

Weber, Andrea; Mahringer, Helmut

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## Choice and success of job search methods

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Reihe Ökonomie  
Economics Series

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Andrea Weber, Helmut Mahringer

November 2002

Institut für Höhere Studien (IHS), Wien  
Institute for Advanced Studies, Vienna

**Contact:**

Andrea Weber  
Department of Economics and Finance  
Institute for Advanced Studies  
Stumpergasse 56, A-1060 Vienna, Austria  
☎: +43/1/599 91-147  
email: andrea.weber@ihs.ac.at

Helmut Mahringer  
Austrian Institute of Economic Research  
P.O.-Box 91, A - 1103 Vienna, Austria  
email: helmut.mahringer@wifo.ac.at

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Founded in 1963 by two prominent Austrians living in exile – the sociologist Paul F. Lazarsfeld and the economist Oskar Morgenstern – with the financial support from the Ford Foundation, the Austrian Federal Ministry of Education and the City of Vienna, the Institute for Advanced Studies (IHS) is the first institution for postgraduate education and research in economics and the social sciences in Austria. The **Economics Series** presents research done at the Department of Economics and Finance and aims to share “work in progress” in a timely way before formal publication. As usual, authors bear full responsibility for the content of their contributions.

Das Institut für Höhere Studien (IHS) wurde im Jahr 1963 von zwei prominenten Exilösterreichern – dem Soziologen Paul F. Lazarsfeld und dem Ökonomen Oskar Morgenstern – mit Hilfe der Ford-Stiftung, des Österreichischen Bundesministeriums für Unterricht und der Stadt Wien gegründet und ist somit die erste nachuniversitäre Lehr- und Forschungsstätte für die Sozial- und Wirtschaftswissenschaften in Österreich. Die **Reihe Ökonomie** bietet Einblick in die Forschungsarbeit der Abteilung für Ökonomie und Finanzwirtschaft und verfolgt das Ziel, abteilungsinterne Diskussionsbeiträge einer breiteren fachinternen Öffentlichkeit zugänglich zu machen. Die inhaltliche Verantwortung für die veröffentlichten Beiträge liegt bei den Autoren und Autorinnen.

## **Abstract**

Job seekers can influence the arrival rate of job offers by the choice of search effort and the search methods they use. In this paper we empirically investigate the contribution of the use of different search methods on the outcome of search. Using unique data on the search behaviour of job seekers sampled from the inflow into employment during the year 1997 in Austria we analyse the quality of job matches in terms of wages and job durations. We find evidence for endogenous selection to the job matching channels. Persons with few social contacts or lower unobserved ability are more likely to be matched by the public employment service. Hence we conclude that selection may contribute to the unfavourable wage outcomes for jobs generated by the public employment service.

## **Keywords**

Job search, search channels, selectivity bias

## **JEL Classifications**

J20, J64, C31

**Comments**

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# 1 Introduction

Job search can be seen as a process of information gathering (Mortensen, 1986). During search the worker collects information on the job offer distribution and on the most successful job search strategies. Her search strategy consists of the necessary search effort and the choice of search methods. Osberg (1993) compares job search to fishing, where the choice of location and lure helps to catch the big fish. For the individual worker search methods vary in their costs and effectiveness. They give access to different pools of employment and to different wage offer distributions (Holzer, 1988). Roper (1988) argues that employers face considerable variations in vacancy durations and potential applicants with respect to their choice of recruitment strategies.

In an early study Rees (1966) finds that most jobs are obtained through informal referrals from friends and relatives. This has generated a large literature stressing the importance of personal contacts and social networks in the analysis of unemployment (Granovetter, 1985; Hannan, 1999; Saloner, 1985). Granovetter (1973) examines how the links in social structures work. For job seekers informal search is less costly and may be most productive in generating acceptable job offers and reliable information about jobs. Holzer (1988) and Lindeboom et al. (1994) find very high acceptance rates for offers through personal contacts. For employers recruitment by referrals from their existing workforce provides a cheap and useful screening device. Employees refer to friends who are similar to themselves and avoid making referrals to unsuitable applicants, because this damages their own reputation (Fernandez et al., 2000).

The role of the public employment agency as a formal intermediary can be seen as complementary to the informal search through personal contacts. The service is designed for job seekers, who cannot rely on social contacts. As a part of the active labour market policy in most industrialised countries, the state provides a free service for job seekers and employers and thus intervenes



directly in the process by which workers and firms are matched. In course of evaluations of this service it has been found that job offers through the public employment agency are characterised by low wages and high rejection rates from the side of the unemployed (Blau and Robins, 1990; Holzer, 1988; Osberg, 1993). Consequently the public employment agency has often been seen as an inefficient public bureaucracy. This has led to suggestions of involving private employment agencies in the placement of the unemployed or bringing market forces into the public employment agency (Martin and Grubb, 2001).

Job searchers with no precise knowledge of the wage offer distribution and of different firms may search by contacting employers directly without referrals. This is sometimes called a “random” search behaviour (Kahn and Low, 1990), generating a relatively high number of offers together with high offer rejection rates by workers. Answers to media advertisements and contacts through referrals point to a more strategic search behaviour, generating more (only) acceptable offers.

The objective of most studies on search methods and search outcome is the effect of job search methods on the probability of finding employment for an unemployed individual (e.g. Holzer, 1988; Osberg, 1993). The quality of the job match is less often investigated. In this paper we use unique data on successful job searchers in the Austrian region Styria sampled from the inflow into employment in the year 1997. Our aim is to examine the effects of search effort and search methods on the outcomes of search such as wages and job durations. The data provide information on the job search not only by unemployed but by all kinds of searchers such as school leavers and job-to-job movers. This makes it possible to extend the analysis to differences in job search behaviour among those groups.

An investigation of the effect of search methods on the outcomes of search is complicated by the endogenous selection of job seekers to particular search

methods. According to job search theory individuals jointly choose search methods and search effort along with the reservation wage for accepting job offers to maximise their expected discounted lifetime incomes. This means that job searchers who just pick search methods randomly would behave sub-optimally and, consequently, the effects of search methods on the outcomes of search are not directly measurable. Several authors control for this kind of endogeneity. Gregg and Wadsworth (1996) and Osberg (1993) estimate the effect of the public employment agency on reemployment probabilities by including selection correction terms into their models.

In international studies the role of different search methods and especially the role of the public employment agency is controversial. In Great Britain the public employment agency is used by a large part of job seekers and employers (70% of unemployed job seekers) and there is evidence of a high efficiency of the service (Gregg and Wadsworth, 1996). Only direct employer contact raises the probability of finding a job more than the public employment agency. The greatest beneficial impact is among the less skilled and long-term unemployed. These findings are confirmed in a younger study by Böheim and Taylor (2001), who stress that applying directly to employers increases the re-employment probability and replying to media advertisements results in higher paying employment.

In Canada Osberg (1993) finds a beneficial impact of the public employment agency on the probability of finding a job in years of economic recession and especially for long-term unemployed. He argues that the cost benefit evaluation of the service is balanced over the business cycle.

For the Netherlands Lindeboom et al. (1994) estimate a general model that allows for both sides of the labour market, employers and employees, to interact. The results indicate large differences in the effectiveness of search channels. Media advertisements and personal contacts are most effective in matching

employed workers and vacancies. The public employment agency is very ineffective in doing this. On the other hand, the public employment agency is very effective in matching unemployed workers and vacancies. For them media advertisements are very ineffective.

Holzer (1988) reports a low market share of the public employment agency and only a small positive impact of the service on the probability of getting a job offer for unemployed youth in the USA. Addison and Portugal (2001) using the Portuguese Labour Force Survey report that the public employment agency has a low success rate and leads to jobs that are unstable and pay low wages. In a study on French unemployed youths Sabatier (2001) finds that the public employment agency mainly assists in locating employment in public employment programs, whereas networks and market intermediaries are most efficient in finding long-term and short-term jobs.

In Austria, Frühstück et al. (1999) evaluate the share of new jobs which were reported as vacancies to the public employment agency and the share of these vacancies, which were filled by the public employment agency. Ebmer (1990) investigates arrival rates of job offers through the public employment agency and the placement policies of public employment agency officials. But no studies exist examining the influence of job finding methods on characteristics of the subsequent jobs.

In this paper we find that the distribution of search methods is equal among individuals, but successful search channels are mostly personal contacts to friends and relatives and to a very small extent the Austrian public employment agency (AMS). This leads to the question: which are the channels generating profitable jobs? To find an answer we study the effect of the successful search channel on wages and job durations. The results show that although jobs matched by AMS pay lower wages, a correction for endogeneity of the successful search channel renders the differences insignificant. We explain this result by the composition

of the AMS clientele, which differs in an unobservable characteristic linked to lack of social contacts or opportunities in the labour market. Job durations, however, are not affected by the successful search channel.

## 2 Data

The empirical analysis of this paper is based on a sample drawn from the Austrian social security records. In the Austrian province of Styria, 500 persons who became employment during the year 1997 underwent a special interview on their job search. Not all of the participants were unemployed during search (27%). The sample also includes new participants in the labour market taking their first job (35%), job-to-job movers (27%), and persons, who were temporarily out of the labour force.<sup>1</sup>

Individuals who returned to their previous employer are excluded from the sample, as workers on temporary layoff exhibit a totally different search behaviour (Feldstein, 1976). In addition, jobs created by subsidised employment programs are excluded from the survey. Workers from all industries are included in the sample. Because of the small sample size the observations are weighted according to the proportion of industries in the labour market. Detailed summary statistics of all variables are given in Table 1.

The central part of the interview concerns the search process, which leads to the successful job match in 1997. Out of a large list of possible job search methods the participants report all the methods they had used during search and the successful search channel that generated the job match. For reasons of small cell sizes and better differentiation we collapse the list to 5 search methods: asking friends and relatives (personal contacts), newspaper or media advertisements, public employment agency (AMS), direct contact to the employer and a residual

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<sup>1</sup>Blau and Robins (1990) find differences in the number of search methods used and offer acceptance rate by unemployed and employed workers. Overall they conclude that search by employed job seekers is more effective.

category of other methods.<sup>2</sup>

Table 2 provides a sample overview of search methods used and successful search channels. As we learn from the first column, the most frequently employed search methods are asking to friends and relatives the use of the media advertisements. Both methods are used by about 60% of the participants. The public employment agency, which is compulsory in Austria for unemployed receiving unemployment insurance benefits, is reported half as often (35%). Employers are contacted directly either by mail or by telephone by 30% of workers. A share of 8% report to use no search methods at all. On average a job seeker uses 2 methods during search.

In the next column we learn about the distribution of successful search channels. We notice that the dispersion among successful channels is higher than the dispersion among search methods used in the first column. Almost half of the jobs are found by personal contacts, whereas in the share of job matches generated by the public employment agency lies around 8%.

The values in the last column of Table 2 perform a check on the informational content of the answers to the questions about search methods used and the successful channel. The group of persons, who are successful with a particular search channel can be divided into two subgroups. There are persons who searched with the method and are then successful and others who do not search with the method but are nevertheless successful. The numbers reported are the “successful searchers”. The share of “successful searchers” in the total sample is often referred to as “hit rate”. If the numbers in column two and column three coincide every individual whose job is generated by the channel also reports the channel as a search method. On the other hand, if the number in column 3 is small in comparison to column 2, individuals find a job with a channel to which they do not attribute any search effort. We find that differences are especially

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<sup>2</sup>Other search methods include private employment agencies, advertisements in schools and universities and contacts which were generated upon the initiative of the employer

high for asking friends and relatives and direct employer contacts, whereas for AMS and media advertisements the numbers of column 3 and column 2 are roughly equal.<sup>3</sup> It seems to be the case that contacting friends is not always seen to be combined with search effort and that the job finding success appears to be a coincidence. Although job search increases the probability of finding a job it may not be an absolute requirement to find employment. Inconsistencies in the reports on search methods used and successful search channels are a common finding in various surveys (Addison and Portugal, 2001).

By sampling from the inflow into employment we get a different subset of all job searchers than by sampling from unemployed job seekers as most other studies do. Neither set is representative for the universe of all job searchers. Among unemployed job searchers we find unsuccessful searchers who give up searching before they find a job. On the other hand among all successful job searchers we also observe searchers who are not registered as unemployed like new entrants in the labour market and searchers on the job. We argue that our sampling design is an important complement to the existing studies on unemployed searchers. However, we have to bear in mind that our results might not be directly comparable as the sample excludes unsuccessful searchers who withdraw from the labour force.

### 3 Model and estimation method

As an extension to the classic stationary job search model, Burdett (1979) constructs a search model in which the workers can vary their search effort. In this model the arrival rate of job offers is not exogenously given but can be influenced by the individual's search behaviour. The choice of search effort is seen as a part of the worker's time allocation decision. In Burdett's model

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<sup>3</sup>It turns out that the number of "successful non-searchers" exceeds the number of persons who reported no search at all with (24% as opposed to 8%).

searchers choose an optimal level of search effort together with the reservation wage in order to maximise their own expected discounted lifetime incomes. Holzer (1988) adopts this model to account also for the choice of search methods according to their cost and profitability. Again, individuals choose the use of each search method to equate its marginal costs<sup>4</sup> and marginal benefits with respect to the maximisation of expected discounted lifetime incomes. Van den Berg and van der Klaauw (2001) generalise the model with endogenous search effort and search along two channels by introducing separate channel specific wage offer distributions. In their model, workers can direct search effort to the various search channels and thereby influence the offer rates, which, in turn, give access to the different wage offer distributions.

The observable outcomes from the search process are search (unemployment) durations and the wages of the new jobs. However, if we consider the search model framework introduced before we see that it is impossible to measure the effect of search effort and the different search methods on the outcomes of the search process directly. The choice of these is endogenous in the whole process and individuals make optimal choices with respect to costs and benefits affecting their specific utility functions.

Here we want to investigate the role of the successful search channel, which finally leads to the job match, on the outcomes of search. We will measure the quality of the job match by wages and durations of the new job since we only have very imprecise information on search duration. We try to answer the question which search channels generate profitable job matches.

As a consequence of the endogeneity of search methods the successful channel will also be endogenous in the determination of the outcome of the search. The connection is less direct, however. First, because of the extra randomness of

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<sup>4</sup>Different search methods diverge in their costs for the job searcher. Asking friends and relatives is a very convenient method, as it comes practically free of costs. Public employment agencies are costless in Austria like in most European countries, they only involve time costs. Other intermediaries like media advertisements and direct employer contacts involve time and monetary costs.

the successful channel if more than one method is used at a time. Second, as we observed in the previous section, a considerable number of individuals report a successful job finding method to which they contributed no search effort at all. We investigate the role of endogeneity of the successful search channel in our model setup. In an analogous way we account for the endogeneity of search effort.

We consider a simultaneous-equation model with underlying continuous latent variables and observed qualitative variables, similar to the one proposed by Maddala (1983) (Model 5, p.120).

$$S_i^* = X_{S,i}\beta_S + u_{S,i} \quad (1)$$

$$SM_i^* = X_{SM,i}\beta_{SM} + S_i\alpha_{SM} + u_{SM,i} \quad (2)$$

$$W_i = X_{W,i}\beta_W + S_i\alpha_W + SM_i\gamma_W + u_{W,i} \quad (3)$$

$$D_i = X_{D,i}\beta_D + S_i\alpha_D + SM_i\gamma_D + u_{D,i} \quad (4)$$

The first equation (1) explains the influence of several personal characteristics  $X_S$  on search effort  $S^*$ , the effects are measured by the parameter vector  $\beta_S$ . The exact amount of search effort is unobservable, we can only observe an approximation  $S$ . In the literature one finds different methods of measuring search effort. Many studies (e.g. Barron and Mellow, 1979) use the time spent for job search during a time interval as an approximation for effort of search. Others use the number of employer contacts (Kahn and Low, 1990). We will follow Holzer (1988) and measure search effort by the number of search methods used during search.

Equation (2) in the system examines the heterogeneity of the successful search channels in personal as well as job specific characteristics  $X_{SM}$  and in search effort.  $SM_i^*$  is a  $1 \times 5$  vector of latent variables, which can be interpreted as the individual  $i$ 's propensities of finding a job with each of the 5 search



channels. The observable variable  $SM_i$  is a vector of dummy variables and its  $j^{th}$  component  $SM_{ij}$  is equal to one if the  $j^{th}$  search channel is successful. The  $j^{th}$  row of the parameter matrix  $\beta_{SM}$  corresponds to influence of the explanatory variables  $X_{SM}$  on the successful search channel. Analogously,  $\alpha_{SM}$  is a  $1 \times 5$  parameter vector measuring the effect of search effort.

The wage outcome  $W$  in equation (3) is influenced by personal characteristics in an augmented Mincer-type specification. In addition, we want to quantify the effects of search effort by the parameter  $\alpha_W$  and the effect of the successful search channel by  $\gamma_W$ . Equation(4) for job duration  $D$  has a similar form. In this model search effort influences the outcomes of search in two ways: first, there is a direct effect on wages and job durations and second, an indirect effect via the successful search channel.

The error terms in the system  $u_S, u_{SM}, u_W, u_D$  are assumed to be independent and identically distributed across individuals but they are allowed to be correlated for the same individual, due to endogeneity.

For the estimation of this system we apply a two-step procedure (Maddala, 1983). In the first step we estimate equation (1) and keep the estimated predictors for search effort  $P(S)$ . These are included as regressors in equations (2) - (4) in the place of the variable  $S$ . In the same way we keep the estimation results  $P(SM)$  from equation (2) for the successful search channel and replace the variable  $SM$  in equations (3) and (4) by the predicted values  $P(SM)$ . Consequently, the estimated equations for wages and durations are the following:

$$W_i = X_{W,i}\beta_W + P(S_i)\alpha_W + P(SM_i)\gamma_W + v_{W,i} \quad (5)$$

$$D_i = X_{D,i}\beta_D + P(S_i)\alpha_D + P(SM_i)\gamma_D + v_{D,i} \quad (6)$$

This procedure yields consistent estimators for  $\beta_W, \beta_D, \alpha_W, \alpha_D, \gamma_W, \gamma_D$  under some general conditions, as the estimators for  $\beta_S, \beta_{SM}$  and  $\alpha_{SM}$  are consistent.

The estimators of the standard errors for the parameters are biased, however, because the variables  $P(S), P(SM)$  are only estimates, measured with errors.

In the system of equations we have several qualitative dependent variables, which require a special nonlinear framework. The measure of search effort is an ordinal qualitative variable. Accordingly we estimate (1) in an ordered probit specification. For the estimation of the successful search channel we employ a multinomial logit framework.<sup>5</sup>

In the survey wages are given in 30 interval categories. We have left and right censored wage observations as well as wage observations in intervals. This suggests estimating the wage equation with an interval regression method rather than with OLS. The likelihood function we apply is a generalisation of the Tobit model since it includes parts for left- right- and interval-censored observations. Durations are modelled in a proportional hazard specification (Kiefer, 1988). For the specification of the baseline hazard we choose Cox's partial likelihood model, which specifies a fully flexible baseline hazard.

The main identification strategy for the model parameters relies on the non-linear structure of equations. However, we include several variables as instruments, which are supposed to affect only search effort or the successful search channel but not the other endogenous variables directly. These specifications support parameter identifications in addition to the functional form assumptions and the distributional assumptions on the error terms. We will discuss the instrumental variables together with the results.

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<sup>5</sup>An assumption implicit in the multinomial logit model is the independence of irrelevant alternatives (IIA), which states that all alternative channels are dissimilar and no two are more alike than the others. Hausman and McFadden (1984) designed a test for the IIA assumption.

## 4 Results

### Search effort

First, we investigate the influence of personal characteristics on search effort measured by the number of search methods used<sup>6</sup>. Table 3 shows the estimation result from the ordered probit model. Search effort is higher for women and for persons living in rural areas. Further search effort decreases with age. Women, rural residents, and young individuals may be population groups with a lower amount of job-related social contacts. Therefore they have to use various search methods. Unemployed job searchers have a higher search effort compared to job-to-job movers, new entrants in the labour market and persons who were temporarily out of labour force. This may be a result from monitoring of search effort by the unemployment insurance agency (van den Berg and van der Klaauw, 2001) and from the higher amount of time available.

We include one variable in the specification, which we assume only affects search effort but not directly the other endogenous variables. This is a measure for the attitude towards a professional career, which is generated from several subjective answers of the individuals.<sup>7</sup> The career orientation variable works as an instrument and we argue that it affects wages and job durations not directly but only via search effort.

### Successful search channels

Now we turn to the differences in the successful search channels. Results from the multinomial logit estimation are reported in Table 4. The public employ-

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<sup>6</sup>The most common combinations of search methods are: friends alone, friends plus media plus AMS, friends plus media, media alone, media plus AMS, friends plus media plus direct contacts, friends plus media plus AMS plus direct contacts.

<sup>7</sup>The variable career orientation is equal to one if the answers to the questions “Even when work is not always fun it is nevertheless important for my life”, and “I can only be satisfied with life if I am successful in my job” are very positive and the answers to the questions “I can imagine a satisfactory life without work”, “If I already have sufficient money to survive it is not important for me to get more money” are very negative. It is zero otherwise.

ment agency is chosen as the reference channel. To facilitate parameter interpretation and to see a comparison of all channels with each other in one table, we try to find out for which channel each characteristic is most important or least important. A "+" sign in Table 5 means that the channel, with respect to a certain characteristic, has a higher probability of being successful than any other. Reversely, a "-" sign means that the channel has a lower probability than any other. We obtain these results by in turn taking every channel as the reference channel and looking for rows (corresponding to the independent variables) with only positive or negative parameter estimates.

For young workers the most likely channel of finding a job is direct contact to the employer. On the other hand the public employment agency is the channel generating the least job matches. The effects are strongest for the youngest age group. Higher qualification decreases the probability of finding a job with the public employment agencies. Especially persons who finished secondary school rather find employment by any of the alternative methods than by AMS. The channels by which workers with education above the compulsory level find employment are most likely media advertisements and direct employer contacts. The individual's labour market status while searching also plays a role in determining the probability of the job finding method. Workers finding their first job are very unlikely to benefit from the public employment agencies. This may be due to the fact that new labour market entrants are not eligible to unemployment benefits and therefore do not register with the AMS. A second reason may be that since we only observe successful job searchers the sample includes a large share of very ambitious new labour market entrants. Unemployed persons also are least likely to acquire jobs by AMS but they are rather successful via direct employer contacts. Job-to-job movers unsurprisingly find new employment through media advertisements and less likely through AMS, but the coefficients are not significant.

We find no clear distinctions due to sex. Residents of a large city have a high probability of finding a job through AMS and a low probability through direct contacts. This result is counter intuitive. Living in the city is often taken as a proxy for the density of employers in one's region (Barron and Gilley, 1981; Chirinko, 1982). For persons living in rural areas this means a higher cost of contacting employers directly.

Workers who lost their last job as a consequence of insolvency are most likely to find new employment through direct contact to employers and less through media advertisements, whereas workers who were laid off more likely profit from AMS.

The variable for search effort included in this estimation is the predicted number of search methods from the ordered probit model. Search effort has positive effect on the probability of finding a job through AMS and a negative effect on finding it through direct contacts. It seems that especially persons who search very hard or who have exploited all alternative methods and contacts are willing to accept a job offer from AMS.

To see if there is an effect of long search duration on the successful channel, we also include a dummy variable for search duration over 4 months. In fact, we find that workers with a long search duration face a higher probability of finding employment through AMS and lower probability of succeeding with direct employer contacts. The effects have the same direction as the effects from search effort. It seems that longer search duration and higher search effort might be correlated in a sense that the individuals change their search behaviour during search.

White collar workers are unlikely to be matched by AMS, which resembles the qualification result. Part time workers find employment more likely through direct employer contact and less likely through AMS.

Variables only affecting the success of a search channel, but not the wages and

job durations, are the area of residence and the reasons for the end of the last job (insolvency vs. layoff vs. the individual's own incentive). Again these variables are seen as instruments. A test for IIA does not support the assumption for all alternative channels.

If we look at the column corresponding to friends and personal contacts in Table 5, we find that none of the characteristics has a significant effect on the probability of finding a job with that channel. It is both the channel through which the majority of matches is generated and the one which matches the most heterogeneous population group.

## **Wages**

Next we turn to the estimation of the wage equation. In the survey monthly gross wages including payment for regular overtime are recorded, as well as the annual frequency of payments. To correct for the differences in the number of annual payments we calculate a standardised monthly wage on basis of 14 annual payments (this is the most common frequency in Austria). Most participants in the survey report wages (95%). However, in the analysis we can only regard full time employees, because it is impossible to calculate hourly wages from the information in the survey. This reduces the sample size to 351 persons.

Table 6 contrasts the estimated coefficients from two different specifications of the wage equation. The first column corresponds to a specification disregarding the endogeneity of the successful search channel. For every search channel a dummy variable, which is equal to one if the channel is the successful one, is included. Again the reference channel is AMS. The second column gives estimation results for the specification with endogenous successful channels. The dummy variables are replaced by the predicted values from the multinomial logit model.

Looking at the first column of Table 6, we see that wages of jobs matched by AMS pay significantly lower wages. The coefficients for all channels are about the same size and we find that wages in these jobs are about 20% higher than in jobs from AMS. But this is the result disregarding endogeneity of the search channels. If, in turn, we look at the coefficients in the model with endogeneity we see that the wage differences due to successful channels vanish. All channel specific coefficients except the one for other methods become insignificantly different from zero.<sup>8</sup> Our interpretation is that the composition of the AMS clientele diverges from the rest of job seekers and that these differences are responsible for the wage differentials. The differences in composition might be due to a lack of social networks, ability, bad physical constitution or some other unobservable characteristic, which disadvantages the individuals in the labour market.

Coefficients of the rest of the explanatory variables show an expected behaviour. Men's wages are significantly higher than women's and wages rise with the educational level. New entrants in the labour market and previously unemployed workers earn lower wages. We include a dummy variable for being unemployed, because among the AMS clients a higher percentage is unemployed and the negative signalling effect of unemployment might be reflected in the coefficients for the successful search channels.

For the comparisons of both models a Hausman test is performed. The null hypothesis claims that the successful search channels are not endogenous. Under the null the first specification is consistent and efficient, whereas the second specification correcting for endogeneity is consistent but less efficient. The test result only allows to reject the null hypothesis at a 10% level.<sup>9</sup>

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<sup>8</sup>The standard errors in the two step estimation procedure are biased. We report non-corrected standard errors in the table. However, approximations show that the standard errors are biased downwards (Maddala, 1983, chapter 8). So in our case correction would make standard errors even higher, which does not change the result.

<sup>9</sup>The test statistic  $\chi(4) = 8.5$ .

## Job durations

Next, we investigate durations of the jobs. The survey was conducted in April 1999 and the jobs started during the year 1997. Hence the maximal observed job durations are 2,5 years, which is not very long. But one can argue that a job, which was dropped after a short time, cannot be the consequence of a very successful match. In the sample the average duration of uncensored spells (jobs that were finished at the date of the interview) is about 11 month. The average duration of censored spells (ongoing jobs) is 22 month.

To get a first picture of the influence of successful search channels on job durations we investigate Kaplan Meyer estimates of the empirical hazard rates, which are presented in Figure 1. The hazards do not seem to differ much among successful channels during the first year. But in the second year the hazard rate of leaving employment increases for jobs found by AMS. The pictures suggest that AMS generated jobs are most unstable.

To take into account the effects of individual and job specific characteristics we turn to the results from Cox regressions in Table 7. The estimated coefficients measure the influence of the covariates on the probability of leaving the job, a negative coefficient means a longer job duration. As in the wage setting, in the paragraph above, we compare the model without endogeneity of successful search channels (in column 1) with the model correcting for endogeneity (column 2). We notice that all coefficients for the search channels (except media advertisements) in the comparison model are negative and the signs switch for the specification correcting for endogeneity (except direct contacts). This would imply that although the jobs generated by AMS are shorter in duration, a correction for endogeneity bias reverses the result. Disadvantaged workers find jobs that are more stable with AMS rather than with all other channels. However, none of the coefficients is significant and standard errors are quite high. No significant differences in job durations for the different search channels can



be detected.

Job durations are better determined by subjective assessments about job security and career possibilities, the number of previous job switches (which enter in a quadratic expression) and age. A bit puzzling is the result on educational levels, where we find that the higher qualified groups have shorter job durations. This effect may again be due to the sampling design which excludes unsuccessful searchers. High qualification is seen as a positive signal for employers (Albrecht and van Ours, 2001), and applicants with a higher educational level are preferred over lower educated ones. Highly educated workers may also take jobs for which they are over-qualified as stepping stones (Booth et al., 2002). Like young workers, individuals who take their first job have shorter job durations, which resembles the phenomenon of “job shopping”. We correct for seasonal influences on job durations by including a dummy variable for seasonal industries (tourism and construction) and a dummy for jobs starting in summer.

## 5 Conclusion

In this paper we investigate search behaviour and the effects of job search strategies in a sample of successful job searchers. The distribution of the main methods among job searchers is relatively equal. Media advertisements and personal contacts are used by 60% of job searchers, the public employment agency and direct contacts to employers by about 30%. On average, a job searcher uses two search methods. The majority of jobs is, however, generated by personal contacts and only 8% of jobs are matched with the help of the Austrian public employment agency AMS. We want to examine if these differences are due to the quality of jobs offered by the different channels. We precisely study the effects of the successful search channel on wages and job durations.

Job search theory suggests that individuals choose job search methods and search effort along with the reservation wage to maximise their expected dis-

counted lifetime incomes. This fact complicates the investigation of the direct effect of job search methods on the outcomes of search. Job searchers do not pick search methods randomly but there is an endogenous selection to search channels according to costs and expected profits. We account for the selection problem in a two stage estimation setting.

We find that search effort and the successful search channels differ for population groups, thus providing evidence for endogeneity. For the various groups of job searchers we find that the unemployed have a higher search effort than others. Furthermore, unemployed searchers and new labour market entrants are more likely to find employment by directly contacting employers and less likely to find jobs via the AMS than are job-to-job movers and re-entrants into the labour market. Regarding wages, we find in a comparison of all successful search channels that jobs matched by AMS pay significantly lower wages than all other jobs. If we control for endogeneity of the successful channel, however, this negative effect vanishes and we find no significant differences among the main channels. Our interpretation is that the clients of AMS differ by an unobservable characteristic linked to lack of social contacts or opportunities in the labour market. Hence, the public service obviously provides assistance to less favourably equipped members in the labour market. But whether this fact is exploited by employers in terms of wage dumping, or whether low wages are justified by productivity arguments, cannot be answered at this current stage. Regarding job durations we find no significant differences due to the successful search channel, either controlling for selectivity or not. Job durations are better explained by subjective assessments about job security and career possibilities, the number of previous job switches and relative age.

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Figure 1: Job durations, empirical hazard rates for different successful search channels

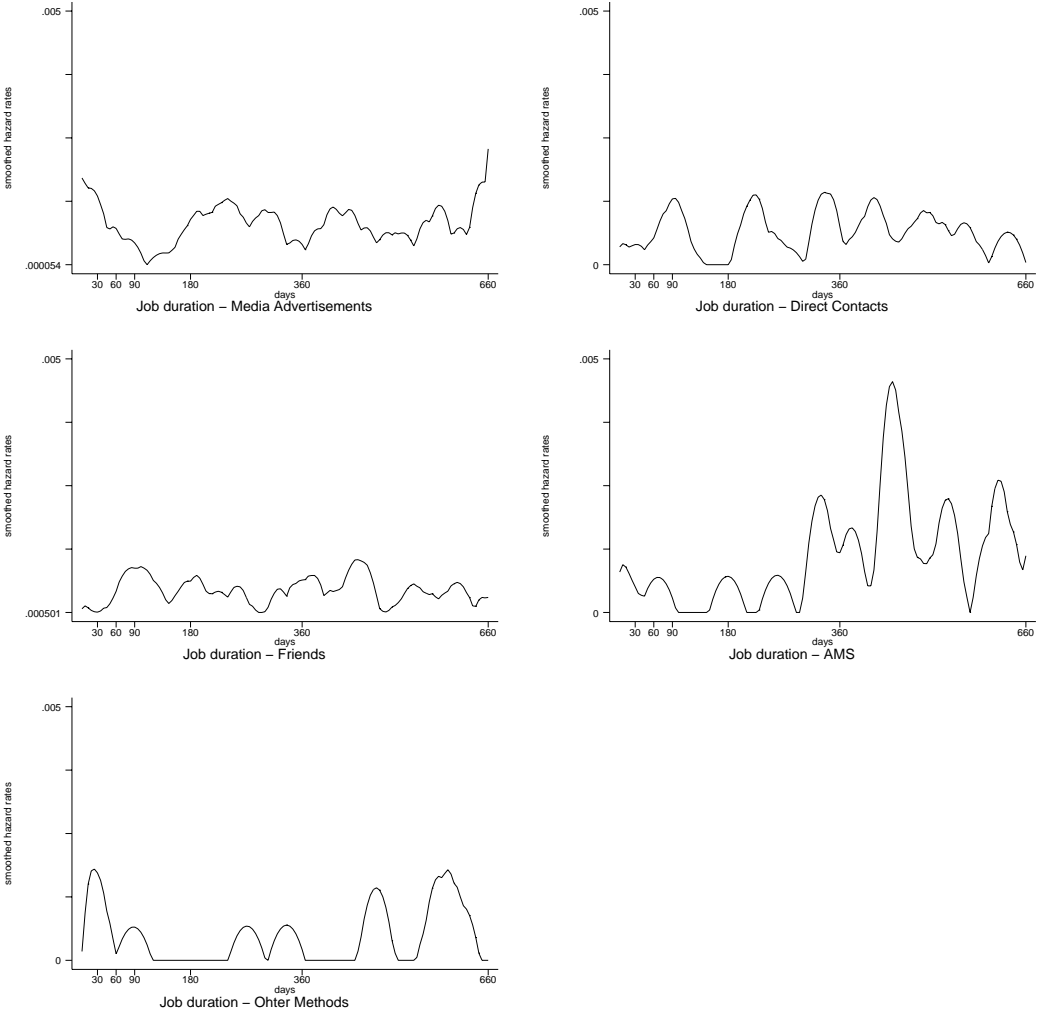


Table 1: Summary Statistics, N=501

	Mean	Standard Deviation
Female	0.48	
Age	29.45	10.07
Children under 10 years	0.26	
Region (=1 if lives in large city)	0.36	
Foreign Nationality	0.03	
Number of previous jobs	2.59	2.85
Experience (years)	7.95	9.27
Education:		
Compulsory	0.17	
Apprenticeship or Vocational School	0.50	
Secondary School	0.22	
University Degree	0.12	
Labourmarket-status before starting the job:		
First job	0.35	
Unemployed	0.27	
Temporarily Out of Labour Lorce	0.11	
Job-to-job Mover	0.27	
Search characteristics:		
Search effort (number of methods used)	1.98	1.17
Search duration (months)	4.46	6.54
Job duration methods used)	1.98	1.17
Search duration	17.7	7.8
Job finishend (uncensored duration)	0.46	
Type of job:		
Blue Wollar Worker	0.42	
White Collar Worker	0.49	
Apprenticeship	0.08	
Part Time	0.24	
Industries:		
Agriculture	0.05	
Construction	0.08	
Trade	0.08	
Tourism	0.08	
Banking	0.05	
Firm related services	0.11	
Public sector	0.07	
Personal services	0.15	

NOTE: Standard deviations are only given for non-dummy variables.

Table 2: Search method use and job finding success

	search method used number of persons in percent	successful method	search method was used and was successful “hit rate”
Media	305 60.9%	103 20.6%	101 20.2%
Direct Contact	154 30.7%	83 16.6%	58 11.6%
Friends	301 60.0%	234 46.7%	168 33.5%
AMS	177 35.3%	39 7.8%	38 7.6%
Other	56 11.2%	42 8.4%	15 3.0%
No Search	42 8.0%		
Total		100%	75.8%
Average number of methods used	1.98		
Observations	501		

NOTE: “hit rate” refers to the share of persons who report the method as their search method and successful method

Table 3: Search Effort

	Coefficient	Standard error
Female	0.16	0.10
Lives in Large City	-0.23	0.11
Career Oriented	0.08	0.04
Apprenticeship	-0.02	0.14
higher Vocational Training	-0.02	0.19
Secondary School and higher	0.07	0.14
Less than 25 years	0.57	0.18
25 to 34 years	0.47	0.18
35 to 44 years	0.36	0.20
First job	-0.02	0.13
Unemployed	0.76	0.12
<hr/>		
Number of observations :	488	
log Likelihood :	-724.07	Pseudo $R^2$ : 0.04

NOTE: ordered probit estimation



Table 4: Multinomial Logit estimation of successful job search, comparison group: AMS

	Media	Dir Contact	Friends	Other Methods
Age (over 44 years)				
< 25 years	3.02 (1.22)	5.73 (2.26)	3.56 (1.52)	1.25 (0.47)
25 to 34 years	2.80 (1.32)	4.74 (2.18)	3.18 (1.57)	1.16 (0.48)
35 to 44 years	2.24 (1.29)	4.12 (2.32)	2.46 (1.53)	0.55 (0.29)
Education (Compulsory)				
Apprenticeship	1.37 (2.25)	1.10 (1.80)	0.82 (1.53)	0.35 (0.50)
Higher Vocational	0.68 (0.87)	-0.44 (0.51)	0.30 (0.45)	0.57 (0.63)
Secondary School	2.00 (1.87)	2.58 (2.51)	2.29 (2.41)	1.70 (1.62)
LM Status Before (OLF)				
First job	2.10 (2.17)	2.14 (2.05)	1.71 (1.91)	1.43 (1.31)
Unemployed	4.95 (1.62)	6.95 (2.27)	5.40 (1.86)	3.99 (1.13)
Job-to-job	1.87 (1.80)	1.53 (1.37)	1.04 (1.08)	0.82 (0.69)
Female	0.75 (0.84)	1.20 (1.24)	0.78 (0.91)	0.31 (0.28)
Area of Residence				
Large City	-0.20 (0.15)	-2.73 (1.99)	-1.35 (1.07)	-0.54 (0.38)
End of Last Job (Own Incentive)				
Insolvency	-0.04 (0.05)	1.53 (1.85)	1.05 (1.41)	0.59 (0.64)
Layoff	-1.12 (1.83)	-0.37 (0.52)	-0.95 (1.63)	-0.93 (1.00)
$P(\text{Search Effort})$	-4.14 (1.13)	-8.03 (2.20)	-6.21 (1.80)	-4.02 (1.02)
Search Duration > 4 Mo	-0.73 (1.15)	-1.59 (2.35)	-0.60 (0.98)	-1.76 (2.50)
White Collar Worker	1.41 (1.85)	1.11 (1.45)	1.19 (1.70)	1.76 (2.20)
Part Time Worker	1.24 (1.96)	1.98 (2.96)	1.40 (2.40)	1.44 (1.93)
Number of observations :	488			
log Likelihood :	-577.06	Pseudo $R^2$ :	0.15	

NOTE: t-statistics in parentheses;  $P(\text{Search Effort})$  is the expected value of number of search methods used estimated from the ordered probit; dummy variables for 8 industries and a constant term were included in the estimation; OLF stands for out of labour force.

Table 5: Interpretation of Multinomial Logit Results

	Media	Dir Contact	Friends	AMS
Age (over 44 years)				
<25 years		+		-
25 to 34 years		+		-
35 to 44 years		+		-
Education (Compulsory)				
Apprenticeship	+			-
Higher Vocational Training	(+)	(-)		
Secondary School		+		-
LM Status Before (OLF)				
First Job		+		-
Unemployed		+		-
Job-to-job	(+)			(-)
Female		(+)		(-)
Area of Residence				
Large City		-		+
End of Last Job (Own Incentive)				
Insolvency	-	+		
Layoff	(-)			(+)
$P(\text{Search Effort})$			-	+
Search Duration > 4 Months			-	+
White Collar Worker				-
Part Time Worker		+		-

NOTE: + means the method has a higher probability of being successful than any other method. - means the method has a lower probability of being successful. Signs in parentheses mean that there is no coefficient significant at a 5%-level.  $P(\text{Search Effort})$  is the expected value of number of search methods used estimated from the ordered probit.

Table 6: Wage estimation results from 2 stage models

	Comparison model	2 stage model
P(search effort)	0.24 (0.15)	0.23 (0.16)
Friends	0.24 (0.09)	0.27 (0.30)
Media	0.24 (0.09)	0.11 (0.38)
Dir. Contact	0.24 (0.10)	0.16 (0.32)
Other Methods	0.28 (0.11)	1.20 (0.47)
First Job	-0.24 (0.06)	-0.25 (0.06)
Unemployed	-0.32 (0.13)	-0.32 (0.15)
Apprenticeship	0.50 (0.08)	0.52 (0.09)
Higher Vocational	0.50 (0.08)	0.48 (0.09)
Secondary School	0.52 (0.09)	0.51 (0.09)
University	0.75 (0.09)	0.70 (0.10)
Woman	-0.40 (0.06)	-0.38 (0.06)
Experience	0.12 (0.08)	0.14 (0.09)
Experience2	0.0006 (0.002)	-0.0008 (0.002)
Constant	1.73 (0.32)	1.69 (0.41)
Observations	351	351
log Likelihood	-828.4	-829.9

NOTE: Interval regressions of  $\log(\text{wages})$ ; specifications in the comparison model with dummy variables for successful channels, 2 stage model with predicted values from the multinomial logit model.  $P(\text{Search Effort})$  is the expected value of number of search methods used estimated from the ordered probit; standard errors in parentheses; dummy variables for 6 industries were included;

Table 7: Job duration, estimation results from 2 stage models

	Comparison model	2 stage model
P(search effort)	-0.39 (0.37)	-0.23 (0.41)
Friends	-0.04 (0.26)	0.21 (0.77)
Media	0.01 (0.28)	-0.35 (0.74)
Dir. Contact	-0.47 (0.31)	-0.75 (0.73)
Other Methods	-0.40 (0.38)	0.48 (1.12)
First Job	1.34 (0.36)	1.30 (0.36)
Unemployed	0.55 (0.34)	0.45 (0.36)
Apprenticeship	-0.21 (0.21)	-0.17 (0.22)
Higher Vocational	-0.18 (0.31)	-0.18 (0.31)
Secondary School	0.67 (0.22)	0.69 (0.23)
University	0.55 (0.28)	0.48 (0.29)
Less than 25 years	1.01 (0.25)	1.06 (0.26)
25 to 35 years	0.46 (0.22)	0.52 (0.23)
# of Previous jobs	0.48 (0.12)	0.46 (0.12)
# of Previous jobs2	-0.02 (0.01)	-0.02 (0.01)
Blue Collar	0.23 (0.17)	0.32 (0.19)
Job Security	-0.74 (0.16)	-0.71 (0.16)
Wage Situation	-0.54 (0.16)	-0.50 (0.16)
Start in Summer	0.27 (0.16)	0.24 (0.16)
Saisonal Industries	0.38 (0.18)	0.39 (0.20)
Observations	484	484
log Likelihood	-1186.3	-1188.1

NOTE: Cox regressions for job durations in days; specifications in the comparison-model is with dummy variables for successful channels, 2 stage model with predicted values from the multinomial logit model.  $P(\text{Search Effort})$  is the expected value of number of search methods used estimated from the ordered probit; standard errors in parentheses;

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