemployment at the time of the interview.

The aging of the sample is evident in Table 4. As age increases, so do the level of education, the presence of own children, the frequency of partnering, the amount of experience in the labour market, and the frequency of individuals living outside their parents' home. Hence, controlling for age, household composition and labour market experience is likely to be important in interpreting the trends in the behaviour of our analysis sample.

4 Econometric Analysis

4.1 Base Models

To begin we present results of probit and OLS regressions of the various search variables on personal and household characteristics. Year dummies and/or the vacancy rate are included to capture the variation in search activity over the sample period. For each type of search and for the three aggregates (direct, nondirect, and any search), we run separate probit regressions. For the number of methods we run an OLS regression.²¹ All regressions also include controls for age, education, sex, marital status, language, living with parents,

government employment.

²¹A negative binomial regression yields results similar to those of the OLS regression.

living with own children, occupation of mother and father, spouse's earnings, other family nonlabour income, receipt of sickness pension, receipt of family allowances, and living in the ACT. Results related to these regressors are discussed further below.

Panel A of Table 5 presents the marginal effects of the year dummies for regressions which do not include the vacancy rate. The marginal effects for the probit regressions are computed by first predicting six probabilities for each sample point, one for each year, with variables other than year kept at their observed values, then averaging over the sample, and finally taking the difference between the predicted probability for each year and the average predicted probability across the six years. The marginal effects for the number of methods are computed similarly. Standard errors are computed using a bootstrap estimator with 200 replications.²²

The predicted average probability of search (using any method) increases from 0.621 in 1989 to 0.691 in 1991, which is an increase of 7 ppt. The increase in the incidence of search in 1991 is observed for all methods. It is stronger for the use of any direct method (10.5 ppt) than for nondirect methods (7.8 ppt) but both are significant. The number of methods used also increases significantly from 2.852 in 1989 to 3.479 in 1991, an increase of 0.627 or approximately 20%.

Basing conclusions on year dummies only is potentially misleading as many factors other than the business cycle may change over time. In panel B of Table 5, we present marginal effects of the vacancy rate.²³ The left-most two columns show results of regressions which include the year dummies as well as the vacancy rate. The third column presents marginal effects for regressions which do not include the year dummies. We present the χ^2 likelihood ratio test statistic of the null hypothesis that the coefficients on the year dummies are jointly zero when the vacancy rate is included. In all cases we cannot reject the null. Hence variation in the vacancy rate captures the relevant variation in the year dummies.²⁴ In much of what follows, we exclude the year dummies in order

²²The results are similar when using robust standard errors clustered to allow dependence across spells for the same individuals.

²³The vacancy rate is entered as a percentage; see Table 3 for values.

²⁴Blundell et al. (1998) found that adding the unemployment rate to their search model lessened the effect of time dummies, but did not eliminate it. We also find this when we use the unemployment rate as a control for business cycle variation.

to improve the standard errors on the vacancy rate coefficient. The results in Table 5 suggest that this may also reduce the estimated effect of the vacancy rate on the search aggregates.

Focusing on the right-most column, we find that a 1 ppt reduction in the vacancy rate leads to an increase of almost 9 ppt in the probability of search (using any method). Again the direct methods are more sensitive to fluctuations in the labour market conditions with a probability increase of closer to 11 ppt. The number of methods used goes up by 0.6 (close to 20%) for a 1 ppt decrease in the vacancy rate. In all cases except for answering advertisements, the effects of the vacancy rate are significant. (There are perhaps fewer job advertisements during the downturn.)

Marginal effects involving other regressors are presented in Table 6 for the direct search indicator as the dependent variable. The underlying regression model includes the vacancy rate but not the year dummies. The pseudo R^2 is quite high at 29%.²⁵ The results suggest that females search less, especially partnered females. Young people living with their parents search less, as do people living with own children. Nonlabour income, the receipt of a family allowance, and the receipt of a sickness pension all reduce search. Having parents with professional or managerial occupations is related to less search, while living in the ACT is related to more direct search on average. The results are similar for other models estimated. It is interesting that age and education, the usual control variables available in this type of research, do not play a strong role in explaining search behaviour of young people. Household composition, gender and income are more relevant factors.

As mentioned previously, most of the literature on discouraged workers is concerned with married women. In order to investigate whether young women are more likely to become discouraged than men, we interact the vacancy rate with sex. We also look at interactions with the indicators for partnered, living with parents and living with own children. Other than those involving sex, the interactions were individually and jointly insignificant. When interacting the vacancy rate with sex, we find that the average

²⁵The pseudo R^2 is computed as one minus the ratio of the log-likelihood value for the estimated model over the log-likelihood value for the model containing an intercept only.

marginal effect of -10 ppt on direct search reported above is a combination of a marginal effect of -15 ppt for males and -5 ppt for women.²⁶ The male effect is highly significant while the female effect has a p-value of 0.14. Results for other dependent variables are also similar to those above. Hence we do not find evidence of discouraged workers among either young women or young men.

4.2 Alternative Models

In the remainder of the paper, we investigate the robustness of the base model results by presenting estimates for several alternative model specifications. We concentrate on three dependent variables: the incidence of direct search, the incidence of any search, and the number of methods. These measures are of particular interest. Results presented above suggest that direct search is most responsive to variations in labour demand, the incidence of any search is the most common information available in survey data and has been analysed most often, and the number of methods variable is related to the intensity of search. We also concentrate on models which include either the year dummies or the vacancy rate. As seen above, these are highly correlated and we do not include both. Although specification tests suggest models with the vacancy rate variable are superior, we also present results with year dummies for ease of interpretation.

Panel A of Table 7 shows estimates of random effects probit models for the search indicators and random effects linear models for the number of methods. The random effects are modelled as normally distributed variables, independent of the regressors. We discuss the independence assumption below.²⁷ Under the maintained assumptions, the random effects estimates are efficient, and it is therefore useful to see how they compare with the base model estimates. The table shows that the random effects models yield slightly stronger effects of the downturn than the base models. For example, the vacancy rate effect is -0.113 instead of -0.105 when direct search is the dependent variable. Thus, the conclusions from the base models remain in this alternative framework.

²⁶The marginal effects are computed for the entire sample as described earlier, except that the sex variable is set to either male or female for every observation.

²⁷Unfortunately since we focus on young individuals who have finished their education, the panel is not long enough for fixed effect binary response models to be useful.

We now turn to the issue of sample selection (incidental truncation). The concern is that sample selection is driving the findings of increased search over the downturn rather than changes in the search behaviour of any given jobless nonstudent. For example, if those with a high propensity to search benefit more from a high vacancy rate than those with a low search propensity, then they will become employed and leave the sample during boom times at a higher rate than those with a low search propensity. In this case, we observe a countercyclical pattern in search activities among the jobless sample, everything else being equal. Similarly, if the propensity to search is negatively correlated with academic aptitude in the general population, then we expect that those with a low propensity to search will become students and leave the sample during recessions at a higher rate than those with a high search propensity. This mechanism will also create a countercyclical pattern in search activities.

It is useful to formalise the potential problem. Let subscripts i and t indicate individual and time period and consider the model

$$y_{it} = 1(\alpha'b_{it} + \beta'x_{it} + u_{it}) \quad \text{if } d_{it} = 1, \quad (1)$$

$$d_{it} = 1(\pi'b_{it} + \eta'x_{it} + \lambda'z_{it} + w_{it}), \quad (2)$$

where y_{it} indicates search activity, d_{it} is an indicator which is 1 if individual i is nonemployed and nonstudying in period t , b_{it} denotes the business cycle variables, x_{it} and z_{it} represent observed individual characteristics, u_{it} and w_{it} are the usual unobserved components, and the Greek symbols are parameters. Within this framework, the base models have the form of equation (1) and the parameters α and β are consistently estimated under the assumptions that u_{it} and (b_{it}, x_{it}) are independent and that u_{it} is normally distributed, conditional on $d_{it} = 1$.

Selection effects such as those described above will induce correlation between u_{it} and (b_{it}, x_{it}) , and thus render the base model estimates inconsistent, because u_{it} will be correlated with $\lambda'z_{it} + w_{it}$ in the whole population. It is well known that estimating α under general (nonparametric) assumptions regarding the joint distribution of u_{it} and w_{it}

requires an exclusion restriction or, in other words, an instrument (z_{it}) which explains selection ($\lambda \neq 0$) but is uncorrelated with search behaviour ($\text{cor}(z_{it}, u_{it}) = 0$). We have been unable to identify such a variable in our data. To proceed, we use two alternative approaches to shed light on the likely effects of selection. Below we present results based on standard selection models which assume joint normality of (u_{it}, w_{it}) , but first we present results from models which account for a larger part of the heterogeneity in the sample of selected individuals by including measures of previous labour market experience among the explanatory variables. The practice of including previous outcomes as proxy variables for unobserved heterogeneity is common in the literature (e.g. Wooldridge, 2006, Chapter 9.2).²⁸

The argument can be explained as follows. To represent the correlation between u_{it} and (b_{it}, x_{it}) , consider the simple auxiliary model

$$u_{it} = \zeta_1 b_{it} + \theta_1 x_{it} + v_{1it} \quad \text{if } d_{it} = 1, \quad (3)$$

where ζ_1 and θ_1 are (matrices of) parameters, and v_{1it} is an idiosyncratic component. Substituting in (1) yields

$$y_{it} = 1((\alpha' + \zeta_1)b_{it} + (\beta' + \theta_1)x_{it} + v_{1it}) \quad \text{if } d_{it} = 1. \quad (4)$$

In this equation, α represents the causal effect of the business cycle on individual search behaviour while ζ_1 represents the selection effect. Now let h_{it} denote a vector of history variables and consider the alternative specification

$$u_{it} = \zeta_2 b_{it} + \theta_2 x_{it} + \delta_2 h_{it} + v_{2it} \quad \text{if } d_{it} = 1, \quad (5)$$

where ζ_2 , θ_2 and δ_2 are parameters, and v_{2it} is another idiosyncratic component. Substi-

²⁸The pros and cons of using proxy variables are well known, see for example Maddala (1992, chapter 11) or Wooldridge (2002, p63–70).

tuting (5) into (1) yields

$$y_{it} = 1((\alpha + \zeta_2)b_{it} + (\beta' + \theta_2)x_{it} + \delta_2h_{it} + v_{2it}) \quad \text{if } d_{it} = 1. \quad (6)$$

If h_{it} is a good proxy for unobserved characteristics, it will explain much of the variation in u_{it} . In this case, we expect ζ_2 to be small. Moreover, if h_{it} is a good proxy and the estimates of $\alpha + \zeta_1$ and $\alpha + \zeta_2$ are similar, then it seems very likely that both ζ_1 and ζ_2 are small. Turning Angrist and Krueger's (1999, p1291) advice on its head, if regression results are insensitive to changes in the set of control variables, then that is one less reason to worry about the effect of unobserved heterogeneity.

As proxies for u_{it} we use variables that represent the individuals' history of labour market experience since leaving secondary school; they are described in Section 3.²⁹ Results for models which include the history variables are presented in panel B of Table 7. Adding the history variables causes a slight reduction in the effect of the downturn on search behaviour, but the overall conclusions remain. For example, the drop in probability of direct search from 1989 to 1991 is now 8.6 ppt instead of 10.5 ppt and the marginal effect of the vacancy rate on direct search is -0.097 instead of -0.107 . The number of methods increases by 0.565 instead of 0.624 from 1989 to 1991. The estimated effects remain highly significant in the augmented model.

The relationship between the history variables and search behaviour is of interest on its own. Marginal effects of these variables on the probability of direct search are presented in Table 6 in the column labelled Model B.³⁰ The results are similar for other models. The estimates suggest that individuals in their first spell after secondary school are less likely to search (the probability difference is around 12 ppt).³¹ There is also evidence of hysteresis in unemployment and employment in the sense that more spells of

²⁹Note that we include any experience earned while studying for post-secondary school qualifications. Models with separate variables for labour market experience accumulated during and after post-secondary schooling were estimated, but did not improve the likelihood. We also estimated models with separate variables for length and type of the most recent spell, but again these models did not yield higher likelihoods.

³⁰We do not report the results on the gap variables to save on space.

³¹For those who are in their first spell, the counterfactual is constructed by giving them the average labour market experience observed in the sample of those not in their first spell.

unemployment (employment) in the past are associated with reductions (increases) in the probability of search in the current spell. It is interesting that correlations are found for the number of spells rather than their duration. The opposite is true when considering the spells out of the labour force: individuals who spent more time in this state in the past also search more in the current nonemployment spell but the number of nonsearching spells is irrelevant.³²

The last two panels of Table 7 present results of models which address the issue of variation over time in the composition of the nonemployment spells. Specifically, since spell durations tend to increase during recessions, the sample of nonemployment spells will consist of longer spells in slack labour markets. If search behaviour changes over the length of the spell, we could observe increased search activity due to the composition of the sample of spells. In panel C, we present results of models which include the elapsed duration of the ongoing spell at the time of the interview. As shown in the table, our conclusions regarding increasing search remain. For example, the effects of the vacancy rate and the year dummies on direct search are virtually the same as in the base model and the effects remain significant. Results shown in Table 6 reveal that the effect of elapsed duration on the probability of direct search is negative and significant. Longer spells are associated with a lower probability of search using direct methods. The same result is found for the probability of any search and for the number of search methods used.

Out of the total sample of 3107 spells, 523 represent second and third interviews within the same continuous period of nonemployment. In the last panel of Table 7 (and the right-most column of Table 6) we present results of estimations using only the 2583 spells which represent first interviews. Again we find increased search over the downturn. Many of the marginal effects of the year dummies are no longer significant, but the effects of the vacancy rate are still precisely estimated and virtually unchanged relative to previous models.

³²The differences in the results for past spells of unemployment versus out of the labour force suggest that these two states are distinct. The findings in this area are mixed: Gönül (1992) concluded the states are not distinct in the US, while Jones and Riddell's (1995) results for Canada suggest they are.

Our second approach to investigating the importance of selection into the analysis sample is based on the standard selection model. Since we do not have a convincing instrument to model the selection process, we must rely on distributional assumptions and nonlinearities to identify the effects of the business cycle variables on search. Specifically, we make the usual assumption of joint normality of the errors in the search and the selection equations, u_{it} and w_{it} in (1) and (2). It is well known that the lack of exclusion restrictions in this context generally lead to imprecise estimates because of multicollinearity (e.g. Puhani, 2000; Wooldridge, 2002, p564). Additionally, selection models are known to be sensitive to distributional assumptions (e.g. Greene, 1997, p983). On the other hand, if the model is correctly specified, the estimates are consistent. As before, we take a finding of a high degree of similarity between the base models and the selection models as one less reason to worry about unobserved heterogeneity and selection.

The specification of the search equation is the same as in previous models with the inclusion of the vacancy rate and the omission of the year dummies. The selection equation includes the same set of variables as well as year dummies.³³

Table 8 shows marginal effects of the vacancy rate. When correcting for selection into nonemployment only (conditional on the nonstudent status) the effects are stronger. This suggests that had they been nonemployed, individuals who are employed during the downturn would have searched more than the observed sample of nonemployed nonstudents. The opposite is true for the selection process into the nonstudent population (conditional on the nonemployed status): those who are studying during the downturn would have searched less than the observed sample. However, overall the differences are not large and our main conclusions remain.

Before closing, it is interesting to discuss the patterns in selection. Table 9 presents marginal effects of the year dummies and the vacancy rate in the selection equation. Only the results based on direct search are shown, as the results for the two other dependent

³³The models are estimated by FIML techniques. The hypothesis that error terms in the search and selection regressions are independent is rejected by likelihood ratio tests for selection into nonemployment and nonstudent status and for nonemployment only. For the selection into nonstudent status only (i.e. conditional on being nonemployed), the χ^2 statistic for the test of the null hypothesis of independence has a p-value of 0.0315.

variables are similar. The effect of the vacancy rate is substantial and significant and suggests that a worsening of the labour market increases the probability of being in the nonemployed and nonstudent samples. However, the year dummies are not insignificant in the selection equations when the vacancy rate is included, and therefore the vacancy rate does not fully capture the variation over time. (Tests of the null of jointly zero coefficients on the year dummies lead to rejection in all cases.) The effects of the year dummies are found to be in the opposite direction to those of the vacancy rate. From 1989 to 1991 (at constant vacancy rates) we find a reduction in the probability of being in the nonemployed and nonstudent samples. For the selection in the nonemployed sample, the year dummy effects are weak and on average the vacancy rate effects dominate; the probability of being nonemployed increases during the recession.³⁴ Year dummy effects are more important for the selection into the nonstudent sample and on average we expect the probability of being a student to increase during the recession. Also in the case of selection into the nonstudent sample, a positive time trend is observed over and above the cyclical variation. This is not surprising given the aging of the sample described earlier.

5 Conclusion

In this paper we investigate variations in the search behaviour of young Australians over the business cycle. We find that jobless young people who have finished their education search more during the downturn. We find this result for all measures of search activity considered and for a wide range models which use different controls for observed and unobserved heterogeneity. We conclude that there is no evidence of a dominant discouraged worker effect among the young in Australia.

Our findings raise the question of why search behaviour of the young differs in such a fundamental way from the behaviour of married women. Although it is possible to generate both types of behaviour in the context of structural search models by varying the different components of the models (especially the structure of search costs), a standard

³⁴For example, the reduction in the vacancy rate in Australia from 1989 to 1991 is 0.84 ppt which, with a marginal effect of -0.095 , yields an increase in the predicted probability of being in the nonemployed sample of 0.08. This dominates the year dummy effect of -0.035 .

search framework would predict a reduction in search during downturns based on reduced benefits due to the lower employment probabilities and lower wage offers.

In a recent paper, Shimer (2004) developed a discrete time search model that predicts more search during slack labour markets. The intuition behind the result can be seen by thinking about search as sending out job applications. During slack periods, the probability of any one application being successful in generating a job falls and the searcher responds by sending out more of them. In one of the rare empirical papers to look at this issue, van der Klaauw et al. (2004) estimated a structural model of college-to-work transition for graduates in selected fields in the Netherlands. Although allowed by their model, they did not find evidence of increased search during slack labour market periods. However they note that their model fits the data on job search effort poorly.

As discussed in the Introduction, the search behaviour of the jobless is an important issue for several reasons and there is much which is not known. The current macroeconomic climate only adds further urgency to this research agenda. We suggest that a comparison of married women and young people would be informative. Further work with structural models which leads to a better fit in the search effort dimension is also likely to be useful.

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