OTTO-VON-GUERICKE-UNIVERSITY MAGDEBURG
FACULTY OF ECONOMICS AND MANAGEMENT

Which one to choose? New evidence on the choice and success of job search methods

Stephan L. Thomsen • Mick Wittich

FEMM Working Paper No. 22, July 2009

F E M M

Faculty of Economics and Management Magdeburg

Working Paper Series

Otto-von-Guericke-University Magdeburg
Faculty of Economics and Management
P.O. Box 4120
39016 Magdeburg, Germany
http://www.ww.uni-magdeburg.de/

Which one to choose?
New evidence on the choice and success of job search methods

Stephan L. Thomsen*
University of Magdeburg & ZEW, Mannheim

Mick Wittich†
University of Magdeburg

This version: July 21, 2009

Abstract

This paper provides new evidence on the choice and success of six different job search channels comprising the public employment agency, advertisements in newspapers and journals, internet job search, recruitment agencies, direct applications, and the social network. In addition, job search intensity and its effects are regarded. Relying on panel data for Germany, we are able to consider observed and unobserved heterogeneity in the estimation. In line with findings for other countries, the results show that consideration of various channels in individual job search increases the employment chances. With regard to the determinants, the estimates exhibit clear differences between the job search channels and with respect to search intensity. The results for success of the job search channels reveal that the public employment agency is ineffective and even harms the employment chances of the unemployed job seekers. In contrast, direct application for jobs and internet job search provide successful channels and increase the employment chances.

Keywords: job search, unemployment, job placement, Germany, SOEP

JEL Classification: J64, J62, J20

*Stephan L. Thomsen is Assistant Professor of Labor Economics at Otto-von-Guericke-University Magdeburg and Research Associate at Centre for European Economic Research (ZEW) Mannheim.
Address: PO Box 4120, D-39016 Magdeburg, e-mail: stephan.thomsen@ovgu.de, phone: +49 391 6718431, fax: +49 391 6711700. Financial support from the Stifterverband für die Deutsche Wissenschaft (Claussen-Simon-Stiftung) is gratefully acknowledged. The usual disclaimer applies.
†E-mail: mickwi@web.de.

1 Introduction

Unemployed persons could use a variety of different job search channels when looking for employment. These job search channels comprise, e.g., replying to job advertisements published in newspapers or journals, engaging the public employment agency or private recruitment agencies, or looking for a job on the internet. Identifying differences in the choice but also with respect to the effectiveness of the different job search channels is an important empirical question for a number of reasons. It helps to understand the functioning of the job search process and enables, therefore, to derive models explaining productivity and cost differences of the different job search channels and the selection of job seekers into different job search channels. Moreover, policy implications with regard to institutional job search may become possible, e.g., the public employment agency. In addition, job search on the internet has been established as a new pathway of job search during the last decade; this job search channel has been rarely regarded in the empirical investigation of the job search process so far. Explaining its determinants and effects is an empirical issue in first line.

Despite the variety of job search channels persons make use of in order to get employed (or to change occupation), the main literature of job search considers search efforts as a uniform activity within a framework of analyzing the determinants of the reservation wage (see, e.g., Mortensen, 1987, or van den Berg, 1994). Thus, the models explain rather job acceptance than job search. However, a number of studies have tried to consider the process of job search more explicitly. A first important analysis has been provided by Holzer (1988) who suggests a theoretical model that considers differences in productivity and costs of job search channels with an empirical application to unemployed youth in the US. In addition, Osberg (1993) characterizes the process of job search as an optimal choice from a system of alternatives conditional of individual circumstances of the job seeker and provides empirical evidence on different job search channels for Canada. Further studies are available for a number of countries; each of them considers more than one job search channel and some studies provide estimates on job search channels' effectiveness in addition. Examples to mention are Addison and Portugal (2002) for Portugal, Böheim and Taylor (2002) for the UK, and Weber and Mahringer (2008) for Austria. Other studies deal with certain aspects of the job search process only, like Kuhn and Skuterud (2004) on the effect of internet search on unemployment durations. Nevertheless, compared to the literature on job acceptance the empirical literature on job search is small. Empirical evidence for Germany is scarce and purely descriptive only, see, e.g., Gröhnke and Strasser (1997) or Brenke and Zimmermann (2007).

This paper aims to contribute to the existing literature in the following directions: First, we provide new and detailed evidence on the determinants of the choice of six different job search channels covering the public employment agency, recruitment agencies, direct applications, advertises in newspapers and journals, job search on the internet, and the social network. We

also consider job search intensity as the outcome of interest. Thus, we extent the scope of comparable studies by comprehensively regarding these job search channels in one single analysis. Second, knowing about the determinants of choice is useful to reveal some new insights about the self-selection of job seekers but knowledge of the relative success of the different job search channels will enable to answer the title question: "Which one to choose?" To do so, we estimate the job finding success conditional on the different job search channels. Here, we control for potential self-selection of the job seekers in the estimation. In addition, we consider the relative effectiveness of the job search channels with respect to socio-economic and workplace characteristics of the jobs obtained via the different job search channels. A further complication arises from the fact that differences may be expected between on-the-job and off-the-job search of job seekers with respect to possible job acceptance, but also with respect to the number and types job search channels used. However, if not distinguished in the empirical analysis the results for all job-seekers will provide "reduced form" estimates of the job search process. Thus, we focus on unemployed persons and provide evidence for off-the-job search. Besides this, we provide the first causal evidence using econometric methods for Germany since there exists no comparable study so far. The empirical analysis is based on panel data of the German Socio-Economic Panel for the years 1999 to 2006.

The paper is organized as follows. The next section reviews some stylized facts from the literature on job search methods and describes features of different job search channels and previous empirical findings. The econometric methods used to estimate the effects of the determinants of the choice of the job search channels as well as the success of the channels are introduced in section 3. The data used in the empirical analysis are presented with some additional descriptive statistics in section 4. Section 5 provides the empirical results of the two empirical questions. The final section concludes.

2 Job search methods

2.1 Some stylized facts

In much of the theoretical literature of job search, a particular emphasis is laid on the total effort that is devoted by the job seeker to find a job (see, e.g., Mortensen, 1987, or van den Berg, 1990, 1994). However, individual job search efforts are heterogenous. Persons looking for a job could, for example, contact friends and relatives, or other informal networks, respond to newspaper or internet advertisements, register at the public employment agency, or directly apply for a job at a potential employer. In that sense, Osberg (1993) compares job search to fishing. Like a fisherman's choice of lure and location or hours of fishing time, the job seeker chooses the job search methods and job search intensity presumably what he or she thinks is optimal under his or her own circumstances. Although the success of fishing as well as of job search depends on a stochastic process, concentrating on the outcome of job search in terms of

job acceptance may omit important aspects of the process of job search. The characteristics of this process may be determined by individual heterogeneity with respect to skills and resources and heterogeneity of job search channels and the related outcomes.

For ease of discussion, it is useful to categorize the different types of job search channels. Already Reid (1972) suggested the distinction between formal and informal job search. Formal job search comprises, for example, the use of the public employment agency, recruitment agencies, and responding to advertisements (in newspapers and journals). Informal job search relates to the use of informal networks, like friends and relatives, but also direct application for a job at potential employer. With regard to the different features of each of the job search channels, it is likely that channel's worth for employment differs across job seekers as well. Deeke (1991, p. 210) illustrates the situation with the following example: on the one extreme, for an unemployed top-manager, it may not be sensible to rely on the local public employment agency only when trying to get a new (and adequate) job, on the other extreme, reading advertisements in a nationwide newspaper may be useless for an unemployed low-skilled worker. Thus, job search channels differ in productivity and costs. Both factors have been emphasized by Holzer (1988) who provides a theoretical model on job search choices that is able to capture the productivity and cost differences between different types of job search channels. His results show that the most frequently used job search methods are also the most productive, and that the number of job search methods used is affected by factors that presumably reflect opportunities as well as resources, i.e. in particular the available income but also the need.

A number of empirical studies have analyzed the determinants of the choice of job search methods. Böheim and Taylor (2002) for the UK show, that besides the skill level of the individual, age and marital status but also the local labor market environment determine the set of individual choices. The local labor market environment given by the level of employment (see McGregor, 1983) or by the number of unemployed persons in the region (see Heath, 1999) influence the individual decisions on the choice of job search methods. Gender differences are relevant as shown by Bortnick and Ports (1992), Osberg (1993), and Heath (1999). In line with the theoretical literature, a number of studies exhibit that the intensity as well as the variety of job search activities depend on the duration of unemployment (see, e.g., Osberg, 1993, Schmitt and Wadsworth, 1993, or Brixy, Gilberg, Hess, and Schröder, 2002). A further aspect identified in the literature are immigrant-native differences in the choice and the use of job search channels, see, for example, Frijters, Shields, and Whitley-Price (2005) for the UK and Nivorozhkin, Romeu Gordo, Schöll, and Wolff (2006) for Germany.

Moreover, relying on a diversified strategy, i.e. combining a number of job search channels, raises the individual probability of employment and reduces the individual unemployment duration (see, e.g., Wielgosz and Carpenter, 1978, or Böheim and Taylor, 2002). However, the number of job search channels used differs across countries.[1] For Germany, Brenke and Zimmermann

[1]It should be noted that the obtained differences could be partly due to differences in the definition of job

(2007) report on average four job search channels per job seeker. For unemployed job seekers (in the empirical analysis below), we find on average three different job search channels per person. In the US (see Holzer, 1988) and the UK (see Gregg and Wadsworth, 1996, and Böheim and Taylor, 2002) job seekers use on average three different job search channels. In contrast, Addison and Portugal (2002) report only two job search channels for Portuguese job seekers on average. Clearly, the studies referred to rely on different periods of time and the situation may have changed meanwhile. Nevertheless, the studies that analyze the effects of job search channels on employment find positive effects of a higher search intensity represented by a higher number of job search channels used on the employment chances.

Generalizing the findings of the studies summarized so far or transferring the results to the case of Germany is limited for a number of reasons. First, there are a number of differences between labor markets across countries that affect the job search behavior of the individuals (see, e.g., Noll and Weick, 2002). These differences are caused, on the one hand, by differences in institutional settings. For example, the generosity of the unemployment benefits and welfare benefits systems in the US and in Germany clearly differs. On the other hand, there are differences, e.g., with respect to formal qualification (certified credentials) as a necessary requirement for many jobs and different laws of dismissal protection. In that sense, Germany's labor market may exhibit larger barriers to employment for job seekers than the US labor market. Hence, when comparing outcomes between countries these differences have to be regarded. Nevertheless, despite institutional differences between labor markets there are a number of analogies (and similarities) in job search that will be discussed in the following subsection.

2.2 Job search channels in Germany

For the interpretation of the empirical results below, it is useful to characterize the different job search channels in Germany. We will refer to similarities and differences with other countries in the discussion. In particular, we will differentiate the following job search channels: public employment agency, recruitment agency, advertisements in newspapers and on the internet (regarded separately in the empirical analysis below), social networks, and direct application.

Public employment agency. Job allocation services of the public employment agency provide an important job search channel for job seekers in many countries. A major reason for this is that entitlement to unemployment benefit requires registration of the unemployed job seekers at the public employment agency in most countries, and to actively search for employment with support of the agency.[2] For several countries, the relevance of the public employment

search channels. For example, whereas Heath (1999) considers only one channel of informal search covering direct applications and effects of social networks, Böheim and Taylor (2002) regard both aspects separately.

[2]Thomsen (2009) provides an overview on the effects and efficiency of job search assistance programs offered by the public employment agency for European countries.

agency in job search is confirmed by empirical studies, e.g., Holzer (1988) for the US, Osberg (1993) for Canada, Heath (1999) for Australia, Böheim and Taylor (2002) for the UK, Brenke and Zimmermann (2007) for Germany, or Weber and Mahringer (2008) for Austria. Despite its importance, the public employment agency seems to be relatively ineffective in providing successful job matches. Wielgosz and Carpenter (1987) for the US show that all other kinds of job search methods exhibit stronger positive effects; a similar picture is revealed for other countries, for example by Osberg (1993) and Böheim and Taylor (2002). With regard to Germany, Brenke and Zimmermann (2007) conclude from a descriptive analysis that although the public employment agency had been involved in job search in most cases there was only a minor impact on successful job matching. However, this finding results from a correlation only and provides no causal relationship. A possible reason for the disappointing picture may be the selection of individuals that look for employment via the public employment agency. Osberg (1993) - and similarly Weber and Mahringer (2008) - argue that contacting the public employment agency may be interpreted as an indicator of a lack of informal networks. In addition, Heath (1999) shows that engaging the public employment agency correlates positively with the local unemployment rate, i.e. the larger the unemployment rate the more likely are persons to search via the public employment agency. This finding is supported for Germany by Pischner, Schupp, and Wagner (2002) who report a larger involvement of the public employment agency in East Germany compared to West Germany. Furthermore, some authors argue (in line with the argumentation that job seekers engaging the public employment agency represent a particular selection) that job seekers who search for employment via the public employment agency are in particular hard-to-place individuals, i.e. persons possessing certain deficits that reduce the chances of finding a job. This provides a further explanation of the small success of this job search channel; for empirical evidence supporting this argument see, e.g., Reid (1972), Osberg (1993), Addison and Portugal (2002), and Blaschke (1987) and Grund (2001) for Germany.

Recruitment agency. In addition to the public employment agency, recruitment agencies (or private employment agencies) provide placement offers and job offers for job-seekers and actively search for jobs on behalf of their clients. In Germany, the public employment agency had possessed a monopoly until 1994 and recruitment agencies were prohibited by law. After that year, recruitment agencies have been established upon special permission; the latter restriction was relaxed in 2002. Nevertheless, despite its availability in Germany this job search channel is used rarely only. About one fifth of all job seekers in Germany consider recruitment agencies when looking for a job (Brenke and Zimmermann, 2007). In addition, their value for actual job matching is debatable, and Bellmann and Promberger (2003) argue that these agencies do no complement with the public employment agency. The low impact of recruitment agencies on the job search process also becomes evident from international studies, e.g., Bortnick and Ports (1992) or Osberg (1993). A reason for this may be that recruitment agencies provide quite specialized services, e.g., head hunters or executive search offices.

Advertisements in newspapers and on the internet. A commonly used job search channel in most countries is reading job advertisements. Whereas in the past, advertisements were published in newspapers and professional journals, the relevance of the internet has increased in recent years. Job advertisements could lead to successful job matches for better qualified persons (see Böheim and Taylor, 2002) but could be less effective for low-skilled persons or immigrants (see Frijters, Shields, and Whitley-Price, 2005, or Nivorozhkin, Romeu Gordo, Schöll, and Wolff, 2006); for the latter finding language deficits have been identified. Pischner, Schupp, and Wagner (2002) report for Germany that reading job advertisements on the internet was not very important for unemployed persons, and Kuhn and Skuterud (2004) provide evidence for the US that online job search has been no more effective than reading printed advertisements (during the years 1998 to 2000). They explain their findings that either internet job search is not effective or internet job searchers are negatively selected, i.e. they may have a lower level of informal contacts only. With regard to the relevance of the internet, the situation has changed over the last years. About five years later every second person looks for a job via the internet already in Germany (Brenke and Zimmermann, 2007). These persons are on average younger and better educated as reported by Grund (2006). However, Grund (2006) relates this positive selection of job seekers to the type of jobs advertised on the internet. Therefore, reinvestigation of the analysis and the conclusions of Kuhn and Skuterud (2004) is reasonable.

Social networks. The social network comprises contacts to relatives, friends and (former) colleagues. These informal contacts provide information that could be helpful for successful job search. Already Rees (1966) noted the value of social networks for job search; however, not every informal contact is helpful for finding a job but the size of the network matters. In that sense, a larger social network correlates positively with job placement (see, e.g., Habich, 1987). Furthermore, Granovetter (1995) shows that for the majority of persons who successfully found a job informal contacts played a crucial role. For long-term unemployed persons, Gregg and Wadsworth (1996) report that the size of the social network decreases with unemployment duration. For Germany, Blaschke (1987) notes that in particular persons with low tenure and a below intermediate education benefit from social networks. One reason is that these persons are looking for a job in a small geographic area. Social networks and informal contacts are also essential for successful job search of immigrants as the evidence by Frijters, Shields, and Whitley-Price (2005) for the UK and Drever and Spiess (2006) for Germany indicate. In contrast, better qualified persons are more likely to look for employment nationwide, and the value of social networks is therefore lower for that group.

Direct application. In contrast to the US or Canada where direct application for jobs as well as informal contacts are the most commonly used job search methods (see, e.g., Holzer, 1988, and Osberg, 1993), in Germany this job search channel is used more infrequently. Here,

Brenke and Zimmermann (2007) report that only about 30 percent of all job seekers consider direct applications as a means to find a new job. According to Heath (1999), direct applications could provide an effective tool for better educated persons in particular to signal their true skills and productivity; in contrast to that, direct application seem to be less effective for long-term unemployed persons (see Schmitt and Wadsworth, 1993). With regard to the employment chances, previous empirical studies establish positive effects of direct applications, for example Osberg (1993) for Canada and Böheim and Taylor (2002) for the UK.

3 Econometric methodology

The aim of this paper, on the one hand, is to empirically identify the determinants of several job search channels that unemployed job seekers use, and, on the other hand, to evaluate the effects of those different job search channels on the job chances, i.e. the effect of the job search channel on the successful transition of the job seeker to employment. In the empirical analysis, we distinguish six channels of job search: public employment agency, recruitment agency, advertisements in newspapers and journals, internet job search, social networks, and direct application to potential employers.

Choice of job search channel and search intensity

To estimate the probability of using a certain job search channel we apply a discrete choice model. The individual can choose between using the channel or not. For the estimation of the effects of the determinants, we further have to consider that the six channels are not mutually exclusive but individuals could choose a number of possible combinations. Therefore, we will estimate separate models for the distinct job search channels in a first step. To regard the comprehensive information provided by the panel data at hand (see below), we apply a random effects panel probit model (see Heckman, 1981, and Guilkey and Murphy, 1993).

The unobserved latent probability that individual i is choosing the job search channel C_j with $j = 1, \ldots, 6$ at time t is defined as

$$C^*_{ijt} = \mathbf{X}_{it}\beta_j + \varepsilon_{ijt} \tag{1}$$

where the observable choice of channel j for individual i at t is given by

$$\begin{aligned} C_{ijt} = 1 \quad &\text{if} \quad \mathbf{X}_{it}\beta_j + \varepsilon_{ijt} > 0, \\ C_{ijt} = 0 \quad &\text{if} \quad \mathbf{X}_{it}\beta_j + \varepsilon_{ijt} \leqslant 0. \end{aligned}$$

$\mathbf{X}_{it}$ is the vector of individual characteristics at time t that determines the probability of choice of channel C_j, the corresponding coefficient vector is given by β_j for channel j. The error term

could be decomposed into $\varepsilon_{ijt} = \eta_{ij} + \epsilon_{ijt}$ with distributions $\eta_{ij} \sim \mathcal{N}(0, \sigma_\eta^2)$ and $\epsilon_{ijt} \sim \mathcal{N}(0, \sigma_\epsilon^2)$. η_{ij} and ϵ_{ijt} are assumed to be mutually independent. ϵ_{ijt} is the random error. If we assume that η_{ij} is unrelated to the $\mathbf{X}_{it}$, the unobserved individual specific heterogeneity is captured by η_{ij}. To evaluate the contribution of that heterogeneity, we have to estimate the parameter $\rho = \sigma_\eta^2/(\sigma_\eta^2 + \sigma_\epsilon^2)$. Unobserved heterogeneity has to be regarded if the parameter estimate of ρ is statistically significant.

Besides analyzing the determinants of which channel to choose, there may also be differences in characteristics with respect to the number of channels used, i.e. the search intensity. The findings of the empirical studies summarized in section 2 indicate that a larger number of job search channels is positively correlated with job search success. To investigate the effects on the job search intensity, we estimate an ordered probit model on the pooled sample. The unemployed job seekers in our sample use at least one and at maximum six different job search channels; for that reason we define the unobserved latent search intensity S^* as

$$S_i^* = \mathbf{X}_i\beta + \varepsilon_i \tag{2}$$

with $S_i = 1$ if $S_i^* \leqslant \mu_1, S_i = 2$ if $\mu_1 < S_i^* \leqslant \mu_2, \ldots, S_i = 6$ if $\mu_5 < S_i^*$ and μ_k with $k = 1, \ldots, 5$ are the threshold parameters to be estimated. The error term is distributed $\varepsilon_i \sim \mathcal{N}(0, \sigma_\varepsilon^2)$.

Effects of job search channels on reemployment probability

Analyzing the effects of the job search channels on the employment chances is the second question we want to answer empirically. To do so, we use two different estimation approaches. First, we estimate a pooled probit model on the reemployment probability, $W_{i,t+1}^*$, in $t+1$ for an unemployed individual i in t conditional on the six job search channels, C_j, and a set of exogenous regressors, $\mathbf{X}$:

$$W_{i,t+1}^* = \mathbf{X}_{i,t}\beta + \sum_{j=1}^{6} C_{ij,t}\gamma_j + u_i \tag{3}$$

with $W_{i,t+1} = 1$ if $W_{i,t+1}^* > 0$ and $W_{i,t+1} = 0$ otherwise. The specification of the model in eq. 3 provides consistent estimates of the effects of the job search channels only if self-selection of job seekers into the different job search channels could be excluded. Given the heterogeneous characteristics of the job search channels, this assumption is likely to be violated. To consider possible selection bias in the estimation, we apply the classical selection correction suggested by Heckman (1979). In analogy to eq. 1 but for a pooled model, we estimate the choice probabilities for each of the job search channels in consideration, and calculate the inverse Mills ratio terms as $\lambda_{ij} = \phi(\mathbf{X}_i\beta_j)/\Phi(\mathbf{X}_i\beta_j)$. In the second step, we augment eq. 3 by the six estimated inverse Mills ratio terms in order to estimate the effects of the job search channels on the reemployment

probabilities[3]:

$$W^*_{i,t+1} = \mathbf{X}_{i,t}\beta + \sum_{j=1}^{6} C_{ij,t}\gamma_j + \sum_{j=1}^{6} \lambda_{ij}(\cdot) + u_i. \tag{4}$$

The estimates of the selection-corrected pooled probit model provide consistent parameter estimates of how much the use of a certain job search channel contributes to the reemployment probability in the subsequent period.

Second, we want to explore whether the different job search channels lead to different types of jobs. To answer this question, outcome and alternatives have to be combined. Given the large number of possible combinations we refrain from a complete permutation of all choices but consider a reduced set of four main channels only. In particular, we model the qualitative outcome Y of finding a job in $t+1$ as follows:

$$Y = \begin{cases} 1 & \text{job found via job center} \\ 2 & \text{job found via internet} \\ 3 & \text{job found via job advertisements} \\ 4 & \text{job found via social network} \end{cases} \tag{5}$$

In addition to the socio-economic variables, we will take account of job characteristics in the estimation. By doing so, we could not only identify who finds a job via which job search channel but also what type of jobs are found via this channel. One possible estimation approach is a mixed logit model, where individual as well as choice-related characteristics could be regarded simultaneously. However, consistence of the estimates may suffer from violation of the independence of irrelevant alternatives assumption. To overcome this problem, we estimate a multinomial probit model. In that model, the probability that a job is found via channel j is given by the probability that the utility of channel j is larger than of channel k with $j \neq k$:

$$U_{ij} = \mathbf{X}_i\beta + \mathbf{Z}_j\alpha + \nu_{ij} \tag{6}$$

and

$$Pr(Y_{ij}) = Prob(U_{ij} > U_{ik}, j = 1, \ldots, J; j \neq k). \tag{7}$$

$\mathbf{Z}_j$ is the vector of the characteristics of the job, and α is the corresponding coefficient vector. To estimate the model, one choice is used as the reference category. The distribution of the error term is given by a trivariate normal distribution.

[3]It should be noted that we do not include any further exclusion restrictions in the selection equation but rely on the non-linear functional form of the inverse Mills ratio terms to capture selection bias. Alternatively, Böheim and Taylor (2002) suggest the use of a control function approach where instead of the inverse Mills ratio the linear expectations of participation in a job search channel are used to augment the outcome equation.

4 Data and descriptives

4.1 Data

The empirical analysis is based on data from nine waves of the German Socio-Economic Panel (SOEP) for the years 1998 to 2006. Started in 1984, SOEP is a wide-ranging representative longitudinal study of almost 12,000 private households with more than 21,000 persons in Germany.[4] Besides others, SOEP provides detailed information about individual, household and job related characteristics. For the analysis at hand, we focus on the exploration of information of two different questions: To analyze the determinants of the different job search channels, we use information of a question that contains the individual job search activities during the last four weeks before the interview. In order to assess the value of a particular job search channel for a successful job match information from another question containing information about the job search channel that has been causal for employment is explored.

The choice of the waves used for the empirical analysis is related to the availability of these two questions in SOEP. To analyze the determinants of job search channels, we will use the waves from 1998 to 2006; although job search channels have been considered in SOEP before, internet job search has been recorded first in the wave of 1999. Due to the panel nature of the data, we could regard changes over time in the estimation. The second question that allows to analyze whether different job search channels are associated with different types of jobs is first available in the wave of 2003; therefore, the second part of the empirical analysis refers to the time period 2003 to 2006. For homogeneity reasons, we restrict our sample to unemployed persons. Hence, we focus on off-the-job search in the empirical analysis. In addition, only persons aged 18 to 65 years (at the date of the interview they have reported unemployment) are considered.

The explanatory variables used in the empirical analyses below have been chosen based on the findings from the literature (see section 2). To describe the individual situation, we take account of age (in classes), marital status, immigrant (foreigner), education (in years), qualification, and the net income. For education, low-educated persons without any schooling degree are assigned 7 years of education, or 9 years if they possess a CSE (*Hauptschule).* Intermediate schooling is given if the person has left school after 10 years (*Realschule*). To receive the highest school degrees, persons have to stay at school for 12 or 13 years (*Fachhochschule, Abitur*). In addition, times of professional or apprenticeship training are regarded in education with 50 percent of the actual duration.[5] Qualification refers to the professional degree of the individual; here, we distinguish between persons with university/university of applied sciences graduation, professional training (in the apprenticeship system) and no training. Since we consider unemployed persons only, we also take account of registration at the public employment

[4] See Haisken-DeNew and Frick (2005) and Wagner, Frick, and Schupp (2007) for a detailed description.

[5] The reason is that persons in apprenticeship training have to visit schools for about 50 percent of the time and are working for the remaining 50 percent.

agency and of long-term unemployment (for more than one year). As noted above, local labor market conditions may be important; we regard these conditions by including a dummy for East Germany. To take account of gender differences we conduct separate analyses for both gender.

To analyze which jobs are obtained by the different job search channels, the following job characteristics are incorporated in the estimation of the multivariate probit model. We take account of the size of the enterprize distinguishing small (1 to 19 employees), medium (20 to 199), large (200 to 1,999), and huge (more than 2,000) enterprizes. Moreover, we regard whether the employment contract is temporary only, whether the type of occupation is white-collar, and for how long the employee has to work per week (weekly working hours).

4.2 Descriptive statistics

As a starting point of the empirical investigation, we will first take a look on some selected descriptive statistics to describe the analysis' sample. Table 1 provides an overview on the shares of unemployed persons' choices of the six different job search channels considered for the years 2003 to 2006 and the average number of job search methods used. The data exhibit that the average unemployed job seeker uses about 3 job search channels. As becomes obvious, reading and replying to job advertisements in newspapers is the most commonly used method. In the pooled sample over the four years, almost 80 percent of the job seekers used this channel of job search. However, the results for the different years establish some dynamics in the use of job advertisements and shares are ranging from 70.21 percent (2004) to 77.53 percent (2005). Help from the public employment agency is received in about 75 percent of the cases; however, by comparing the responses in the different waves a decline in the use of this channel is observed (from 72.43 percent in 2003 to 64.70 percent in 2006). As mentioned above, the high share of unemployed persons looking for a job via the public employment agency is not surprising since receiving unemployment benefits requires registration at the public employment agency. Compared to these two channels, engaging the social network in job search is undertaken by a bit more than half of the job seekers (56.34 percent) but the importance of this channel tends to increase over the years. Responding to job advertises on the internet or actively looking for employment via the internet is regarded by about 44 percent of the job seekers; however, whereas in the wave of 2003 only about one third of the job seekers reported internet job search (34.19), the share has increased substantially to about 46.50 percent in 2006. The remaining job search channels - direct applications for employment and recruitment agencies - are used by about 23.94 percent and 17.79 percent of the job seekers only.

Include Table 1 about here

Who are the job seekers choosing the different job search channels? Before turning to the results of the econometric analyses, descriptive statistics of selected socio-economic characteristics of

the job seekers choosing the different job search methods are displayed in Table 2 for men and Table 3 for women.[6] The figures in the Tables exhibit some notable differences. Persons looking for a job on the internet or using direct applications are on average younger compared to those using help of the public employment agency, replying to newspaper advertisements or receiving help from the social network. Gender differences are slightly only but there occur some differences in the age patterns for the use of the public employment agency and recruitment agencies. Whereas the shares of aged men (51 to 61 years) are clearly smaller for both types of job search compared to young-aged and medium-aged men, the picture for women is reversed. Thus, older women do more often rely on those two job search methods compared to younger women.

Include Tables 2 and 3 about here

Differences could also be obtained by marital status. A higher share of unmarried persons (46.71 percent of males/47.21 percent of females) is looking for a job on the internet than of married persons (40.92/40.63 percent). Further differences are observable in the use of social networks for men; here, married men make use of informal contacts (61.59 percent) more often than unmarried men (56.17 percent). However, there may be further age effects underlying this descriptive comparison, e.g., age effects. Foreigners differ in job search from German nationals in a number of respects. Independently of gender, foreigners less often reply to job advertisements, search for jobs on the internet, engage recruitment agencies, or apply directly for jobs. In contrast, the share of persons using the social network in job search exceeds that of German nationals.

Persons looking for a job on the internet or directly applying for a job are on average better educated, whereas no educational differences could be obtained for job advertisements. In contrast, the better educated use the public employment agency less often than persons with an intermediate (apprenticeship training) or no professional degree. The results for average years of education and the average years of education support this picture. Registered unemployment plays a role with regard to the use of the public employment agency; the share is almost twice as high compared to non-registered job seekers. Finally, with regard to regional conditions no clear differences between East and West Germany in the choice of the job search methods could be revealed for men. However, West German women do less often (61.87 percent) engage the public employment agency compared to their East German counterfactuals (80.03 percent).

[6]Since choices are not mutually exclusive, the shares do not sum up to 100 percent.

5 Empirical results

5.1 Choice of job search channel and search intensity

To identify the determinants of the choice of the different job search methods, Tables 4 and 5 provide the estimates of the random effects probit models for each job search channel. Reported are the marginal effects on the predicted probability of a positive outcome. The results indicate that younger job seekers aged 18 to 30 years use the internet and direct applications significantly more often than persons in the reference group (aged 51 to 61) independently of gender. No significant differences with respect to age could be established for the use of job advertisements, recruitment agencies, and social network for men but women aged 31 to 50 reply to job advertisements more often than those older than 51 years. In addition, whereas the results exhibit no age effects in the use of the public employment agency for females, we find a positive effect for males aged 18 to 30 years. Cohabitation (including marriage) seems to be relevant for women in using the public employment agency only; for males and the other job search channels the parameter estimates of cohabitation reveal no significant effects.

Independently of gender, foreigners search for jobs on the internet less often than German nationals. In addition, foreign men have significant lower probabilities of using advertisements and direct applications in job search (the point estimates for women have a negative sign but are statistically insignificant). The findings in the literature (see, e.g., Frijters, Shields, and Whitley-Price, 2005) and the descriptive statistics above indicate the expectation of a positive effect of the use of the social network for foreigners. However, the estimates are positive but statistically insignificant; thus, the empirical estimates indicate a difference in the use of the social network for foreigners in Germany compared to the finding of Frijters, Shields, and Whitley-Price (2005) for the UK.

Include Tables 4 and 5 about here

No significant effect differences in qualification for men could be found using the public employment agency, reading job advertisements, incorporating a recruitment agency, or to directly apply for a job but there are strong effects of qualification with regard to job search on the internet and within the social network. Here, men who graduated from university/university of applied sciences have a 43 percentage points higher probability to use the internet and a 21 percentage point higher probability to engage the social network than men without professional training. For women, these clear differences could not be established but women with apprenticeship are clearly more likely to use the public employment agency (14.9 percentage points) or to directly apply for a job (12.8 percentage points) than women without professional training.

The type of unemployment is relevant for the choice of the job search channels as well. Registered unemployment at the public employment agency increases the probability of using nearly all job

search methods; exceptions are search on the internet and direct application for men, and using recruitment agencies and the social network for women. This finding indicates that registered unemployed persons tend to look more intensively for a job than non-registered unemployed persons. A straightforward explanation could be the requirement to actively look for work if entitled to unemployment benefits. These activities are monitored by the public employment agency. In addition, long-term unemployment also affects the choice of the different job search channels. As the figures of Table 4 indicate, long-term unemployed men use the internet, recruitment agencies, direct applications, and the social network less intensive than short-term unemployed persons. Significant negative estimates for women are found for internet and direct applications, too. Finally, no regional differences in the choice of job search channels could be established (East Germany vs. West Germany).

Besides analyzing the relevance of the determinants on the choice of each job search channel, we will take a look on the effects of the characteristics on the job search intensity. Table 6 provides the estimates of an ordered probit model regarding the number of job search channels used (from one to six). The results indicate that young and medium-aged job seekers use a higher number of job search channels compared to job seekers aged 51 to 65. Reasons may be the higher use of the internet and direct applications as the analysis of the choice of the job search channels reveals. Foreigners do not only have a reduced probability of using most of the job search channels (except social network) but incorporate a smaller number of job search channels compared to German nationals as well. A higher qualification exhibits a positive effect on the job search intensity. In the full sample, both graduation from university/university of applied sciences and apprenticeship shows a positive effect on job search intensity compared to no professional training. Distinction by gender obtains that the first effect is mainly driven by men, whereas the latter finding is determined by the effect for women. Finally, job search intensity does not differ between East and West Germany.

Include Table 6 about here

5.2 Effects of job search channels on reemployment probability

The second question we want to answer empirically is how much the different job search channels increase the employment probability, i.e. the channel-specific effectiveness of job search. Table 7 shows the employment probabilities in $t+1$ for unemployed job seekers using the respective job search method in t. In addition, the employment probabilities in $t+1$ with respect to the number of job search channels used in t (search intensity) are provided. As becomes obvious, employment probabilities in the subsequent period differ across job search channels; independently of gender, the lowest probabilities are given for the use of the public employment agency (37.67 percent for males/38.60 percent for females), the largest probabilities are found for direct applications (50.00/50.90). With regard to the job search intensity, using a larger number of job search

channels and employment probability are positively correlated. However, using one or two channels seems to make no difference, but using three, four, or five channels is associated with increasing employment probabilities. Interestingly, for job seekers reporting to use all six channels of job search considered here, the employment probabilities in the subsequent period are smaller than that of job seekers using five channels (except for women).[7]

Include Table 7 about here

As outlined in section 3, estimation of the channel-specific employment probabilities has to take account of potential self-selection into the different job search channels. Therefore, we apply a selection-corrected model with channel-specific correction terms. The results are given in Table 8. Directly applying for a job at a potential employer clearly increases the employment probability in the subsequent period by 9.2 percentage points. Gender differences are small with an increase of 8.9 percentage points for men and 9.7 percentage points for women. Positive effects of direct contacts to employers are established by studies for other countries as well, see, e.g., Böheim and Taylor (2002), Osberg (1993), or Addison and Portugal (2002). In addition, searching for a job on the internet exhibits a positive effect; it increases the employment probability by 4.8 percentage points in the full sample. When distinguishing men and women explicitly, the estimate is still positive but - unfortunately - not statistically significant. This finding contradicts the results and implications of internet job search of Kuhn and Skuterud (2004) who analyzed the effects of job search on the internet for the US. Obviously, one possible reason may be that internet job search has become more common until 2006 than it has been in the years 1998 to 2000 that were analyzed by Kuhn and Skuterud (2004). Nevertheless, given the seminal character of the former result, the new evidence revealed here is important for the knowledge of internet job search effectiveness.

However, not all types of job search channels are effective. Using the public employment agency in job search has a significant negative effect for men. The employment probability decreases by 8.3 percentage points. This finding is rather disappointing since it indicates that the public employment agency is not only ineffective but harmful in terms of successfully placing job seekers. Fortunately, women do not suffer from using the public employment agency. Poor outcomes of job search via the public employment agency have also been reported for other countries, e.g., Wielgosz and Carpenter (1987) for the US, Osberg (1993) for Canada, or Böheim and Taylor (2002) for the UK. Since the estimation controls for job seeker characteristics, the obtained ineffectiveness is due to public employment agency-specific effects. On the one hand, we could think of capacity or capability problems of the staff. On the other hand, there may be a negative selection of jobs offered by the public employment agency. This aspect will

[7] A possible explanation for this finding may be that the marginal contribution of an additional job search channel is decreasing.

be investigated below. For the remaining job search channels no significant effects on the employment probability are obtained.

Include Table 8 about here

The effect of job search intensity on the job finding probability is provided by Table 8 as well. The corresponding parameter estimate shows a statistically significant positive effect. Hence, using one additional job search channel increases the job finding probability by 2.4 percentage points. This positive effect is in line with empirical studies for other countries, e.g., Holzer (1988), Gregg and Wadsworth (1996), and Böheim and Taylor (2002). Distinction by gender shows a stronger effect for females (3.0 percentage points) and a positive but insignificant effect for males (1.8 percentage points).

Finally, we want to explore which individual and job characteristics affect the success of the job search channels on finding a job. To do so, we explore data of a different question in SOEP providing information on the job search channel that was causal for a successful job match. The results obtained from a multinomial probit model for the four main job search channels are provided as marginal effects in Table 9.[8] The marginal effects indicate a change in the probability of success in the respective channel in comparison to the other three job search channels considered.

Include Table 9 about here

A first thing to note is that women have a lower probability to find a job via the social network compared to men. With regard to the other job search channels, no significant effects could be established but women tend to benefit more from the public employment agency than men. Referring to the age effects indicates that younger and medium-aged job seekers experience a lower probability of finding a job via the public employment agency compared to persons over 51 years. In contrast to that, the effects for internet and advertisements indicate a reverted relationship but are statistically insignificant. Persons living with a partner (cohabitation) profit from the social network but it decreases the probability to find a job via the public employment agency.

For long-term unemployed persons, registered unemployed persons, and persons living in East Germany there are positive effects of finding a job via the public employment agency compared to the other job search channels. Long-term unemployed persons and registered unemployed persons are even less likely to find a job via any of the other job search channels. In contrast, in East Germany persons have a lower probability to obtain a job from advertisements published

[8] Unfortunately, due to the smaller number of observations for each channel we could not conduct a separate analysis by gender. Additional descriptive statistics are given in Table A.1 in the Appendix.

in newspapers and journals. For foreigners as well as with respect to education no differences in success probabilities could be obtained.

What types of jobs are found via the different job search channels? If successful, the public employment agency leads with a clearly higher probability to jobs with temporary employment contracts only; in contrast to that, temporary employment contracts are less likely when the job match results from advertisements or the social network. Advertised jobs are, furthermore, more likely to result in white-collar occupations. On the other hand, jobs provided by the social network are more probable to be blue-collar occupations. Finally, jobs obtained from the different job search channels differ slightly in weekly working hours but differences are small.

6 Conclusion

In this study, we have empirically analyzed the job search process of unemployed job seekers in Germany. The determinants of the choice of various formal and informal job search methods, the job search intensity, and the value of the use of the job search channels in terms of finding a job have been in focus of this study. Since we have restricted the study to unemployed job seekers only, we are able to derive meaningful conclusions for off-the-job search. The empirical analysis has been based on data from SOEP that enable consideration of characteristics of the individual and the workplace.

The empirical results indicate that replying to advertisements in newspapers and journals, and using the public employment agency are the two most common job search methods of unemployed job seekers, while the individuals use about three different job search channels on average. However, internet job search but also direct application at potential employers have become more important as methods of choice. In 2006, nearly every second unemployed job seeker was looking for a job on the internet already. The choice of the job search channels depends on a number of socio-economic characteristics; younger and better qualified persons are more likely to search for a job on the internet or to directly apply at a potential employer, and are more active with regard to the number of job search channels used. In contrast, foreigners rely on a smaller number of job search channels compared to German nationals; in addition, direct application or using the internet are not very common job search methods of foreigners.

With regard to the effectiveness of the different job search methods direct applications to potential employers and the use of the internet significantly increase the employment chances. Moreover, increasing the job search intensity in terms of encompassing a number of different job search channels exhibits a positive effect on the employment probability. In contrast, engaging the public employment agency in job search reduces the employment chances for men. This is a disappointing finding given the large reforms of the German public employment agency during the last decade. Success of job search channels differ with respect to individual characteristics but also with respect to the jobs obtained from the channels. Here, jobs provided

by the public employment agency are mainly for low-qualified individuals (blue-collar workers) and offer temporary employment contracts only.

References

Addison, J. T., and P. Portugal (2002): "Job search methods and outcomes," *Oxford Economic Papers*, 54(3), 505–533.

Bellmann, L., and M. Promberger (2003): "Private Arbeitsvermittlung gestern und heute - eine Alternative zum Arbeitsamt?," *Arbeit und Beruf*, 54(9), 298–300.

Böheim, R., and M. P. Taylor (2002): "Job search methods, intensity and success in Britain in the 1990s," Economics working papers, 2002-06, Johannes Kepler University Linz, Austria.

Blaschke, D. (1987): "Erfolgswege zum neuen Arbeitsplatz. Wie Beschäftigte, die den Arbeitgeber wechselten, ihre neue Stelle fanden.," *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung*, 20, 164–180.

Bortnick, S., and M. Ports (1992): "Job search methods and results: tracking the unemployed," *Monthly Labor Review*, 115, 29–35.

Brenke, K., and K. Zimmermann (2007): "Erfolgreiche Arbeitssuche weiterhin meist über informelle Kontakte und Anzeigen," *Wochenbericht des DIW*, 20, 325–331.

Brixy, U., R. Gilberg, D. Hess, and H. Schröder (2002): "Was beeinflusst den Übergang von der Arbeitslosigkeit in die Erwerbstätigkeit," IAB-Kurzbericht 01/2002, IAB, Nuremberg.

Deeke, A. (1991): *Informelle Beziehungen auf dem Arbeitsmarkt: Marktregulierung und Chancenverteilung durch Arbeitsvermittlung*. Campus Verlag, Frankfurt a.M., New York.

Drever, A. I., and C. K. Spiess (2006): "Netzwerke sind bei der Stellenfindung von Migranten bedeutend," *DIW Wochenbericht*, 73(21), 327–331.

Frijters, P., M. A. Shields, and S. Whitley-Price (2005): "Job search methods and their success: a comparison of immigrants and natives in the UK," *The Economic Journal*, 115(507), 359–376.

Granovetter, M. S. (1995): *Getting a job: a study of contacts and careers*. Harvard University Press, Cambridge, 2 edn.

Gregg, P., and J. Wadsworth (1996): "How effective are state employment agencies? Jobcentre use and job matching in Britain," *Oxford Bulletin of Economics and Statistics*, 58(3), 443–467.

Gröhnke, K., and H. Strasser (1997): "Die Arbeitsplatzsuchstrategien von Arbeitslosen. Forschungsprojekt Langzeitarbeitslosigkeit," Duisburger Beiträge zur soziologischen Forschung 5/1997, Gerhard-Mercator-University of Duisburg.

Grund, C. (2001): "Zum Signalcharakter unterschiedlicher Wege der Stellenfindung," *Die Betriebswirtschaft*, 61, 519–529.

——— (2006): "Mitarbeiterrekrutierung über das Internet - Marktanalyse und empirische Untersuchung von Determinanten und Konsequenzen für die Arbeitnehmer," *Zeitschrift für Betriebswirtschaft*, 76, 451–472.

Guilkey, D., and J. Murphy (1993): "Estimation and testing in the random effects probit model," *Journal of Econometrics*, 59, 301–317.

Habich, R. (1987): "Wege der Stellenfindung und berufliche Platzierung," in *Empirische Befunde aus dem Sozioökonomischen Panel: Arbeitsmarktbewegung als sozialer Prozess*, ed. by A. Deeke, J. Fischer, and U. Schlimm-Garling, pp. 143–173. Paderborn.

Haisken-DeNew, J., and J. Frick (2005): "Desktop companion of the German Socio-Economic Panel," Companion, DIW, Berlin.

Heath, A. (1999): "Job-search methods, neighbourhood effects and the youth labour market," Research discussion paper 1999-07, Reserve Bank of Australia.

Heckman, J. (1979): "Sample selection bias as a specification error," *Econometrica*, 47, 153–161.

——— (1981): "Statistical models for discrete panel data," in *Structural analysis of discrete data with econometric applications*, ed. by C. Manski, and D. McFadden. MIT Press, Cambridge, MA.

Holzer, H. J. (1988): "Search method use by unemployed youth," *Journal of Labor Economics*, 6(1), 1–20.

Kuhn, P., and M. Skuterud (2004): "Internet job search and unemployment durations," *American Economic Review*, 94(1), 218–232.

McGregor, A. (1983): "Neighbourhood influence on job search and job finding methods," *British Journal of Industrial Relations*, 21(1), 91–99.

Mortensen, D. (1987): "Job search and labor market analysis," in *Handbook of Labor Economics*, ed. by O. Ashenfelter, and R. Layard, pp. 849–919. Elsevier-North Holland, New York.

Nivorozhkin, A., L. Romeu Gordo, C. Schöll, and J. Wolff (2006): "Arbeitssuche von Migranten. Deutschkenntnisse beeinflussen Suchintensität und Suchwege," IAB-Kurzbericht 25/2006, IAB, Nuremberg.

Noll, H.-H., and S. Weick (2002): "Informelle Kontakte für Zugang zu Jobs wichtiger als Arbeitsvermittlung - Prozesse der Arbeitssuche und Stellenfindung im europäischen Vergleich," in *Sozialberichterstattung, gesellschaftliche Trends, aktuelle Informationen*, vol. 28 of *Informationsdienst Soziale Indikatoren*, pp. 6–10, Mannheim. ZUMA.

Osberg, L. (1993): "Fishing in different pools: job-search strategies and job-finding success in Canada in the early 1980s," *Journal of Labor Economics*, 11(2), 348–386.

Pischner, R., J. Schupp, and G. G. Wagner (2002): "Arbeitsvermittlung durch das Arbeitsamt: Reform des Berichtssystems dringend erforderlich," *DIW Wochenbericht*, 9, 145–152.

Rees, A. (1966): "Information networks in labor markets," *American Economic Review*, 56, 559–566.

Reid, G. L. (1972): "Job search and the effectiveness of job finding methods," *Industrial and Labor Relations Review*, 25(4), 479–495.

Schmitt, J., and J. Wadsworth (1993): "Unemployment benefit levels and search activity," *Oxford Bulletin of Economics and Statistics*, 55(1), 1–24.

Thomsen, S. (2009): "Job search assistance programs in Europe: evaluation methods and recent empirical findings," FEMM-Discussion Paper 09-18, University of Magdeburg.

van den Berg, G. J. (1990): "Nonstationary job search theory," *Review of Economic Studies*, 57, 255–277.

——— (1994): "The effects of changes of the job offer arrival rate on the duration of unemployment," *Journal of Labor Economics*, 12(3), 478–498.

Wagner, G. G., J. R. Frick, and J. Schupp (2007): "The German Socio-Economic Panel Study (SOEP) - scope, evolution and enhancements," *Schmollers Jahrbuch*, 127(1), 139–169.

Weber, A., and H. Mahringer (2008): "Choice and success of job search methods," *Empirical Economics*, 35, 153–178.

Wielgosz, J., and S. Carpenter (1987): "The effectiveness of alternative methods of searching for jobs and finding them," *American Journal of Economics and Sociology*, 46(2), 151–164.

Tables

Table 1: Job search methods used by unemployed persons (percentages, 2003 to 2006 and pooled sample)

Search Method	Year				Pooled
	2003	2004	2005	2006	
public employment agency	72.43	68.61	67.19	64.79	74.58
job advertisements (newspapers etc.)	70.34	70.21	77.53	73.87	79.83
internet job search	34.19	38.24	41.69	46.50	43.89
recruitment agency	16.54	18.61	13.26	16.81	17.79
social networks	44.85	44.86	58.54	57.79	56.34
direct application	16.05	24.54	24.38	22.21	23.94
Avg. number of job search methods					2,96

Note: Persons could choose multiple job search channels; observations n = 3,108; no distinction by gender.

Table 2: Descriptive statistics of selected characteristics (males, by job search method)

	public employment agency	advertisements	internet job search	recruitment agency	social network	direct application
age groups						
18 - 30 years	80.15	74.51	52.21	19.36	54.66	27.21
30 - 50	80.87	78.64	41.81	19.13	61.86	27.52
51 - 65	76.11	78.47	38.94	15.93	56.64	16.52
avg. age (in years)	39.53	40.05	38.59	39.32	40.05	37.87
cohabitation (including marriage)						
yes	78.35	76.96	40.92	18.85	61.59	21.79
no	80.73	77.96	46.73	18.14	56.17	27.83
foreigner						
yes	80.68	70.45	28.98	15.91	66.48	18.18
no	79.46	78.41	45.95	18.82	57.72	25.86
qualification						
univ./univ. of appl. sciences	60.00	80.00	80.00	20.00	70.00	50.00
apprenticeship	85.51	81.16	62.32	27.54	53.62	30.43
no professional qualification	79.59	77.27	42.58	18.02	58.83	24.35
avg. years of education	11.19	11.44	12.05	11.64	11.28	11.72
monthly net earnings (in Euro)	1,721.75	1,762.72	1,901.12	1,792.93	1,749.54	1,858.19
long-term unemployed						
yes	81.47	75.36	33.63	15.83	55.04	20.32
no	78.51	78.72	50.00	20.02	60.90	27.67
registered unemployment						
yes	83.18	78.19	42.89	19.06	59.42	24.98
no	40.00	69.60	56.00	12.00	51.20	24.80
region						
East Germany	81.22	77.16	45.41	19.46	58.11	24.86
West Germany	78.05	77.79	42.60	17.53	59.35	25.06
Total	79.60	77.48	43.97	18.48	58.74	24.97

Note: Job search channels are not mutually exclusive; observations n = 1,510.

Table 3: Descriptive statistics of selected characteristics (females, by job search method)

	public employment agency	advertisements	internet job search	recruitment agency	social network	direct application
age groups						
18 - 30 years	67.26	78.87	56.85	15.48	49.40	27.98
30 - 50	69.66	84.04	43.34	17.76	54.33	23.26
51 - 65	73.10	79.43	31.33	17.09	58.23	16.77
avg. age (in years)	40.60	40.31	38.36	40.74	40.94	38.62
cohabitation (including marriage)						
yes	63.72	81.98	40.63	17.53	54.66	20.56
no	76.39	82.10	47.21	16.73	53.44	25.55
foreigner						
yes	58.27	73.38	26.62	14.39	58.27	18.71
no	70.94	82.86	45.44	17.41	53.67	23.37
qualification						
univ./univ. of appl. sciences	41.18	76.47	76.47	17.65	35.29	41.18
apprenticeship	89.39	81.82	63.64	21.21	56.06	42.42
no professional qualification	69.31	82.11	42.57	16.96	54.19	21.91
avg. years of education	11.46	11.63	12.19	11.60	11.54	11.95
monthly net earnings (in Euro)	1,734.21	1,852.07	1,948.45	1,789.88	1,792.16	1,891.34
long-term unemployed						
yes	79.90	81.63	36.05	18.37	54.07	18.54
no	64.15	82.27	48.19	16.45	54.06	25.47
registered unemployment						
yes	81.52	83.63	44.81	18.15	54.70	24.88
no	30.22	76.65	40.38	13.74	51.92	16.48
region						
East Germany	80.03	81.88	46.36	16.41	53.35	24.11
West Germany	61.87	82.16	41.81	17.73	54.63	22.07
Total	69.84	82.04	43.80	17.15	54.07	22.97

Note: Job search channels are not mutually exclusive; observations n = 1,598.

Table 4: Random effects probit estimates of choice of search methods (marginal effects, males)

	public employ-ment agency	adver-tise-ments	internet	recruit-ment agency	direct applica-tion	social network
age (ref. group. 51- 65)						
18-30	0.070**	-0.063	0.184**	0.036	0.103*	-0.031
31-50	0.044	0.001	0.061	0.026	0.143***	0.063
cohabitation (incl. marriage)	-0.016	-0.026	-0.023	0.022	-0.035	0.033
foreigner	0.025	-0.090*	-0.290***	-0.022	-0.097***	0.099
qualification (ref. group: no professional training)						
univ./univ. of appl. sciences	0.036	0.031	0.429***	0.033	0.228	0.206*
apprenticeship	0.016	0.037	0.183	0.069	0.021	-0.097
long-term unemployed	0.006	-0.038	-0.172***	-0.039*	-0.054**	-0.133***
registered unemployment	0.481***	0.091**	-0.102	0.070***	0.045	0.149**
East Germany	0.015	-0.026	0.044	0.020	-0.002	-0.002
log. net earnings	-0.017	0.009	0.115**	-0.012	0.030	0.019
observations	1,510	1,510	1,510	1,510	1,510	1,510
log-likelihood	-696.84	-756.23	-895.69	-700.6	-784.47	-942.8
χ^2	93.72***	30.26***	66.45***	17.44	39.87***	60.34***
χ^2 $(\rho = 0)$	7.42***	55.88***	171.15***	24.61***	75.25***	94.07***

Notes: Dependent variable is choice of job search method. Year dummies have been regarded in the estimation but effects are not displayed here. Significance is indicated as follows: *** denoting the 1 %, ** the 5 % and * the 10% level.

Table 5: Random effects probit estimates of choice of search methods (marginal effects, females)

	public employ-ment agency	adver-tise-ments	internet	recruit-ment agency	direct applica-tion	social network
age (ref. group. 51- 65)						
18-30	0.036	0.012	0.386***	0.006	0.098**	-0.104
31-50	0.030	0.049*	0.201***	0.016	0.077***	-0.320
cohabitation (incl. marriage)	-0.072**	-0.016	-0.083	0.014	-0.034	0.026
foreigner	-0.038	-0.083	-0.234***	-0.028	-0.040	0.223
qualification (ref. group: no professional training)						
univ./univ. of appl. sciences	-0.231	-0.065	0.287	0.052	0.149	-0.199
apprenticeship	0.149***	-0.005	0.089	0.058	0.128**	0.086
long-term unemployed	-0.014	-0.000	-0.105**	0.015	-0.087***	-0.034
registered unemployment	0.560***	0.069**	0.142***	0.034	0.105***	0.014
East Germany	0.049	-0.019	0.080	-0.027	0.017	-0.014
log. net earnings	-0.007	0.027	0.121***	-0.021	0.007	-0.050
observations	1,598	1,598	1,598	1,598	1,598	1,598
log-likelihood	-788.70	-697.17	-964.71	-704.70	-803.65	-1052.77
χ^2	178.19***	24.59***	73.61***	15.53	56.16***	40.95***
χ^2 $(\rho = 0)$	22.18***	74.86***	133.85***	36.74***	44.23***	56.25***

Notes: Dependent variable is choice of job search method. Year dummies have been regarded in the estimation but effects are not displayed here. Significance is indicated as follows: *** denoting the 1 %, ** the 5 % and * the 10% level.

Table 6: Ordered probit results for job search intensity

	Total	Females	Males
female	-0.029		
age (reference group: 51-65)			
18-30	0.137**	0.204**	0.083
31-50	0.177***	0.196***	0.170**
cohabitation (including marriage)	-0.047	-0.046	-0.043
foreigner	-0.246***	-0.260***	-0.235**
qualification (reference group: No professional training)			
university/university of applied sciences	0.347**	0.051	0.534**
apprenticeship	0.225**	0.294**	0.161
long-term unemployed	-0.274***	-0.251***	-0.302***
registered unemployment	0.693***	0.745***	0.560***
East Germany	0.026	0.031	0.013
log. net income	0.045	0.028	0.066
threshold parameters			
μ_1	-0.319	-0.396	-0.264
μ_2	0.483	0.464	0.479
μ_3	1.222	1.198	1.226
μ_4	1.971	1.929	2.003
μ_5	2.773	2.83	2.717
observations	3,108	1598	1,510
pseudo R^2	0.026	0.032	0.019
log-likelihood	-4,962.97	-2,510.94	-2,442.31
(χ^2)	(259.36)	(166.27)	(95.57)

Note: Table provides coefficient estimates. Dependent variable is the number of job search methods used. Year dummies are regarded in the estimation but results are not displayed here. Significance is indicated as follows: *** denoting the 1%, ** the 5% and * the 10% level.

Table 7: Employment probabilities at $t+1$ (in %) by job search methods at t and by job search intensity at t

	Search method used in t			Number of job search channels used in t			
	Total	Males	Females	No.	Total	Males	Females
publ. empl. agency	38.11	37.67	38.60	1	34.80	32.68	36.51
advertisement	40.39	40.16	40.60	2	34.22	35.42	33.23
internet	47.11	46.68	47.52	3	38.24	36.55	39.94
recruitment agency	39.57	40.19	38.92	4	42.92	42.80	43.05
social network	40.95	41.19	40.70	5	53.15	55.56	50.88
direct application	50.44	50.00	50.90	6	48.48	41.86	60.87
Observations	2,368	1,153	1,215		2,368	1,153	1,215

Note: Employment comprises full-time, part-time and marginal employment, and apprenticeship training.

Table 8: Probit estimates of the probability of employment at $t+1$ given unemployed at t (marginal effects)

	Total	Males	Females	Total	Males	Females
advertisements	0.010	0.008	0.012			
publ. empl. agency	-0.034	-0.083**	0.005			
recruitment agency	-0.023	-0.032	-0.004			
internet	0.048**	0.048	0.043			
direct application	0.092***	0.089**	0.097***			
social network	0.022	0.031	0.010			
search intensity				0.024***	0.018	0.030**
Selection-correction terms						
λ_1 (advertisements)	-0.845	-0.287	-1.980	-0.880	-0.372	-2.125
λ_2 (publ. empl. agency)	0.226	-0.230	0.494	0.227	-0.162	0.437
λ_3 (recruitment agency)	-11.654**	-5.414	-9.176	-12.601**	-6.750	-9.729
λ_4 (internet)	0.031	-0.006	0.161	0.055	0.013	0.225
λ_5 (direct application)	0.853	0.379	1.447	1.045	0.763	1.460
λ_6 (social network)	-0.029	-0.125	0.735	-0.108	-0.100	0.728
observations	2,368	1,153	1,215	2,368	1,153	1,215
log-likelihood	-1,436.31	-694.80	-735.01	-1,444.32	-701.49	-737.56
χ^2	301.16***	152.84***	161.25***	285.14***	139.45***	156.16***
pseudo R^2	0.095	0.099	0.099	0.09	0.090	0.096

Note: Employment (full-time, part-time and marginal employment, and apprenticeship training). Control variables: age, age squared, gender, jobless reported, foreigner, cohabitation (including marriage), long-term unemployed, university/university of applied sciences, apprenticeship, East Germany, log net earnings, and year dummies. Significance is indicated as follows: *** denoting the 1 %, ** the 5 % and * the 10 % level. Employment is coded 1 if individual unemployed at t is employed at time $t+1$, and = 0 otherwise.

Table 9: Multinomial Probit estimates (marginal effects)

	public employment agency (n=338)	internet (n=62)	advertisements (n=234)	social network (n=523)
individual characteristics				
female	0.051	0.010	0.010	-0.072*
age (ref. group: 51- 65)				
18 - 30	-0.147***	0.054	0.007	0.085
31 - 50	-0.100**	0.061**	0.058	-0.018
cohabitation (including marriage)	-0.114***	-0.010	-0.008	0.132***
foreigner	0.037	-0.006	-0.027	-0.004
years of education	-0.002	0.001	-0.001	0.002
long-term unemployed	0.118*	-0.018*	-0.056	-0.044
registered unemployment	0.223***	-0.022*	-0.037	-0.164***
East Germany	0.090***	-0.002	-0.120***	0.032
job characteristics				
temporary employment contract	0.229***	-0.005	-0.093***	-0.131***
white-collar	-0.046	0.008	0.134***	-0.096**
firm size	-0.001	0.007	0.005	-0.011
weekly working hours	0.006***	0.002***	-0.001	-0.006***
observations	1,157			
log-likelihood	-1,159.29			
χ^2	344.37			

Note: Year dummies have been regarded in the estimation but effects are not displayed here. Significance is indicated as follows: *** denoting the 1 %, ** the 5 % and * the 10 % level.

A Appendix

Table A.1: Means of selected variables for successful job search by job search channels

	public employment agency (n=338)	internet (n=62)	advertisements (n=234)	social network (n=523)
individual characteristics				
female	0.50	0.55	0.69	0.62
cohabitation (including marriage)	0.50	0.45	0.60	0.63
foreigner	0.10	0.10	0.13	0.16
years of education	11.63	12.91	11.96	11.67
age (in years)	39.46	35.66	36.77	36.8
East Germany	0.59	0.40	0.21	0.34
long-term unemployed	0.10	0.02	0.05	0.07
registered unemployment	0.87	0.58	0.52	0.52
job characteristics				
temporary employment contract	0.65	0.39	0.27	0.32
white-collar	0.36	0.58	0.60	0.39
firm size	1.98	2.15	1.88	1.81
weekly working hours	37.68	39.57	29.05	28.27