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Which One to Choose?

Evidence on the Choice and Success of Job Search Methods*

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Abstract

This paper empirically investigates the determinants of the choice of six different job search channels and the job search intensity, and the resulting success in terms of employment uptake of the job seeker. The channels comprise the public employment agency, advertisements in newspapers and journals, internet job search, recruitment agencies, direct applications, and personal contacts. In line with the findings for other countries, the results show that consideration of a larger number of channels raises the employment chances. The estimates of the determinants exhibit specific patterns for the choice of the single channels and the level of search intensity. The results of success of the job search channels reveal that the public employment agency is ineffective and harms the employment chances of the unemployed job seekers. In contrast, direct applications for jobs increase the employment chances.

Zusammenfassung

In dieser Arbeit werden die Determinanten für die Auswahl von sechs Wegen der Arbeitsuche sowie die der Suchintensität empirisch analysiert und der dazugehörige Arbeitsmarkterfolg in Bezug auf die Aufnahme einer Beschäftigung untersucht. Die sechs unterschiedenen Wege umfassen die Suche über die Arbeitsagentur, Anzeigen in Zeitungen und Zeitschriften, das Internet, private Arbeitsvermittler, Initiativbewerbungen und persönliche Kontakte. In Übereinstimmung mit den Ergebnissen für andere Länder zeigt sich, dass die Berücksichtigung einer größeren Zahl von Suchwegen die Beschäftigungschancen erhöht. Die geschätzten Effekte für die Determinanten zeigen spezifische Muster im Hinblick auf die einzelnen Suchwege sowie für die Suchintensität. Aus den Ergebnissen des Arbeitsmarkterfolgs wird deutlich, dass die Einschaltung der Arbeitsagentur vergleichsweise ineffektiv im Hinblick auf die Beschäftigungschancen ist. Initiativbewerbungen erhöhen die Beschäftigungschancen dagegen deutlich.

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1. Introduction

The variety of different job search channels job seekers can access includes, 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. For a number of reasons, identifying differences in the choice, but also in the effectiveness of different job search channels is an important empirical question. 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 via the public employment agency may become possible. In addition, job search on the internet has been established as a new pathway during the last decade; it has been rarely regarded in the empirical investigation of the job search process so far.

Despite the variety of job search channels persons can use 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. Osberg (1993) characterizes the process of job search as an optimal choice from a system of alternatives conditional on individual circumstances of the job seeker; he provides empirical evidence on different job search channels for Canada. There exists a small number of further studies for other countries studying different job search channels and job search intensity. Examples are Addison / Portugal (2002) for Portugal, Böheim / Taylor (2002) for the UK, and Weber / Mahringer (2008) for Austria. For Germany, the available empirical evidence is purely descriptive, see, e.g., Gröhnke / Strasser (1997) or Brenke / Zimmermann (2007). Further studies deal with certain aspects of the job search process only, like Kuhn / Skuterud (2004) who address the effect of internet job search on unemployment durations. Nevertheless, compared to the literature on job acceptance the empirical literature on job search is still small.

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 from the job seeker's perspective, covering the public employment agency, recruitment agencies, direct applications, advertises in newspapers and journals, job search on the internet, and personal contacts. Thus, we extent the scope of comparable studies by comprehensively regarding these job search channels in one single analysis.

Moreover, we also regard the job search intensity as the outcome of interest. Second, knowing about the determinants of choice is useful to reveal some new insights about the selection of job seekers, but knowledge of the relative success of the different job search channels will answer the title question: "Which one to choose?", To do so, we estimate the job finding success with respect to the different job search channels. In addition, we analyze 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. We provide new empirical evidence for Germany based on panel data of the German Socio-Economic Panel Study (SOEP) for the years 1998 to 2008. Since differences may be expected between on-the-job and off-the-job search with respect to possible job acceptance, but also with respect to the number and types of job search channels used, we focus on unemployed persons and provide evidence for off-the-job search in this paper.

The remainder of 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 data used in the empirical analysis are presented with some additional descriptive statistics in section 3. The econometric methods used to estimate the effects of the determinants of choice as well as the success of the channels are introduced in section 4. Section 5 presents the empirical results of the two empirical questions. The final section concludes.

2. Job Search Methods

2.1 Job Search Channels

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 a potential employer. In line with this distinction, we will use a more detailed classification of job search channels for the case at hand and distinguish the following six categories.

The first channel is the use of the public employment agency. Job allocation services of the public employment agency provide an important job search channel for (unemployed) job seekers in many countries.[1] A major reason for this is that entitlement to unemployment benefits requires registration of the unemployed job seeker at the public employment agency in most countries and to actively search for employment with support of the agency.[2] In addition to the public employment agency, a second possible channel is given by recruitment agencies (or private employment agencies) that 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 (see Dincher / Gaugler, 2000, for a comprehensive overview on private recruitment agencies in Germany). Nevertheless, despite its availability in Germany this job search channel is used rarely. Brenke / Zimmermann (2007) note, that only about one fifth of all job seekers in Germany consider recruitment agencies when looking for a job.

A commonly used job search channel in most countries is reading and responding job advertisements. Whereas in the past, advertisements were published in newspapers and professional journals, the relevance of the internet has increased in recent years. We therefore distinguish between two channels: channel three comprises print advertisements, and channel four refers to job search on the internet. The fifth channel of job search we consider are personal contacts. Personal contacts are contacts to relatives, friends and (former) colleagues. These informal contacts provide information that could be helpful for successful job search. Finally, whereas the first five channels provide some kind of "reactive", job search strategy, i.e. the job seekers reacts on job offers

[1] For several countries, the relevance of the public employment 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 / Taylor (2002) for the UK, Brenke / Zimmermann (2007) for Germany, or Weber / Mehringer (2008) for Austria.

[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.

posted by potential employers, the sixth job search channels refers to the self-initiative job search via direct application. In contrast to the US or Canada, where direct application for jobs at potential employers 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 and Brenke / Zimmermann (2007) report that only about 30 percent of all job seekers consider direct applications as a means to find a new job.

2.2 Determinants of Choice of Job Search Channels

With regard to the different features of each of the job search channels, it is likely that the channel's value in terms of employment chances differs between job seekers. Deeke (1991, 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 exhibit different 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 of the individual, i.e. in particular the available income but also the need.

There are some empirical studies analyzing the determinants of the choice of job search methods. Böheim / 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 / 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 / Wadsworth, 1993, or Brixy / Gilberg / Hess / 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 / Whitley-Price (2005) for the UK and Nivorozhkin / Romeu Gordo / Schöll / Wolff (2006) for Germany.

2.3 Effects of Job Search Channels

Related to the different values of the single job search channels for the individual job seeker, we can expect different success probabilities with respect to employment. Despite its importance, the public employment agency seems to be relatively ineffective in providing successful job matches. Wielgosz / 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 for Canada by Osberg (1993) and for the UK by Böheim / Taylor (2002). For Germany, Brenke / Zimmermann (2007) conclude from a descriptive analysis that although the public employment agency had been involved in the majority of cases its impact on successful job matching was rather small. 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 / Mahringer (2008), argue that contacting the public employment agency may be interpreted as an indicator of a lack of informal networks providing sufficient help. 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 / 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 is a further explanation of the small success. Empirical evidence supporting this argument is given by, e.g., Reid (1972), Osberg (1993), Addison / Portugal (2002), and Blaschke (1987) and Grund (2001) for Germany.

Besides the small share of engagement of private recruitment agencies in the individual job search process, their value for actual job matching is also debatable. Beckmann / Deimel / Schauenberg (2004) argue that private recruitment agencies can offer a number of advantages compared to the public employment agency and should therefore improve the matching process. These advantages cover, first, the potential of specialization, i.e. to concentrate on a certain type of productivity of applicants, second, the potential of a reduction of job search costs on side of the employers resulting from a quicker filling of vacant positions from a larger pool of adequate candidates that will be available at the private recruitment agency, and, finally, the reduction of informational asymmetries between employers and applicants. Nevertheless, in contrast to that Bellmann / Promberger (2003) argue that these agencies do no complement with the public employment agency. This small impact of recruit-

ment agencies on the job search process is also reported in international studies, e.g., Bortnick / Ports (1992) or Osberg (1993).

Job advertisements can lead to successful job matches for better qualified persons (see Böheim / Taylor, 2002), but can be less effective for low-skilled persons or immigrants (see Frijters / Shields / Whitley-Price, 2005, or Nivorozhkin / Romeu Gordo / Schöll / Wolff, 2006); for the latter finding language deficits have been identified. Pischner / Schupp / Wagner (2002) report for Germany that reading job advertisements on the internet was not very important for unemployed persons, and Kuhn / 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 substantially over the last years. About five years later in 2006, already every second person has looked for a job via the internet in Germany (Brenke / Zimmermann, 2007). These persons are on average younger and better educated as reported by Grund (2006). However, he 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 / Skuterud (2004) is reasonable.

Already Rees (1966) noted the value of personal contacts 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 number of personal contacts 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 / Wadsworth (1996) report that the number of personal contacts decreases with unemployment duration. For Germany, Blaschke (1987) notes that in particular persons with low tenure and a below intermediate education benefit from personal contacts. One reason is that these persons are looking for jobs in a small geographic area. In addition to that, Winter (1997) analyzes the value of informal job search, i.e. the use of personal contacts, from different perspectives comprising the perspective of the employer, the perspective of the person who recommends a friend or colleague, and the perspective of the job seeker. His analysis shows that engaging personal contacts is of benefit for the successful match from all three perspectives. In support of this theoretical exploration, Grund (2001) shows that personal contacts in the job search process lead to higher returns in the new job. Personal contacts are also essential for successful job search of immigrants as the evidence by Frijters / Shields / Whitley-Price (2005) for the UK and Drever / Spiess (2006) for Germany indicate.

Moreover, direct applications can provide an effective tool for better educated persons in particular to signal their true skills and productivity, see

Heath (1999). However, in contrast to that direct application seems to be less effective for long-term unemployed persons (see Schmitt / 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 / Taylor (2002) for the UK.

Finally, 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 / Carpenter, 1978, or Böheim and Taylor, 2002). Nevertheless, the number of job search channels used differs across countries.[3] For Germany, Brenke / Zimmermann (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 / Wadsworth, 1996, and Böheim / Taylor, 2002) job seekers use on average three different job search channels as well. In contrast, Addison / 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.

3. Data and Descriptives

3.1 Data

The empirical analysis is based on data from up to eleven waves of the German Socio-Economic Panel Study (SOEP) for the years 1998 to 2008. Due to the panel nature of the data, we could regard changes over time in the estimation. 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] Information is surveyed annually. Besides others, SOEP provides detailed information about individual, household and job related characteristics. For homogeneity reasons, we restrict our sample to unemployed persons and 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 when they have reported unemployment) are considered.

[3] It should be noted that the obtained differences could be partly due to differences in the definition of job search channels. For example, whereas Heath (1999) considers only one channel of informal search covering direct applications and effects of personal contacts, Böheim / Taylor (2002) regard both aspects separately.

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

For the analysis at hand, we explore information of two different questions in particular. The choice of the waves used for the empirical analysis is related to the availability of these two questions in SOEP. The first question, recorded in the waves 2003 to 2007, contains detailed information on the job search activities of the individual during the last four weeks before the interview. The data included enable the distinction of the six different job search channels, namely public employment agency, recruitment agency, advertisements in newspapers and journals, internet job search, personal contacts, and direct application for a job at potential employers. Based on this information, we analyze the determinants of the choice of the job search channels in a first step, and extend the analysis to study the employment effects of the single channels. To model successful employment uptake as a result of the job search process, we consider the employment status of the individual in the subsequent wave. Hence, for this second analysis we consider information of the waves 2003 to 2008.

In addition, we construct a measure of job search intensity as the number of job search channels used, i.e. individuals using only one job search channel have a job search intensity of 1, individuals using all six channels for job search are assigned a job search intensity of 6. We analyze the determinants as well as the effects of the job search intensity in the empirical analysis below. To augment the analysis of the effects of the job search channels, we consider another question surveyed with newly employed persons containing the job search channel that was causal for employment. This question has been recorded in the waves 1999 to 2008 and provides information on four job search channels, namely public employment agency, internet job search, advertisements in newspapers and journals, and personal contacts.[5] The information contained in this question further allows to analyze whether different job search channels are associated with different types of jobs. To estimate the employment probabilities, we again condition on unemployment in the preceding year; therefore, we regard the waves 1998 to 2008 in this analysis.

The explanatory variables used in the empirical analyses below have been chosen with respect to the findings and experiences of the literature (see above). To characterize the individual situation, we take account of age, cohabitation (including marriage), immigrant (foreigner), qualification, the number of children and child care obligations. Child care obligations are included in four categories reflecting the amount of time spent on child care per day in hours (ranging from zero hours to more than nine hours per day). Qualification should reflect different skill levels of the individuals resulting in differences in the value of the job search channels. It is regarded in five categories: no occupational training, basic occupational training, intermediate occupational

[5] Although job search channels causal for employment have been considered in SOEP before, internet job search has been recorded first in the wave of 1999.

training, university entrance qualification and university degree. Since we consider unemployed persons only, we also take account of registration at the public employment agency and of long-term unemployment (for more than one year). With respect to the possible existence of role models, characteristics like cohabitation or child care obligations may have different effects for males and females. Nevertheless, gender differences may also exist in the other factors regarded in the estimation and have been found relevant in other studies, see Bortnick / Ports (1992), Osberg (1993), or Heath (1999). To take account of gender differences we conduct separate analyses for both genders. As outlined in section 2, local labor market conditions can be important. To regard these conditions, we control for regional unemployment rates, regional GDP, and dummy variables for the 16 federal states or a dummy for East Germany in the estimation.

To analyze the kind of jobs obtained via the different job search channels, we incorporate the following job search characteristics in the empirical model. We distinguish between temporary or permanent employment contracts indicating the potential persistence of the job match. In addition, we take account of the size of the company distinguishing small (1 to 19 employees), medium (20 to 199), large (200 to 1,999), and huge (more than 2,000) enterprizes. We further differentiate white-collar and blue-collar occupations and take account of the working hours per week. Finally, we regard a variable categorizing the jobs in ascending order according to the degree of occupational autonomy from low to high in the estimation.

3.2 Descriptive Statistics

As a starting point of the empirical investigation, we will first present some selected descriptive statistics of the sample. Table 1 depicts the shares in percent of unemployed persons using each of the six different job search channels and the average number of job search channels used for the years 2003 to 2007 and the pooled sample (over the years). Since job seekers can access more than one job search channel, i.e. job search channels are not mutually exclusive, it is reasonable to describe the composition of job search channel choices this way.

Regarding the figures of the pooled sample, reading and replying to printed advertisements is the most commonly used method, and about 8 out of 10 job seekers use this channel. With respect to the figures for the single years, some dynamics in the use of this channel can be established and shares are ranging from 77.06 percent (2003) to 86.22 percent (2007). Help from the public employment agency is received in about 75 percent of the cases; nevertheless, by comparing the responses in the different waves a decline in the use of this channel can be observed (from 80.00 percent in 2003 to 71.93 percent in

2007). As mentioned above, the high share of unemployed persons looking for a job via the public employment agency is not surprisingly since receiving unemployment benefits requires registration at the public employment agency.

Table 1

Job search methods used by unemployed persons (percentages, 2003 to 2007 and pooled sample)

Search method	year					pooled
	2003	2004	2005	2006	2007	
public employment agency	80.00	76.78	74.40	73.16	71.93	75.37
job advertisements (newspapers etc.)	77.06	78.95	85.22	81.88	86.22	81.70
internet job search	37.16	42.98	46.83	51.71	53.76	46.23
recruitment agency	18.38	20.95	14.98	17.92	16.29	17.77
personal contacts	48.63	49.31	63.69	63.27	65.66	57.84
direct application	18.07	27.37	27.08	24.19	26.07	24.52
Avg. number of job search methods	2.79	2.96	3.12	3.12	3.20	3.03
No. of observations	985	1,012	1,008	1,021	798	4,824

Note: Choice of job search channels is not mutually exclusive.

Compared to these two channels, engaging personal contacts in job search is undertaken by a bit more than half of the job seekers (57.84 percent, pooled sample), 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 46 percent of the job seekers; however, whereas in the wave of 2003 only quite one third of the job seekers reported internet job search (37.16 percent), the share has increased substantially to more than a half of all job seekers with 53.76 percent in 2007. The remaining job search channels - direct applications for employment and recruitment agencies – are used by about 24.52 percent and 17.77 percent of the job seekers only. With regard to the number of job search channels used, the figures exhibit that the average unemployed job seeker uses about 3 job search channels.

In addition, Table A.1 in the appendix provides frequencies of all combinations used by the job seekers. Here, combinations are depicted conditional on the number of channels chosen. Regarding the modes of the distributions, persons using only one job search channel most frequently access the help of the public employment agency. The mode of persons relying on two channels is the combination of the public employment agency and reading printed advertisements. Public employment agency, reading advertisements and using personal contacts is the most frequently used combination of those persons using

three channels; persons using four channels use the same combination but add internet job search in addition. When five job search channels are used, all channels except private recruitment agencies are engaged.

Who are the job seekers choosing the different job search channels? Before turning to the econometric analysis, descriptive statistics of selected socio-economic characteristics of the job seekers are displayed in Table 2 for men and Table 3 for women. 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 personal contacts. Gender differences are slightly only, but there occur some differences in the age pattern for the use of the public employment agency. Whereas the share of aged men (51 to 61 years) is smaller compared to young-aged and medium-aged men, the picture for women is reversed and older women do slightly more often rely on help from the public employment agency compared to younger women. Differences could also be obtained for cohabitation. A higher share of singles (47.96 percent of males / 50.54 percent of females) is looking for a job on the internet than of persons living with a partner (43.13 / 42.20 percent). Further differences are observable in the use of personal contacts for men; here, males living with a partner make use of informal contacts (63.75 percent) more often than singles (56.56 percent). However, there may be further age effects underlying this descriptive comparison. 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 a job. In contrast, the share of persons using personal contacts in job search exceeds that of German nationals.

Persons looking for a job on the internet or directly applying for a job are better educated than the average. In contrast, the lowest average years of education are found for persons using the public employment agency. This finding tends to support the evidence from the international literature showing that the public employment agency is more likely to support hard-to-place job seekers. To claim unemployment benefits in Germany, unemployed job seekers have to register at the public employment agency and have to actively look for employment. The higher intensity of job search for registered unemployed persons is also reflected by the corresponding figures in the tables. The largest difference occurs with respect to the use of the public employment agency; whereas only about one third of the female and about 44 percent of the male non-registered unemployed job seekers engage the public employment agency, the shares are substantially higher for registered unemployed exceeding 80 percent in both gender groups. 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 (64.01 percent) engage the public employment agency compared to their East German counterparts (80.34 percent) which has also been reported by Pischner / Schupp / Wagner (2002).

Table 2

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

	public employment agency	advertisements	internet job search	recruitment agency	personal contacts	direct application
age groups						
18 – 30 years	80.06	75.70	53.79	19.38	56.32	26.26
30 – 50 years	82.05	81.15	43.99	20.02	62.66	27.47
51 – 65 years	77.78	81.75	38.89	15.48	57.74	19.84
avg. age (in years)	38.86	39.37	37.65	38.54	39.29	37.80
avg. no. of children	0.62	0.59	0.57	0.58	0.61	0.56
avg. years of education	11.17	11.35	11.98	11.52	11.24	11.68
cohabitation (including marriage)						
no	80.69	79.19	47.96	18.78	56.56	26.92
yes	80.28	80.18	43.13	18.92	63.75	23.51
foreigner						
no	80.48	80.58	48.47	19.12	59.24	26.53
yes	80.72	73.20	28.76	16.99	62.42	18.30
registered unemployment						
no	43.86	73.25	54.82	12.28	50.00	23.25
yes	84.49	80.30	44.91	19.55	60.70	25.69
long-term unemployment (more than one year)						
no	79.24	80.69	52.66	20.00	61.11	28.30
yes	82.60	77.85	34.80	16.95	57.29	20.79
region						
West Germany	78.15	80.74	44.87	17.71	59.26	25.09
East Germany	83.79	78.05	47.28	20.41	60.21	25.95
regional GDP (in billion Euro)	19.25	20.28	19.44	17.91	19.87	18.35
regional unemployment rate	13.00	12.78	12.95	13.21	12.83	13.10
Share of observations	80.52	79.61	45.88	18.84	59.66	25.45

Note: Job search channels are not mutually exclusive; observations n = 2,330. Figures report shares (in percent) except for avg. age, avg. no. of children, avg. years of education, regional GDP and regional unemployment rate where means are depicted.

Table 3

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

	public employ-ment agency	ad-vertise-ments	internet job search	recruit-ment agency	personal contacts	direct applica-tion
age groups						
18 – 30 years	67.85	79.48	60.10	15.67	50.40	27.46
30 – 50 years	70.55	85.92	44.54	17.10	56.47	23.56
51 – 65 years	74.12	82.40	34.99	17.18	62.53	19.05
avg. age (in years)	39.84	39.69	37.49	40.09	40.33	38.20
avg. no. of children	0.71	0.76	0.70	0.71	0.71	0.68
avg. years of education	11.46	11.65	12.12	11.59	11.56	11.99
cohabitation (including marriage)						
no	76.42	83.10	50.54	16.67	54.84	26.19
yes	64.18	84.23	42.20	16.86	57.55	20.89
foreigner						
no	71.36	84.31	48.13	16.96	55.45	23.84
yes	61.50	76.00	28.50	14.50	64.00	21.50
registered unemployment						
no	32.35	80.10	45.85	12.46	53.63	28.51
yes	82.10	84.71	46.76	18.06	56.89	25.21
long-term unemployment (more than one year)						
no	64.81	84.29	51.73	16.41	54.87	26.41
yes	80.19	82.55	37.90	17.34	58.24	19.06
region						
West Germany	64.01	84.18	44.84	16.49	54.76	22.99
East Germany	80.34	82.83	49.10	17.17	58.18	24.65
regional GDP (in billion Euro)	18.61	20.27	19.42	19.25	19.65	19.32
regional unemployment rate	13.06	12.43	12.58	12.83	12.49	12.66
Share of observations	70.57	83.64	49.55	16.76	56.13	23.66

Note: Job search channels are not mutually exclusive; observations n = 2,494. Figures report shares (in percent) except for avg. age, avg. no. of children, avg. years of education, regional GDP and regional unemployment rate where means are depicted.

4. Econometric Methodology

4.1 Choice of Job Search Channel and Search Intensity

Although job search channels are not mutually exclusive, i.e. an individual can choose a number of different combinations, the choice of a single job search is binary, and we can apply a discrete choice model where the individual can choose between using the channel (1) or not (0). Given the six different job search channels considered in the analysis, we have to estimate the six distinct possible choices for each individual separately in a first step. To regard the comprehensive information provided by the panel data at hand, we apply a random effects panel probit model (see Heckman, 1981, and Guilkey / Murphy, 1993).

The unobserved latent probability that individual i chooses 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

$$C_{ijt} = 1 \quad \text{if} \quad \mathbf{X}_{it}\beta_j + \varepsilon_{ijt} > 0\,,$$
$$C_{ijt} = 0 \quad \text{if} \quad \mathbf{X}_{it}\beta_j + \varepsilon_{ijt} \leq 0\,.$$

$\mathbf{X}_{it}$ 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 $\eta_{ij} \sim \mathcal{N}(0, \sigma^2_\eta)$ and $\epsilon_{ijt} \sim \mathcal{N}(0, \sigma^2_\epsilon)$. 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 $\rho = \sigma^2_\eta/(\sigma^2_\eta + \sigma^2_\epsilon)$. 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. 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 $S^*_i \leq \mu_1$, $S_i = 2$ if $\mu_1 < S^*_i \leq \mu_2, \ldots, S_i = 6$ 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 $\varepsilon_i \sim \mathcal{N}(0, \sigma^2_\varepsilon)$.

4.2 Effects of Job Search Channels on Reemployment Probability

To answer the second empirical question of the paper, we have to estimate the effects of the job search channels on the employment chances. 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[6]:

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

If all self-selection is captured in the inverse Mills ratio terms, the estimates of the selection-corrected pooled probit model will provide consistent parameter estimates of how much the use of a certain job search channel contributes to the reemployment probability in the subsequent period.

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. Therefore, we are not only interested in the effects of the job search channels on the individual (re-)employment probability, but also on the effects

[6] 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 / 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.

of variation in the job search intensity. To allow for a possible non-linear effect of the job search intensity on the employment probability, we estimate the effects of the six different levels of the job search intensity using a similar model like that for the job search channels.

Finally, we want to explore whether 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:

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

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 job is found via this channel.

A 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.

5. Empirical Results

5.1 Choice of Job Search Channel and Search Intensity

The estimation results of the random effects probit models of the choice of the six job search channels are provided in Table 4 for men and Table 5 for women. Reported are the marginal effects on the predicted probability of a positive outcome. Comparison of the results for men and women establish some similarities in job search for both genders, but also some differences. The figures of the tables indicate that younger unemployed persons aged 18 to 30 years are clearly more likely and medium-aged job seekers aged 31 to 50 years are a bit more likely to use the internet compared to older job seeker (aged 51 to 65 years) independently of gender. In contrast, gender differences are found with respect to the other five job search channels. Whereas no age differences can be established in the use of the public employment agency, private recruitment agencies and direct applications for women, young men are more likely to engage the public employment agency and also more likely to engage private recruitment agencies. Moreover, young-aged and medium-aged men use direct applications more often then older job seekers. With regard to personal contacts, medium-aged men have a significantly higher probability to rely on this job search channel compared to the older; no difference in the use of personal contacts between medium-aged and older-aged women can be established, but younger women do significantly less often consider the help of personal contacts.

Regarding the other socio-demographic characteristics, cohabitation (including marriage) affects the propensity of using the public employment agency for women negatively. No differences in the effects for the other job search channels can be found. For men, cohabitation does not affect the use of the public employment agency, but men living with a partner are much more likely to incorporate their personal contacts in job search. Job seekers with children independently of gender tend to have less personal contacts valuable for job search. Responsibility for children also decreases the probability of searching via the public employment agency and reading and responding to job advertisements for men. No differences in probabilities for using the internet or private recruitment agencies are found for both genders. With regard to the time spent for child care obligations, the results exhibit gender-specific patterns in the effects. Whereas men with extensive time obligations (more than 9 hours per day) tend to use the public employment agency more often than men with shorter child care obligations, reading and responding to advertisements in print and on the internet is particulary common for men who care for their children between 5 to 8 hours compared to men with no child care obligations. Having duties for child care for up to 8 hours per day also increases the likelihood of engaging personal contacts for male job seekers. For women, different child care obligations do only affect the use of the public employment agency and reading and responding to printed advertisements negatively; for

the other channels, no specific patterns result. The type of unemployment is relevant for the choice of the job search channels as well. Registration at the public employment agency increases the probability of using nearly all job search methods; exceptions are search on the internet for men and regarding personal contacts 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 printed advertisements, the internet, direct applications, and personal contacts less intensively than short-term unemployed persons. Significant negative estimates for women are found for internet and direct applications.

Independently of gender, foreigners search for jobs on the internet or by reading printed advertisements less often than German nationals. In addition, foreign men have significant lower probabilities of direct applications in job search. The findings in the literature (see, e.g., Frijters, and Whitley-Price, 2005) and the descriptive statistics above indicate the expectation of a positive effect of the use of personal contacts for foreigners. However, only the estimates for women are significantly positive; for men, there is a positive point estimate, but it is statistically insignificant. Hence, the empirical estimates for foreigners in Germany can only partially replicate the findings for the UK. The effects of qualification on the choice of the job search channels have to be interpreted in reference to the lowest educational group without any occupational training. No differences can be established with respect to the use of the public employment agency or of private recruitment agencies independently of gender. In contrast, better educated men are clearly more likely to look for jobs in printed advertisements (persons with a university degree), on the internet or to directly apply for jobs at potential employers. The educated men use also personal contacts more often than the reference group, but no positive trend in qualification level can be established. For women, the findings for internet job search and direct applications resemble the picture for men. For printed advertisements, better educated women are more likely than the non-educated to use this channel. The highest probability is found for women with intermediate occupational training, whereas all other groups use this channel less, but on a comparable level. In contrast to the finding for men, the use of personal contacts decreases with qualification level for women.

Regarding the determinants of job search intensity, i.e. the number of job search channels used (from one to six), the corresponding results of the ordered probit model (coefficient estimates) are provided in Table 6. For the interpretation of the estimates with respect to the probability of using a certain level of job search intensity, the threshold parameters have to be regarded.

Table 4

Random effects probit estimates of choice of search method (marginal effects, males)[a)]

	public employment agency	advertisements	internet job search	recruitment agency	personal contacts	direct application
age (ref. group: 51 – 65 years)						
18 – 30 years	0.066**	–0.047	0.376***	0.066**	0.083	0.088**
31 – 50 years	0.036	0.012	0.151**	0.049*	0.101*	0.117***
cohabitation	–0.013	–0.003	0.010	0.012	0.107***	–0.008
foreigner	0.011	–0.114***	–0.317***	–0.013	0.034	–0.087**
no. of children	–0.021*	–0.024*	–0.039	–0.014	–0.066***	–0.017
registered unemployment	0.427***	0.093***	0.010	0.063***	0.136***	0.057*
long-term unemployed	0.010	–0.040**	–0.177***	–0.020	–0.098***	–0.052**
child care obligations, hours per day (ref. group: no child care obligation)						
1 to 4 hours	0.041	0.031	0.205***	0.025	0.201***	0.054
5 to 8 hours	0.055	0.067*	0.402***	0.030	0.116*	0.009
more than 9 hours	0.111***	0.030	0.175	0.087	0.107	0.036

qualification (ref. group: no occupational training)						
basic occ. training	0.040	–0.021	0.332***	0.013	0.210***	0.026
interm. occ. training	0.012	0.012	0.577***	0.031	0.198**	0.096
univ. entrance qual.	–0.029	–0.031	0.646***	0.000	0.097	0.197**
university degree	0.014	0.085*	0.705***	0.110*	0.202**	0.295
regional variables						
reg. GDP (in bn. Euro)	–0.021	–0.008	–0.021	0.041**	–0.004	0.018
reg. unemp. rate	–0.002	0.014	0.032	–0.040***	–0.019	–0.007
statistics						
no. of observations	2,275.00	2,275.00	2,275.00	2,275.00	2,275.00	2,275.00
log-likelihood	–993.97	–1,063.19	–1,229.48	–1,038.73	–1,398.03	–1,183.46
χ^2	161.13***	83.71***	159.58***	52.15**	119.83***	82.36***
$\chi^2(\rho = 0)$	11.93***	59.42***	246.81***	64.22***	107.51***	90.38***

a) Dependent variable is binary dummy of choice of job search method. Year dummies and regional dummy variables for the federal states have been included but marginal effect estimates are not displayed. $\chi^2(\rho = 0)$ is test statistic of test of unimportance of panel-level variance (H_0) on total variance.

Significance is indicated as follows: *** denoting the 1%, ** the 5% and * the 10% level.

Table 5

Random effects probit estimates of choice of search method (marginal effects, females)

	public employment agency	advertisements	internet job search	recruitment agency	personal contacts	direct application
age (ref. group: 51 – 65 years)						
18 – 30 years	0.043	–0.012	0.367***	0.019	–0.107**	0.044
31 – 50 years	0.050	0.041*	0.158***	0.017	–0.000	0.040
cohabitation	–0.063**	0.003	–0.058	0.005	0.009	–0.036
foreigner	–0.004	–0.074**	–0.223***	–0.023	0.111**	0.027
no. of children	-0.006	–0.004	–0.047	–0.010	–0.043**	–0.005
registered unemployment	0.551***	0.055***	0.135***	0.044**	0.118	0.105***
long-term unemployed	–0.015	–0.015	–0.113***	–0.006	0.006	–0.091***
child care obligations, hours per day (ref. group: no child care obligation)						
1 to 4 hours	–0.133***	–0.040*	0.033	0.011	–0.029	0.023
5 to 8 hours	–0.097**	0.011	0.016	–0.010	0.020	–0.028
more than 9 hours	–0.028	–0.030	–0.009	0.024	0.054	–0.042

qualification (ref. group: no occupational training)						
basic occ. training	0.046	0.073**	0.271*	–0.041	–0.105	–0.023
interm. occ. training	0.043	0.047***	0.546***	–0.046	–0.047	0.087
univ. entrance qual.	0.028	0.073***	0.582***	–0.051	–0.167*	0.216**
university degree	–0.037	0.075***	0.619***	–0.035	–0.078	0.144*
regional variables						
reg. GDP (in bn. Euro)	0.036	–0.017	–0.041	0.006	0.018	0.008
reg. unemp. rate	–0.036**	–0.009	0.046*	–0.021*	–0.033	–0.012
statistics						
no. of observations	2,419.00	2,419.00	2,419.00	2,419.00	2,419.00	2,419.00
log-likelihood	–1,172.16	–982.42	–1,391.16	–1,044.60	–1,557.79	–1,219.01
χ^2	290.73***	73.91***	163.10***	34.20	105.40***	105.75***
$\chi^2(\rho = 0)$	31.08***	73.90***	184.98***	53.41***	70.35***	55.18***

a) Dependent variable is binary dummy of choice of job search method. Year dummies and regional dummy variables for the federal states have been included but marginal effect estimates are not displayed. $\chi^2(\rho = 0)$ is test statistic of test of unimportance of panel-level variance (H_0) on total variance.

Significance is indicated as follows: *** denoting the 1%, ** the 5% and * the 10% level.

For ease of interpretation, more detailed results providing the marginal effects of the characteristics on the probability for each of the six outcomes of the dependent variable are provided in Table A.2 for men and Table A.3 for women in the appendix.

Table 6

Ordered probit results for job search intensity

	Males	Females
age (reference group: 51 – 65 years)		
18 – 30 years	0.285***	0.148*
31 – 50 years	0.266***	0.183**
cohabitation	0.067	–0.068
foreigner	–0.250***	–0.088
no. of children	–0.131***	–0.069*
registered unemployment	0.625***	0.719***
long-term unemployed	–0.266***	–0.231***
child care obligations, hours per day (ref. group: no child care obligation)		
1 to 4 hours	0.311***	–0.071
5 to 8 hours	0.375***	–0.051
more than 9 hours	0.448***	–0.009
qualification (ref. group: no occupational training)		
basic occ. training	0.273**	0.148
interm. occ. training	0.443***	0.456**
univ. entrance qual.	0.494***	0.482**
university degree	0.942***	0.476**
regional variables		
reg. GDP (in bn. Euro)	–0.004	–0.010
reg. unemp. rate	–0.010	–0.055
threshold parameters		
μ_1	–0.518	–1.411
μ_2	0.259	–0.584
μ_3	1.064	0.232
μ_4	1.803	0.904
μ_5	2.598	1.875
no. of observations	2,275.00	2,419.00
McFadden's R^2	0.04	0.04
log-likelihood	–3,622.30	–3,778.16
χ^2	223.83***	269.88***

Note: Table provides coefficient estimates. Dependent variable is the number of job search methods used. Year dummies and regional dummy variables for the federal states have been included but coefficient estimates are not displayed.

Significance is indicated as follows: *** denoting the 1 %, ** the 5 % and * the 10 % level.

The coefficient estimates of Table 6 indicate that younger men consider a higher number of job search channels compared to medium-aged and older job seekers; for women, older job seekers have the lowest level of job search intensity, and medium-aged and younger women take more channels into consideration. Correspondingly to the results obtained for the choice of the job search channels, foreign men use also a smaller number of job search channels overall. No significant difference can be established with respect to job search intensity between foreign and native women. Having children reduces the job search intensity of both genders, but the effect is more pronounced for men. Less variety of job search intensity can also be established for long-term unemployed persons compared to short-term unemployed persons. In line with the higher probability of using the different job search channels, the estimates on the job search intensity support a higher level of job search activity for registered unemployed persons. With respect to qualification, the coefficient estimates reveal that a higher qualification results in a higher job search intensity; this finding is most pronounced for males with a university degree.

5.2 Effects of Job Search Channels on Reemployment Probability

How successful are the different job search channels in bringing unemployed job seekers back into employment? And, is the use of a higher number of job search channels more productive? To answer both questions, Table 7 provides the employment rates by genders in $t + 1$, the year after the job search, conditional on the job search method in period t (left panel), and conditional on the number of job search channels in t (right panel).

Some heterogeneity in the employment rates across job search channels but also across levels of job search intensity can be observed. Taking a look on the job search channels first, at the lower end of the spectrum, the employment probabilities for the use of the public employment agency with about 38.06 percent for men and 38.36 percent for women are found. At the other end of the spectrum, direct applications of job seekers at potential employers have the largest employment probabilities with 51.66 percent for men and 51.08 percent for women. The employment probabilities of the other job search channels lie in between these bounds. However, whereas the employment probabilities associated with reading and replying to printed advertisements, engaging private recruitment agencies or personal contacts are only slightly higher than those of the public employment agency, internet job search tends to be more effective with employment rates of 46.93 percent for men and 46.02 percent for women. For persons regarding this job search channel within their job search repertoire, almost every second is employed one year after.

Table 7

Employment probabilities at $t + 1$ (in percent) 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		
	Males	Females		Males	Females
publ. empl. agency	38.06	38.36	1	31.00	33.56
advertisement	40.76	39.85	2	33.73	32.63
internet	46.93	46.02	3	36.35	36.73
recruitment agency	42.82	40.11	4	43.06	44.50
social network	41.24	39.87	5	54.31	48.64
direct application	51.66	51.08	6	50.00	61.70
observations	1,977	2,163		1,977	2,163

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

Turning to the figures of job search intensity indicates that using a larger number of job search channels is positively correlated with employment probability. However, using one or two channels is similar effective for both genders (about 32 percent), but the use of three channels increases the employment probability to about 36 to 37 percent. Another steep increase is found when even four channels are regarded. Here, the employment probabilities amount to about 43 (men) to 45 (women) percent. For men the highest employment probabilities are given when five channels were employed (54.31 percent), but when six channels are used the corresponding probability is slightly smaller.[7] For women we find an additional increase between using five and using six channels where the corresponding employment probability reaches 61.70 percent. For the estimation of the channel-specific employment effects, we have used pooled probit models. As noted above, the selection patterns into the different channels could be important, i.e. there may be self-selection of the individuals. To take account of the possible self-selection and to mitigate the bias of the coefficient estimates, we consider a selection-correction for the single channels by including inverse Mills ratio terms (see section 4). The corresponding estimation results separated by gender for both model specification are provided in Table 8. The reported marginal effect can be interpreted as follows: A marginal effect of –0.068 for public employment agency for males means that the use of this channel reduces the employment probability in the subsequent period by 6.8 percentage points for males *ceteris paribus.* This finding is rather disappointing since it indicates, that the public

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

employment agency is not only ineffective but harmful in terms of successfully placing job seekers. This interpretation should be taken with some caution since possible self-selection is not regarded in the estimate. Nevertheless, when turning to the corrected estimate (right-panel), the estimated marginal effect is slightly lower but still of the same level with 6.7 percentage points decrease in the employment probability. Still, a causal interpretation of the effects is only valid if we are willing to assume that self-selection is controlled for successfully.

Table 8

Probit estimates of the probability of employment at $t + 1$ given unemployed at t (marginal effects, job search channels)

	Males	Females	Males	Females
public employment agency	–0.068**	0.005	–0.067**	0.005
advertisements	0.011	0.019	0.011	0.015
internet job search	0.037	0.042	0.034	0.043
recruitment agency	–0.015	–0.001	–0.014	0.002
personal contacts	0.026	–0.002	0.024	–0.001
direct application	0.111***	0.109***	0.113***	0.106***
λ_1 (publ. empl. agency)	–	–	–0.811	0.711
λ_2 (advertisements)	–	–	0.341	–1.154
λ_3 (internet job search)	–	–	–0.737**	–0.008
λ_4 (recruitment agency)	–	–	–4.874	4.330
λ_5 (personal contacts)	–	–	0.455	1.889
λ_6 (direct application)	–	–	1.079	2.901**
observations	1,654.00	1,744.00	1,654.00	1,744.00
McFadden's R^2	0.08	0.09	0.09	0.10
log-likelihood	–1,018.21	–1,056.09	–1,012.50	–1,048.96
χ^2	171.32***	180.31***	183.89***	196.10***

Note: Employment comprises full-time, part-time and marginal employment, and apprenticeship training. Further control variables regarded in the estimation: age, age squared, gender (model: total), registered unemployment, foreigner, cohabitation (including marriage), long-term unemployed, years of education, regional GDP, regional unemployment rate, year dummies, dummies for the federal states.

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.

Fortunately, the estimates of the public employment agency for women show no significant change in the employment probability, and women do not suffer from that kind of help. Poor outcomes of job search via the public employment agency have also been reported for other countries, e.g., Wielgosz / Carpenter (1987) for the US, Osberg (1993) for Canada, or Böheim / Taylor (2002) for the UK. Possible explanations for this finding can be, on the one hand, capa-

city 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 be investigated below.

Directly applying for a job at a potential employer clearly increases the employment probability in the subsequent period by 11.1 percentage points for males and 10.9 percentage points for women when selection correction is not regarded. Taking account of self-selection, the coefficient of the inverse Mills ratio of direct application for women is significant, an self-selection may play a role. However, the marginal effects of the job search channel for men and women do only change slightly. The effect for women is with 10.6 percentage points less pronounced, for men with 11.3 percent slightly higher. For the other types of job search channels, no significant effects on the employment probability can be established.

We have also estimated the effects of the different job search intensity levels on the job finding probability and corresponding results are provided in Table 9. The marginal effects for each of the levels have to be interpreted in reference to using one job search channel only. Again, estimates are presented separately by gender with and without selection correction. Although not all estimates are statistically significant, the point estimates tend to indicate an increase in the employment probability conditional on an increase in the number of channels used. This positive tendency in the results is in line with the findings of empirical studies for other countries, e.g., Holzer (1988), Gregg / Wadsworth (1996), and Böheim / Taylor (2002). Statistically significant increases can be observed for men using five channels, where the employment probability increases by 12.6 percentage points (without consideration of selection correction) or 12.1 percentage points (with selection correction) compared to using only one channel. For women, an effect of similar size can be established for using four compared to one job search channel with an associated increase in the employment probability of about 10.1 percentage points (without selection correction) or 10.5 percentage points (with selection correction). Moreover, another strong increase for women can be found for using six compared to one job search channel: Here, the employment probability increases by about 16.9 percentage points (without selection correction) or 16.1 percentage points (with selection correction). Although the corrected estimates do slightly differ from the estimates of the pooled probit without selection correction, the comparability of the regression results tends to support a concise picture. Nevertheless, in any case even the estimates with selection correction can be interpreted causally only if the procedure captures all self-selection.

In the last part of our empirical analysis, we explore the individual and job characteristics relevant for successful matches via different job search channels. As described above, we explore the data of a different question in SOEP providing information on the job search channel that was responsible for find-

Table 9

Probit estimates of the probability of employment at $t + 1$ given unemployed at t (marginal effects, no. of job search channels)

	Males	Females	Males	Females
no. of job search channels used (ref. group: 1 channel)				
2	0.007	0.001	–0.004	0.006
3	0.025	0.039	0.016	0.049
4	0.082*	0.101**	0.072	0.105**
5	0.126**	0.070	0.121**	0.078
6	0.054	0.169*	0.051	0.161*
λ_1 (1 channel)	–	–	–1.705	0.173
λ_2 (2 channels)	–	–	1.265	4.294*
λ_3 (3 channels)	–	–	–4.376	5.425
λ_4 (4 channels)	–	–	0.535	1.871
λ_5 (5 channels)	–	–	–1.384	–0.500
λ_6 (6 channels)	–	–	–1.597	1.102
observations	1,654.00	1,744.00	1,654.00	1,744.00
log-likelihood	0.08	0.09	0.08	0.09
χ^2	–1,025.63	–1,059.82	–1,023.22	–1,052.11
McFadden's R^2	155.55***	172.44***	159.57***	189.28***

Note: Employment comprises full-time, part-time and marginal employment, and apprenticeship training. Further control variables regarded in the estimation: age, age squared, gender (model: total), registered unemployment, foreigner, cohabitation (including marriage), long-term unemployed, years of education, regional GDP, regional unemployment rate, year dummies, dummies for the federal states.

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.

ing the current job. Since direct applications and recruitment agencies play a minor role only, we focus in the estimation on the four main job search channels: public employment agency, internet job search, advertisements, and personal contacts. Before turning to the interpretation, it may be useful to consider some descriptives statistics of the job characteristics; additional details are given in Table A.4 in the appendix. Jobs found via the public employment agency are in about 69 percent of the cases temporary only, i.e. no permanent employment contract is offered; in comparison, about half of the jobs found via the internet (48 percent) are temporary. In cases where the job was obtained via printed advertisements or personal contacts, only in 36 and 39 percent of the cases temporary contracts were offered first. With regard to the assigned working hours, the public employment agency and internet job search commonly leads to full-time employment; for the other to channels, part-time employment is more likely. In addition, differences in the kinds of jobs can be revealed.

Table 10

Multinomial probit model estimates (marginal effects)

	public employment agency	internet job search	advertise-ments	personal contacts
individual characteristics				
female	0.013**	–0.001**	0.060**	–0.072**
age (ref. group: 51 – 65 years)				
18 – 30 years	–0.120***	0.048***	0.014***	0.057***
31 – 50 years	–0.068	0.047	0.042	–0.020
cohabitation	–0.085***	–0.000***	0.017***	0.069***
foreigner	0.013	–0.031	–0.038	0.056
no. of children	–0.010	0.003	–0.005	0.013
years of education	–0.051	0.010	0.039	0.002
years of education (squared)	0.001	–0.000	–0.001	–0.000
long-term unemployed	0.074	–0.023	–0.058	0.007
registered unemployment	0.180***	–0.004***	–0.023***	–0.153***
job characteristics				
temp. employment contract	0.191***	–0.001***	–0.069***	–0.121***
white-collar	0.055***	0.009***	0.032***	–0.096***
weekly working hours	0.005***	0.002***	0.001***	–0.008***
no. of employees in company (ref. group: 1 to 19 employees)				
20 to 199 employees	0.030***	0.010***	0.036***	–0.076***
200 to 1,999 employees	0.006	0.007	0.052	–0.065
more than 2,000 employees	–0.040	0.036	0.036	–0.032
occupational autonomy (ref. group: low autonomy)				
2	–0.109***	–0.007***	0.023***	0.093***
3	–0.083**	0.019**	0.047**	0.017**
4	–0.128***	0.043***	–0.014***	0.099***
5 = high autonomy	–0.154	–0.002	–0.089	0.245
regional variables				
East Germany	0.085	–0.007	–0.086	0.008
reg. GDP (in bn. Euro)	–0.000	–0.000	0.000	–0.000
reg. unemp. rate	0.005	–0.001	–0.002	–0.001
No. of observations	3,477.00			
log-likelihood	–3,588.78			
χ^2	983.69***			

Note: Year dummies have been included, but marginal effect estimates are not displayed. Significance is indicated as follows: *** denoting the 1 %, ** the 5 % and * the 10 % level.

Whereas jobs found via printed or internet advertisements are in 51 percent of the cases white-collar, this share is clearly lower for personal contacts with 38 percent and the public employment agency with 30 percent only. The distribution of white-collar / blue-collar occupations is also reflected in the average firm size. Here, almost one fifth of the jobs found via internet is at companies with more than 2,000 employees. Personal contacts are mainly helpful to become employed in smaller businesses and 47 percent of the jobs are at companies with between 1 and 19 employees. No strong differences with respect to the size of the company where the job seeker is placed can be observed between the public employment agency and printed advertisements.

Moreover, we take account of the occupational autonomy of the job using a 5-pointscale from low (1) to high (5). Comparison of the distributions shows that 57 percent of the jobs found via the public employment is at low autonomy jobs while the corresponding shares of internet and printed advertisements are clearly lower with 35 and 37 percent. At the other end of the spectrum, 22 percent of the jobs found via internet have an occupational autonomy of 4 or 5 compared to 4 percent for the public employment agency, 7 percent for personal contacts and 8 percent for advertisements. Finally, regional differences between West and East Germany can also be observed: Whereas 52 percent of the jobs found via the public employment agency are located in East Germany, this is only the case in 20 to 28 percent of the jobs found via one of the other three channels.

The corresponding estimation results of the multinomial probit model (marginal effects) are displayed in Table 10. 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. It may be worth noting that in the model all observations with job found via one of the four channels as the outcome were regarded. A first thing to note is that women have a clearly lower probability (–7.2 percentage points) to find a job via personal contacts compared to men. Also internet job search is marginally less effective for women. With regard to the other job search channels, women tend to benefit more from the public employment agency (1.3 percentage points) and reading and responding to printed advertisements (6.0 percentage points) than men. Referring to the age effects indicates that younger-aged 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, printed advertisements and also personal contacts indicate a reverted relationship. Persons living with a partner (cohabitation) clearly profit from personal contacts (6.9 percentage points) and also from printed advertisements (1.7 percentage points), but the relationship decreases the probability to find a job via the public employment agency (–8.5 percentage points). Registered unemployed persons experience positive effects of finding a job via the public employment agency (18.0 percentage points), but, on the other hand, have clearly less chances to find a job via one of the other channels.

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 personal contacts and – with a very small effect – from internet job search, too. Also with respect to the working hours, the results of the multivariate model are in line with the descriptive findings. In contrast, except for personal contacts where jobs provided are more probably blue-collar occupations, white-collar jobs are more likely obtained via the other three job search channels. With regard to company size, jobs found via the public employment agency, the internet or printed advertises are more likely in companies with 20 to 199 employees compared to smaller businesses. For jobs found via personal contacts the picture is different. Here, persons have a 7.6 percentage points lower chance to end up in a firm with 20 to 199 employees compared to the smaller ones.

There are clear differences in the occupational autonomy of the jobs found via the four channels. Whereas ending up in a job with a higher occupational autonomy via the public employment agency (in reference to low autonomy) is very unlikely, the results provide a different picture for internet and personal contacts. When being successful via the internet, finding a job with a moderately high occupational autonomy (level 4) is even 4.3 percentage points higher than finding a job with low autonomy, for personal contacts the probability of a level 4 autonomy job increases by even 9.9 percentage points. Jobs found via printed advertisement are not really of high autonomy, but finding a job with a moderately low (2.3 percentage points) or an intermediate autonomy (4.7 percentage points) is more likely than finding a job with low autonomy.

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 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 over the observation period. In 2007, more than 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. Moreover, they are also 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 applications, reading and responding to printed advertisements or looking for a job on the internet are not very common job search methods of foreigners. In contrast, foreign women do rely more often on personal contacts in job search compared to their native counterparts.

With regard to the effectiveness of the different job search methods direct applications at potential employers significantly increase the employment chances. Moreover, increasing the job search intensity in terms of encompassing a number of different job search channels exhibits positive effects on the employment probability. In contrast, engaging the public employment agency in job search seems to clearly reduce 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 the job search channels differs with respect to individual characteristics, but also with respect to the jobs obtained from the channels. Jobs provided by the public employment agency are more likely to offer temporary contracts only and are associated with low occupational autonomy of the employee. Jobs found via personal contacts, in contrast, are clearly more often permanent positions where the individual possesses a higher degree of autonomy of the tasks.

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Appendix

Table A.1

Frequencies of combinations of job search channels

1 and 2 channels									
				1	2	3	4	5	6
			1	273	417	63	40	127	14
			2		203	136	17	188	30
			3			11	6	15	8
			4				11	7	0
			5					82	20
			6						37
3 channels									
						3	4	5	6
		1	2			315	70	558	63
		1	3				12	45	7
		1	4					28	0
		1	5						17
		2	3				14	159	36
		2	4					27	3
		2	5						49
		3	4					1	2
		3	5						3
		4	5						3
4 channels									
							4	5	6
	1	2	3				63	441	105
	1	2	4					110	15
	1	2	5						135
	1	3	4					6	1
	1	3	5						11
	1	4	5						3
	2	3	4					18	3
	2	3	5						54
	2	4	5						6
	3	4	5						0
5 channels									
								5	6
1	2	3	4					152	33
1	2	3	5						319
1	2	4	5						41
1	3	4	5						4
2	3	4	5						13
6 channels:									
									148

Note: Table denotes frequencies of all possible combinations of job search channels used. Job search channels are denoted as follows: (1) public employment agency, (2) advertisements, (3), internet job search, (4) recruitment agency, (5) personal contacts, (6) direct application.

Reading advice: The first number in the upper panel (1,1) denotes that 273 persons have used the public employment agency for job search solely. The second number (1,2) denotes that 417 persons have used the public employment agency *and* reading job advertisements to find employment.

Table A.2

Ordered probit results for job search intensity (males, marg. eff.)

	$Pr(y = 1)$	$Pr(y = 2)$	$Pr(y = 3)$	$Pr(y = 4)$	$Pr(y = 5)$	$Pr(y = 6)$
age (reference group: 51 – 65 years)						
18 – 30 years	–0.050***	–0.050***	–0.008***	0.042***	0.045***	0.021***
31 – 50 years	–0.050***	–0.046***	–0.004***	0.041***	0.040***	0.018***
cohabitation	–0.013	–0.011	–0.001	0.010	0.010	0.004
foreigner	0.052***	0.041***	–0.003***	–0.041***	–0.035***	–0.014***
no. of children	0.025***	0.023***	0.002***	–0.020***	–0.020***	–0.009***
registered unemployment	–0.155***	–0.086***	0.036***	0.103***	0.075***	0.027***
long-term unemployed	0.052***	0.045***	0.001***	–0.042***	–0.039***	–0.017***
child care obligations, hours per day (ref. group: no child care obligation)						
1 to 4 hours	–0.052***	–0.055***	–0.013***	0.044***	0.050***	0.025***
5 to 8 hours	–0.057***	–0.066***	–0.022***	0.049***	0.063***	0.034***
more than 9 hours	–0.064***	–0.079***	–0.032***	0.055***	0.076***	0.044***
qualification (ref. group: no occupational training)						
basic occ. training	–0.051**	–0.047**	–0.004**	0.042**	0.042**	0.019**
interm. occ. training	–0.076***	–0.077***	–0.016***	0.063***	0.071***	0.035***
univ. entrance qual.	–0.071***	–0.087***	–0.036***	0.060***	0.084***	0.049***
university degree	–0.110***	–0.154***	–0.099***	0.077***	0.160***	0.125***
regional variables						
reg. GDP (in bn. Euro)	0.001	0.001	0.000	–0.001	–0.001	–0.000
reg. unemp. rate	0.002	0.002	0.000	–0.002	–0.001	–0.001
observations	2,275.00					
McFadden's R^2	0.04					
log-likelihood	–3,622.30					
χ^2	223.83***					

Note: Dependent variable is the number of job search methods used. Year dummies and regional dummy variables for the federal states have been included but marginal effect estimates are not displayed.

Significance is indicated as follows: *** denoting the 1 %, ** the 5 % and * the 10 % level.

Table A.3

Ordered probit results for job search intensity (females, marg. eff.)

	$Pr(y = 1)$	$Pr(y = 2)$	$Pr(y = 3)$	$Pr(y = 4)$	$Pr(y = 5)$	$Pr(y = 6)$
age (reference group: 51 – 65 years)						
18 – 30 years	–0.029*	–0.026*	0.002*	0.022*	0.025*	0.007*
31 – 50 years	–0.038**	–0.031*	0.005**	0.028**	0.029**	0.007**
cohabitation	–0.014	0.012	–0.002	–0.010	–0.011	–0.003
foreigner	0.019	0.015	–0.003	–0.013	–0.014	–0.003
no. of children	0.014*	0.012*	–0.002*	–0.010*	–0.011*	–0.003*
registered unemployment	–0.181***	–0.098***	0.054***	0.108***	0.095***	0.021***
long-term unemployed	0.049***	0.039***	–0.008***	–0.035***	–0.036***	–0.009***
child care obligations, hours per day (ref. group: no child care obligation)						
1 to 4 hours	0.015	0.012	–0.002	–0.011	–0.011	–0.003
5 to 8 hours	0.011	0.009	–0.002	–0.008	–0.008	–0.002
more than 9 hours	0.002	0.002	–0.000	–0.001	–0.001	–0.000
qualification (ref. group: no occupational training)						
basic occ. training	–0.030	–0.026	0.003	0.022	0.024	0.006
interm. occ. training	–0.091**	–0.079**	0.008**	0.067**	0.075**	0.020**
univ. entrance qual.	–0.078**	–0.089**	–0.016**	0.062**	0.090**	0.030**
university degree	–0.079**	–0.087**	–0.014**	0.062**	0.088**	0.029**
regional variables						
reg. GDP (in bn. Euro)	0.002	0.002	–0.000	–0.002	–0.002	–0.000
reg. unemp. rate	0.011	0.010	–0.001	–0.008	–0.009	–0.002
observations	2,419.00					
McFadden's R^2	0.04					
log-likelihood	–3,778.16					
χ^2	269.88***					

Note: Dependent variable is the number of job search methods used. Year dummies and regional dummy variables for the federal states have been included but marginal effect estimates are not displayed.

Significance is indicated as follows: *** denoting the 1 %, ** the 5 % and * the 10 % level.

Table A.4

Means of selected variables for successful job search by job search channels

	public employment agency	internet job search	advertise-ments	personal contacts
individual characteristics				
female	0.50	0.51	0.68	0.60
cohabitation	0.36	0.34	0.48	0.47
foreigner	0.09	0.04	0.10	0.13
years of education	11.29	12.99	12.04	11.67
age (in years)	34.93	32.04	34.49	33.70
no. of children	0.63	0.67	0.83	0.85
registered unemployment	0.11	0.03	0.04	0.07
long-term unemployed	0.73	0.50	0.48	0.43
job characteristics				
temp. employment contract	0.69	0.48	0.36	0.39
white-collar	0.30	0.51	0.51	0.38
weekly working hours	37.50	38.88	31.39	28.44
no. of employees in company				
1 to 19 employees	0.36	0.30	0.39	0.47
20 to 199 employees	0.39	0.33	0.33	0.29
200 to 1,999 employees	0.16	0.18	0.16	0.13
more than 2,000 employees	0.09	0.19	0.12	0.11
occupational autonomy				
1 = low autonomy	0.57	0.35	0.37	0.48
2	0.25	0.18	0.30	0.30
3	0.14	0.25	0.24	0.15
4	0.04	0.21	0.08	0.06
5 = high autonomy	0.00	0.01	0.00	0.01
regional variables				
East Germany	0.52	0.28	0.20	0.27
reg. GDP (in bn. Euro)	16.42	22.84	24.84	23.10
reg. unemp. rate	13.10	10.64	9.99	10.62
No. of observations	955	239	640	1,644