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Competition between employed and unemployed job applicants: Swedish evidence

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Competition between employed and unemployed job applicants: Swedish evidence*

by

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Abstract

We use the Swedish Job Applicant Database to empirically investigate whether being unemployed *per se* reduces the probability to get contacted by a firm. This database contains personal characteristics and preferences over the type of job the applicant wants to find. The data is submitted both by employed and unemployed workers over the Internet by the applicants themselves. This means that we have access to *exactly* the same information as firms have when they choose whom to contact. Our results show that an unemployed applicant faces a lower probability to get contacted by a firm than an otherwise identical employed applicant, thus supporting the claim that firms view employment status as an important signal for productivity.

Keywords: Employed and unemployed job seekers, discrimination.
JEL classification: J64, J71.

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1 Introduction

In continental Europe, unemployment started to rise in the late seventies and it has since remained very high. In Sweden high unemployment became a problem during the severe economic crisis of the 1990s. The Swedish unemployment rate quickly reached a very high level and it then took several years before it started to fall back to more normal levels. Irrespective of what economic disturbances that caused the initial rise in unemployment, the question why the adjustment back to equilibrium has taken so long must be explained before we can claim to understand the dynamics of unemployment.

A number of explanations for the persistence of unemployment have been proposed.[1] These explanations are often based on the idea that some factor in the wage formation process prevents wages from falling, thereby, keeping the unemployment rate high. One such explanation starts by noting that a firm often has a choice between hiring employed and unemployed applicants. If firms perceive employed applicants as more attractive to hire than unemployed applicants, wages will not fall despite the high unemployment rate. Instead, competition among firms over already employed workers will keep wages high.

In principle, there are two reasons why unemployment might be perceived as a negative worker characteristic. The first explanation is based on a selection argument. It assumes that the most unproductive workers in the economy are concentrated to the pool of unemployed workers, e.g. because firms generally lay off their least productive workers in bad times. If firms cannot distinguish these workers from other fully productive unemployed workers, unemployment becomes a signal of low productivity.[2] Firms might thus find it optimal to avoid hiring unemployed workers. The second explanation is based on duration effects. It assumes that workers lose human capital, e.g. productive or social skills, during unemployment. If firms perceive that many unemployed workers have suffered such a loss of skills, it might be optimal to avoid hiring them, especially if this is combined with an inability among firms to identify which workers that have lost skills. Both of these

[1] See, for example, the discussion in Bean (1994).

[2] The term signal is used throughout the paper and should be interpreted in a wide sense. Employment status is viewed as a signal of productivity by firms but obviously differs from the more narrow use of the word signal as something that the sender chooses.

stories share the idea that unemployment signals low productivity and should be important in labor markets where firms have an imperfect ability to observe the productive abilities of their applicants. If this is a reasonable assumption for real world labor markets, we might expect such signals to significantly affect the hiring strategies used by firms. However, two factors could mitigate these effects; unemployed workers might be able to start working on a new job sooner and/or accept a lower initial wage.

It can be shown, that if firms discriminate against unemployed workers in hiring this can have profound effects for the aggregate economy. Eriksson and Gottfries (2003) analyze the macroeconomic implications of such behavior.[3] It is shown that this, in the aggregate, will lead to higher equilibrium unemployment and a slower adjustment back to equilibrium after a negative shock to the economy. The explanation for these effects is that since firms use the wage to control turnover they will be reluctant to lower it rapidly fearing a costly rise in turnover. Numerical simulations indicate that the effects are substantial and have the potential to explain the observed persistence of unemployment.

However, to be certain that such statistical discrimination is a feature characterizing European labor markets we have to verify it empirically. The purpose of this paper is, therefore, to empirically investigate whether an unemployed applicant has a lower probability to find a job than an otherwise identical employed applicant.

Anyone wishing to investigate how employment status affects an applicant's chance to get a job faces a number of difficulties. First, data is needed about the search behavior and search outcomes for both employed and unemployed job applicants. This data must include information about the search intensity for both groups, since it is possible that there are systematic differences between them. However, such data is often difficult to obtain because on-the-job search and job-to-job switches are not recorded in official registers. Second, data about all other relevant characteristics of the searchers are needed to isolate the effect from employment status from other factors that employers take into account when they make hiring decisions. The last complication is often encountered in studies of discrimination and is very

[3] In Eriksson and Gottfries (2003), it is taken as a starting point that employers prefer to hire employed applicants. In Eriksson (2002) a microeconomic explanation for such behavior is explored.

difficult to solve because it is rare for the researcher to have access to all the information the firms use when they make their hiring decisions.

This paper uses data from the Applicant Database (Sökandebanken), which is kept by the Swedish Employment Office (AMS). All workers, both employed and unemployed, looking for a new job are invited to submit details about their education, work experience, other skills as well as details about the type of jobs they want to find.[4] Employers can then search in this database for applicants that they find interesting and contact them for interviews etc. All such contacts are registered. The data covers all applicants remaining as active searchers in April 2001 who agreed to participate in this research project. This dataset makes it possible to study how the probability to get contacted by an employer, and the number of contacts received, depends on the characteristics of the applicants; e.g. their employment status.

The dataset allows us to overcome many of the above-mentioned problems. First, we have data about the search activities of a lot of employed workers; almost half of all workers in the sample search on the job. Second, the search intensity is the same for all workers in the database; to search just means to submit the required information to the database. Third, since the employer only observes what is in the database, we can be certain that we have records of all information that the employer uses when he or she chooses whom to contact. Thus, we do not need to worry that the employer has access to more information than we do. If we include properly defined control variables for all other characteristics, we will obtain estimates measuring the effect from being unemployed on the chance to get contacted by an employer.

One limitation of using this dataset is that we do not know whom the employer finally decides to hire. However, for an applicant to get hired, he or she must be contacted by an employer. Therefore, if we find that the probability to get contacted by an employer is lower for unemployed workers, this will also be strong evidence that the hiring probability is lower for unemployed workers.[5]

[4] This dataset has previously been used in Edin and Lagerström (2002) who study discrimination based on gender or ethnicity.

[5] The hiring of a worker often involves several steps. For example, a firm identifies a few candidates in the Applicant Database they find interesting and decides to contact them, these workers are asked to send in applications, the firm chooses to interview a couple of these workers, and finally hires one of them. This means that the firm may be: (i) less likely to contact unemployed workers, (ii) given that the firm contacts unemployed workers be less likely to

We estimate two types of models in the paper. First, we estimate models for the probability to get contacted by an employer. We insert control variables for education, work experience, other skills, regional and occupational dummies as well as dummy variables for the current labor market status of the applicant. The results of these regressions show that an unemployed worker faces a lower probability to get contacted by an employer than an employed applicant. For an otherwise identical searcher, being unemployed reduces the contact probability by 3 percentage points. For the "typical" searcher, this corresponds to a decrease in the probability to get contacted from 45 percent to 42 percent; i.e. a 7 percent decrease.[6] However, it should also be noted that the relative effect from a 3 percentage point drop in the contact probability can be much bigger for a low skilled worker searching for unqualified work. Second, we estimate models for the number of contacts received by the applicants using the same control variables. The results of the regressions show that an unemployed worker gets around 0.13 fewer contacts over the sample period than an employed worker. For the "typical" searcher, this corresponds to a decrease in the number of contacts received from 1.10 to 0.97; i.e. a 12 percent decrease. All results are statistically significant at conventional levels and appear stable over different specifications and estimation methods.

Both of these results indicate that firms prefer to contact employed applicants rather than unemployed applicants even when we control for a number of other observable differences. Thus, it seems to be the case that unemployment *per se* is seen as a signal of negative unobservable characteristics. These results give support to the theoretical claims in Eriksson and Gottfries (2003) and Eriksson (2002).

Due to the difficulties that arise when one tries to identify labor market discrimination based on employment status, there exist few related studies that use standard econometric techniques. Instead, most of the existing literature uses surveys or interviews. Examples using Swedish data are Agell and

choose to interview unemployed workers and (iii) given that the firm chooses to interview unemployed workers be less likely to hire them. Thus, total discrimination may be a product of these three components. However, it can also be the case that it does not matter, or even is an advantage, to be unemployed in the later stages of the hiring process for the reasons discussed above.

[6] The "typical" searcher is a 26-35 year old Swedish man with secondary education and at least five years labor market experience who has a driving license, good computer skills, good language skills in Swedish and English and that searches for technical work (Amsyk 3) in Stockholm.

Bennmarker (2002), Agell and Lundborg (2003), Klingvall (1998) and Behrentz and Delander (1996). All of these studies find evidence in favor of the view that some firms view unemployment as a negative characteristic. Similar results for other countries can be found in Bewley (1999) for the US and Atkinson, Giles and Meager (1996) for the UK. However, even though these studies support the view that labor market status is used as a hiring criterion, it is difficult to draw conclusions about the relative probability to find employment from such studies. One might also question whether employers that do use unemployment as a hiring criterion are willing to admit to that in an interview or a survey. Such bias might result in an underestimation of the true extent of discrimination. Given these limitations of survey-based data, it is clearly advantageous to use data on what employers *actually do* rather than what they *claim they do*.

There are a few related econometric studies. An example is Blau and Robins (1990). They use data from the Employment Opportunity Pilot Project (EOPP), a US dataset collected in 1979-80. They find that unemployed searchers do get fewer job offers than employed searchers even after controlling for other differences. Belzil (1996) finds similar results using Canadian data.[7] However, in none of these studies can the authors claim that they have access to all the information that firms use when choosing whom to hire. Thus in those studies, it is difficult to know if it is unemployment *per se* or some other information obtained by firms in job interviews etc., unobservable to the researcher, that determines whom the firm hires.

The rest of the paper is organized as follows. Section 2 presents a discussion about which factors we expect should affect the hiring decisions of firms. In Section 3 we present the dataset used in the estimation and in Section 4 we define the variables, discuss the estimation strategy and present the results. Section 5 concludes.

[7] There exist a few more studies but they tend to focus on youths. Andrews et al (2001) find that employed search is slightly more effective for UK youths aged 15-18. In contrast, Holzer (1987) finds that unemployed search is more effective using a sample of US youths. Belzil (1996) finds that mature workers are more likely to be stigmatized by unemployment than youths.

2 A theoretical framework

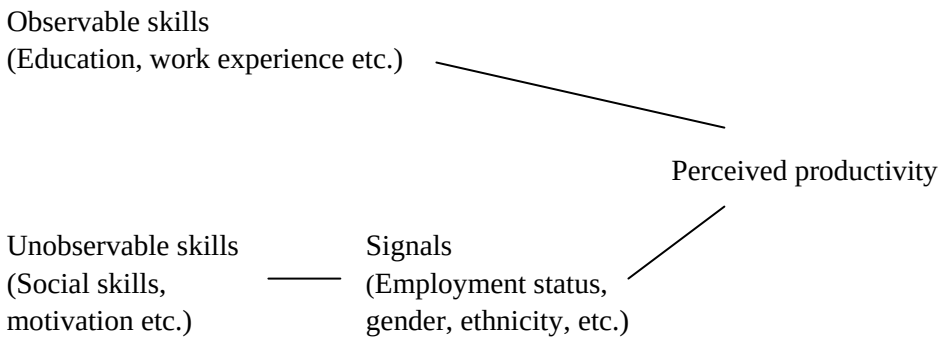
Before going into the empirical analysis, it is useful to briefly consider how we would expect an employer, which must choose whom to hire from a pile of applications, to behave; i.e. which factors should influence whom the firm chooses to contact. The discussion in this section is very informal and its sole purpose is to guide us in the empirical analysis below. A formal analysis of hiring under uncertainty can be found in Eriksson (2002).

A crucial factor that determines whom the employer considers as hirable is the information set he or she has available when choosing whom to contact. If the information available to the employer were totally illuminating about the abilities of all the applicants, this would be easy. However, this is highly unlikely since there are a lot of factors that determine the productivity of a worker. Therefore, the employer has to make a decision in a situation characterized by imperfect information. In such a situation, there are essentially two types of factors that we expect will affect whom the employer decides to contact. First, some observable factors can affect the productive abilities of the applicants directly. Examples of such factors are education, work experience, other skills etc. Second, other factors are important only as signals for unobservable factors that in turn may affect the productivity of the applicants. Examples of signals are employment status, gender and ethnicity.[8] Examples of unobservable factors are ability to cooperate, motivation and other social skills.

Figure 1 illustrates how different types of information should affect the contact decision. The lines represent real or perceived correlations. From Figure 1 it is clear that in the empirical analysis below we should include variables for all observable productive factors and for all signals that employers observe prior to making their hiring decisions.

[8] Factors such as education and experience also might be viewed as signals for unobservable characteristics. However, there is a fundamental difference between these factors and factors like employment status. Employment status is only meaningful as a screening criterion if the employer believes it is correlated with some other factor that do affect productivity, while education and experience are meaningful as screening criterions by directly affecting productivity.

Figure 1. Factors that affect the contact decision of the firm



3 Data

This paper uses data from the Applicant Database (Sökandebanken), which is kept by the Swedish Employment Office (AMS) since the fall of 1997. All workers, both employed and unemployed, that want to find a new job are invited to submit their personal details to the database. This can be done either from home via the Internet or at the Employment Office. The applicant is required to submit details about education, work experience, language skills and a personal letter as well as information about which type of job he or she is interested in.[9] Employers that are registered with the Employment Office can

[9] The information is submitted using specially constructed forms that must be filled out by the applicants. This means that there are no missing values. In the personal letter, the applicant is free to write whatever he or she wants. This means that it can contain both a duplication of information that also has been filled out in the other forms and other kinds of personal information. It is difficult for us to know how much this information affects employers in their contact decisions. We do not try to grade the quality of the personal letters because such a measure would be highly subjective. However, it should be kept in mind that employers might use the quality of the personal letter as a signal for unobservable characteristics. Another peculiarity of the data set is that people are allowed to hide personal information like name and gender. This generates information that can be used to study discrimination based on gender or ethnicity (see Edin and Lagerström (2002)). This feature of the data is not used in this paper and does not in any way affect our results.

use the database to locate workers they find interesting and contact them for interviews etc. Most such contacts are registered in the database.[10]

In this section we discuss the data used in the empirical investigation. We describe how the data was obtained, give summary statistics and discuss selection issues.

3.1 The characteristics of the sample

In the spring of 2001, the Applicant Database contained approximately 50,000 individuals with a monthly inflow of around 11,000 new applicants. All applicants that logged into the system between March 1 and March 12, 2001 were asked if they wanted to participate in a research study investigating the recruitment behavior of firms.[11] Around 50 percent of those asked agreed, giving us a sample of 8,666 individuals. Because we did not want to include youths in secondary school in the sample we excluded all individuals aged below 20.[12] That gives us the sample used in this study consisting of 8,043 individuals.[13] These people have been in the database for an average time of approximately 35 weeks. Table 1 gives some descriptive statistics about the people in the sample and the jobs they hope to find.

[10] It is possible that some employers contact applicants using other methods that do not get recorded, e.g. if a worker includes a phone number in the personal letter. However, according to the Employment Office most contacts are made within the system.

[11] This was required by the Employment Office. The data used were collected for use in Edin and Lagerström (2002). The system registers if and when the applicants log into the system. Since all workers included in our empirical investigation logged in during this time, only active searchers should be included in the sample.

[12] Most of the applicants aged below 20 look for work during the summer break or temporary work on school holidays etc. Therefore, it seems natural to exclude them in our empirical investigation.

[13] It should be noted that our sample is a stock-flow sample; i.e. our sample includes both new applicants that registered their details during the period 1-12 March and applicants that logged into their already existing accounts in that time period. Stock-flow sampling sometimes can cause problems. However, given that we insert properly defined control variables for all factors that affect the contact probability it should not affect our results.

Table 1. Descriptive statistics about the characteristics of the applicants and the jobs they want to find (in fractions)

	All	Employed	Unemployed
Number of applicants	8043	3941	3056
Labor market status:			
Employed	0.49		
Unemployed	0.38		
University student	0.08		
In other training	0.04		
On parental leave	0.01		
Highest level of completed education:			
Primary	0.07	0.05	0.12
Secondary	0.49	0.51	0.53
University	0.44	0.44	0.35
Work experience:			
None	0.15	0.05	0.21
Some (less than 5 years)	0.42	0.45	0.40
Long (five years or more)	0.43	0.50	0.39
Other skills:			
Managerial experience	0.34	0.42	0.27
Telecommuting experience	0.12	0.14	0.11
Research experience	0.05	0.06	0.04
Driving license	0.79	0.83	0.73
Good computer skills	0.74	0.76	0.69
Good language skills - Swedish	0.97	0.98	0.96
Good language skills - English	0.56	0.58	0.50
Good language skills – G-F-S	0.20	0.20	0.18
Age:			
Mean (years)	33.8	34.1	34.0
Age 20-25	0.29	0.25	0.28
Age 26-35	0.33	0.36	0.29
Age 36-50	0.28	0.30	0.29
Age 51-	0.10	0.09	0.14
Gender:			
Female	0.49	0.49	0.45
Ethnicity:			
Foreign name	0.13	0.12	0.15

Desired region:			
Stockholm	0.29	0.31	0.26
Uppsala	0.09	0.09	0.08
Södermanland	0.08	0.07	0.08
Östergötland	0.08	0.08	0.08
Jönköping	0.06	0.06	0.06
Kronoberg	0.05	0.05	0.04
Kalmar	0.05	0.05	0.05
Gotland	0.02	0.02	0.02
Blekinge	0.05	0.05	0.04
Skåne	0.19	0.19	0.19
Halland	0.08	0.08	0.07
Västra Götaland	0.18	0.20	0.15
Värmland	0.05	0.05	0.05
Örebro	0.07	0.06	0.07
Västmanland	0.07	0.07	0.08
Dalarna	0.05	0.05	0.06
Gävleborg	0.06	0.05	0.06
Västernorrland	0.04	0.04	0.05
Jämtland	0.02	0.02	0.02
Västerbotten	0.04	0.04	0.04
Norrbotten	0.03	0.03	0.03
Desired occupation:			
Legislators, senior officials and managers (Amsyk 1)	0.03	0.04	0.02
Professionals (Amsyk 2)	0.28	0.30	0.22
Technicians and associate professionals (Amsyk 3)	0.29	0.33	0.25
Clerks (Amsyk 4)	0.25	0.27	0.24
Service workers and shop sales workers (Amsyk 5)	0.19	0.20	0.19
Skilled agricultural and fishery workers (Amsyk 6)	0.02	0.02	0.02
Craft and related trades workers (Amsyk 7)	0.12	0.12	0.12
Plant and machine operators and assemblers (Amsyk 8)	0.10	0.10	0.11
Elementary occupations (Amsyk 9)	0.11	0.09	0.13

Note: Our measure of labor market experience only includes work in those occupations the worker wants to find a job. This explains why some of those who are employed are classified as having no work experience. G-F-S denotes language skills in German, French or Spanish. The column labelled all includes all searchers including students etc. It is possible for the workers to search for jobs in several regions and/or occupations. This explains why the fractions do not sum to one.

From Table 1 there are several things worth noting. First, the people in the sample tend to be quite young and well educated. The average age is just around 34 years and 44 percent have a university degree. Moreover, many of the applicants have a lot of other potentially useful skills. Second, there are almost as many women as men in the database and it includes a non-negligible number of workers with foreign names.[14] Third, we have more employed than unemployed people in the sample. This is obviously one of the most attractive features of the data set for the purpose of studying competition between employed and unemployed workers. Fourth, we see that a substantial fraction of the workers seek employment in the areas surrounding the three biggest metropolitan areas and that they are quite diversified with respect to the types of work they seek.

Finally, turning to the number of offers received, the 8,043 workers in our sample have received 7,179 contacts from employers during their time in the database. Table 2 gives some summary statistics about the fraction receiving at least one offer and the number of offers received, both for all workers and for the four employment status subgroups.

Table 2. Descriptive statistics about the contacts received divided into employment status subgroups

Employment status	Fraction receiving at least one contact	Average number of contacts
All	0.34	0.89
Employed	0.41	1.16
Unemployed	0.28	0.64
University student	0.25	0.57
In other training	0.30	0.75

Table 3 presents the distribution of the number of contacts received for all workers, unemployed workers and employed workers respectively.

[14] The Applicant Database does not contain information about the ethnical origin of people. However, since employers often easily can see the name of the applicant from the information submitted, we might expect some employers to use this as a basis for discrimination. Therefore, all workers in the Applicant Database agreeing to participate in the study were asked whether they believed other people perceived their name as foreign.

Table 3. Descriptive statistics about the distribution of contacts received divided into employment status subgroups, percent

	0	1	2	3	4	5	6	7	8	9	>9
All	65.9	17.4	6.7	3.1	2.0	1.2	1.0	0.8	0.3	0.5	1.1
Unemployed	71.9	15.2	5.4	2.3	1.8	1.2	0.8	0.5	0.2	0.2	0.5
Employed	59.4	19.6	8.2	3.8	2.2	1.4	1.3	1.1	0.4	0.6	2.0

From Tables 2 and 3 we see that employed workers receive many more contacts than workers in any of the other states. An employed worker receives, on average, almost twice as many contacts as an unemployed worker. Obviously, we cannot conclude from these tables that it is unemployment in itself that leads to this outcome, since the groups differ systematically in a number of other ways as well. To get an estimate of the extent of discrimination, we need to control for all these other differences; which is what we do in the next section. However, the shear size of the differences in Table 2 is striking. We also see that people currently participating in some sort of education receive quite few contacts. This could be due to the fact that employers want to find people that can take new jobs directly or some other reason.

3.2 Selection issues

In our case, we have essentially two types of selection issues to discuss. However, it is difficult to know the extent of these potential selection problems.

First, for our results to have internal validity for this particular search channel, we must ask whether we have successfully controlled for all differences correlated with employment status. Even though we have access to exactly the same information as the employers, it is not certain that we have succeeded in this. If not, this can be a problem if there are systematic differences in those dimensions between those who agreed to participate in the study and those who did not. This may lead us to over- or underestimate the true amount of discrimination. For example, if employers that are looking for workers with very rare skills are less likely to view unemployment as a negative characteristic than employers that are looking for workers with more common skills, our sample might include a higher proportion of the first group and, thus,

overestimate the true amount of discrimination. Unfortunately, we do not have access to any data about those workers that did not agree to participate in this study. However, we find no significant differences in the effects across regions or occupations. Still, even though it seems unlikely that such factors would significantly affect the results, this possibility must be kept in mind when interpreting the results.

Second, since both workers and firms can choose whether or not to use the Applicant Database, we might wonder whether those that do use it differ from those that do not. This issue is important if we want to generalize our results to the entire economy, i.e. the external validity. It can be addressed by comparing the characteristics of our data to other data sets. To get a rough idea about whether the unemployed in our data differ from the typical unemployed in Sweden, we can compare it to data from the Swedish public employment offices.[15] Appendix 1 presents the characteristics of unemployed workers in the Applicant Database and Händel. Comparing these two data sets, the most striking difference is the high proportion of university graduates in our sample. In addition, our workers are younger. To investigate whether the discrimination effect differs across education levels and age groups, we have included interaction terms in our regressions. These effects are all highly insignificant and do not improve our model significantly, indicating that our results are valid also for the entire economy. Regarding the employers that use the Applicant Database it is unfortunately not possible to compare them to the typical employer in Sweden. The reason being that our dataset does not include direct information about the employers that use the Applicant Database; we only have information on the offers received by the searchers in the sample.

4 Estimation

We want to investigate whether the probability to get contacted by an employer, and the number of contacts received, is affected by the current employment status of the applicant. As we have seen from Table 1, employed

[15] Another data set to compare our sample with is the dataset used by Carling et al (1996) who studies the effects of unemployment benefits. Compared with that data set the most important difference is again the high share of university graduates in our sample. In addition, our applicants are a little older and have more work experience.

and unemployed workers differ systematically in a number of other dimensions as well. Thus, we need to define proper control variables for all these other factors; observable productive characteristics, other signals than employment status and the requirements of the desired job. In this section, we define the variables, present the econometric specification and discuss the results.

4.1 Variables

The control variables correspond to those presented in Table 1. Here, we will try to give some intuition for how we have chosen to construct these variables.

First, we have factors that are directly related to the productivity of the applicant. We expect these factors to both explain much of the variation in contact rates between applicants and contain systematic differences between employed and unemployed applicants. As a consequence, we must insert proper controls for these characteristics. The two most important observable characteristics that directly affect the productivity of the worker are education and labor market experience. To control for education, we include dummy variables for the highest completed level of education; primary, secondary or university. To control for experience, we use dummy variables for three lengths of experience; none, some ($0 < t < 5$ years) and long (≥ 5 years).[16] We also use dummy variables for managerial experience, experience of telecommuting, research experience, driving skills, good computer skills and good language skills in Swedish, English, German, Spanish or French.

Second, we have factors that employers can use as signals for other un-observable characteristics. These include age, gender, ethnicity and employment status. For age, we divide the workers into five groups; 20-25, 26-35, 36-50, 51- years old.[17] For gender and ethnicity, we use naturally defined dummy variables. For employment status, we divide the applicants into five groups; employed, unemployed, university students, in other training and on child leave. We include the last three groups to make sure that those classified as employed or unemployed really are just that and not students.

[16] It can be argued that the number of years of experience is the relevant variable. However, we only have data on labor market experience in those occupations the searcher wants to find a job.

[17] In principle, we could insert age as a continuous variable. However, we have chosen not to do so because there is hard to find a theoretical argument why for example a 35 year old should be judged differently by employers than a 34 year old. In addition, the results do not change if we introduce age as a continuous variable.

Third, we have to include variables for differences among occupational and regional labor markets. Usually, an employer that uses the Applicant Database will only consider a small number of the searchers relevant for the job that he or she wants to fill; e.g. if a firm wants to hire a carpenter in Stockholm an applicant that searches for work as a nurse in Southern Sweden is irrelevant. This means that the employer's choice will usually be limited to those searchers that have stated that they are interested in a particular occupation at a particular location. Thus, the requirements the applicants have about the jobs they want to find will affect if they receive contacts or not.[18] We must include controls for such effects since it is natural to expect that labor market conditions differ between different occupational groups as well as between different regions. To control for such effects, we use dummy variables for occupation and location. For desired occupation, we use dummy variables based on the nine-group classification system used by the Employment Office. For desired location, we use dummy variables for counties.

Fourth, we need to include controls for the length of time applicants have been in the Applicant Database since applicants that have been in the database longer, on average, have received more contacts. Thus, we include a vector of the variables time and time squared in the estimation.

4.2 The probability to receive a contact

We estimate a model for the probability that a searcher in the Applicant Database receives at least one contact, during his or her time in the database, as a function of the variables introduced above. We use the linear probability model (LPM) and estimate it using ordinary least squares. The empirical specification is given by:

$$P(Y=1) = \alpha + \phi' t + \beta' S + \delta' Z + \gamma' X + \phi' T + \varepsilon, \qquad (1)$$

[18] Of course, it is possible for firms to ignore such requirements and contact workers anyway. However, in most cases we would expect such action to be pointless. In addition, the personal letter can contain other requirements for the desired job. However, it can be argued that such more qualitative factors are more likely to be discussed after a contact has been established rather than affecting whom the firm chooses to contact.

where $Y = 1$ if a contact is recorded ($Y = 0$ otherwise), t is the time vector, S denotes the current employment status of the applicant, Z denotes the characteristics of the desired job, X denotes the observable productive characteristics of the applicant, and T denotes signals other than employment status. Estimation of the specification in (1) yields the results presented in Table 4.

Table 4. Ordinary least squares estimates of the probability to receive a contact

	(1)	(2)	(3)	(4)
Labor market status (S) (ref. employed):				
Unemployed	-0.063	-0.048	-0.040	-0.031
	(0.010)	(0.010)	(0.010)	(0.010)
University student	-0.036	-0.047	-0.050	-0.057
	(0.017)	(0.018)	(0.018)	(0.018)
In other training	-0.020	-0.012	-0.017	-0.009
	(0.023)	(0.023)	(0.023)	(0.023)
On child leave	0.044	0.041	0.044	0.050
	(0.050)	(0.049)	(0.049)	(0.050)
Characteristics of the desired job (Z):				
Dummies for desired region	No	No	Yes	Yes
Dummies for desired occupation	No	No	Yes	Yes
Observable productive characteristics (X):				
Highest level of completed education (ref. primary):				
Secondary		0.065	0.050	0.020
		(0.016)	(0.015)	(0.016)
University		0.110	0.088	0.052
		(0.016)	(0.017)	(0.018)
Work experience (ref. some):				
None		-0.052	-0.035	-0.029
		(0.013)	(0.013)	(0.013)
Long		0.003	-0.0004	0.024
		(0.010)	(0.010)	(0.012)

	(1)	(2)	(3)	(4)
Other skills:				
Managerial experience				0.052
				(0.011)
Telecommuting experience				0.025
				(0.015)
Research experience				0.005
				(0.022)
Driving licence				0.005
				(0.012)
Good computer skills				0.011
				(0.011)
Good language skills – Swedish				0.013
				(0.025)
Good language skills – English				0.032
				(0.010)
Good language skills – G-F-S				0.032
				(0.013)
Other signals (T):				
Age (ref. age 20-25):				
Age 26-35				-0.029
				(0.012)
Age 36-50				-0.075
				(0.014)
Age 51-				-0.094
				(0.020)
Ethnicity:				
Foreign name				-0.015
				(0.013)
Gender:				
Female				-0.046
				(0.010)
Other variables:				
Weeks in the database	0.011	0.010	0.010	0.010
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
(Weeks in the database)^2	-0.00004	-0.00004	-0.00004	-0.00004
	(0.000002)	(0.000002)	(0.000002)	(0.000002)
Constant	0.119	0.048	0.010	0.030
	(0.009)	(0.017)	(0.017)	(0.031)
Number of observations	8043	8043	8043	8043
R^2	0.237	0.243	0.270	0.281

Note: The reference category is an employed man with a Swedish sounding name having primary education, some labor market experience and looking for unskilled work in Stockholm. Robust standard errors are in parentheses.

In column 4, we see the parameter estimates for the full specification. The results indicate that unemployment is considered as a negative worker characteristic. The probability to get contacted by an employer is approximately 3 percentage points lower for an unemployed applicant than for an employed applicant and this effect is statistically significant at conventional levels. To get a feeling for the size of this effect, we can calculate contact probabilities for a "typical" applicant.[19] Such a searcher has a 45 percent probability to get contacted if he is employed, and a 42 percent probability to get contacted if he is unemployed. Thus, the contact probability is reduced by around 7 percent. However, it should also be noted that the relative effect from a 3 percentage point drop in the contact probability can be much bigger for a low skilled worker searching for unqualified work in regions with a depressed labor market.[20] These results support the theoretical proposition that firms view unemployment as a signal of some unobservable negative worker characteristic and, ceteris paribus, prefer to contact an employed applicant rather than an unemployed applicant.

Several other things are worth noting. First, searchers currently enrolled in university education also face a lower probability than employed searchers to get contacted by an employer. This might reflect the fact that firms want workers that are available for work directly or some other reason. Second, education and labor market experience have the expected signs. A higher level of completed education, or more labor market experience, has a clear positive effect on the probability to get contacted. Third, we see that other applicant characteristics functioning as signals, like age and gender, also have quite strong effects. Women and older workers face a significantly lower probability to get contacted.

In Section 3, we saw that employed workers, on average, have a much higher probability to get contacted by an employer. It is obvious from the results of the estimation that a large proportion of this difference reflects systematic differences between employed and unemployed applicants. To get a

[19] The "typical" searcher is a 26-35 year old Swedish man with secondary education and at least five years labor market experience who has a driving license, good computer skills, good language skills in Swedish and English and that searches for technical work (Amsyk 3) in Stockholm.

[20] It is quite easy to think of a low skilled older worker for whom a 3 percentage point reduction in the contact probability translates into a 15-20 percent relative difference between being employed and unemployed.

feeling for what these differences are, it is illuminating to consider columns 1 to 3 in Table 4, where we start with only labor market status variables as regressors and then successively introduce other variables that might contain systematic differences between employed and unemployed applicants (the constant and the time variables are included in all regressions).

In the first column, we regress the probability to get contacted by an employer only on the employment status variables. An unemployed worker faces a 6.3 percentage points lower probability to get contacted than an employed worker. In the second column, we include variables corresponding to such observable productive characteristics that are usually included in discrimination studies. The probability difference now falls to 4.8 percent implying that some of the difference in search outcome between employed and unemployed applicants is explained by the fact that the unemployed applicants have less education and less labor market experience. In the third column, we introduce the variables corresponding to the requirements applicants have on the jobs they hope to find. We see that unemployed workers now face a 4.0 percentage points lower probability to get contacted. The difference between the results in columns 2 and 3 hence reflects the fact that unemployed applicants seem to search for the "wrong" kinds of jobs in the "wrong" regions. In column 4, all variables observed by the firms are included. It should be noted that many of these variables are not normally available in studies of discrimination.

An interesting question is if the disadvantage unemployed searchers seem to face differs between different subgroups of unemployed applicants. We might for example ask whether unemployed women face a bigger disadvantage than unemployed men do. To investigate this, we introduce an interaction term between the female and unemployed variables in specification (1). This new variable turns out to be statistically insignificant and thus we conclude that firms consider unemployment as an equally strong negative signal for men and women. A similar question is whether the negative effect of being unemployed differ among occupations. Such an analysis can be done by adding interaction terms between occupational variables and the unemployed variable. Doing this we find that the coefficient estimates are bigger for less skilled occupations, but that all these differences are statistically insignificant. Thus, we draw the conclusion that no particular occupational group drives the results.[21]

[21] Similar results are obtained when we interact skill variables with the unemployment variable.

An important issue for any empirical analysis is whether the results are sensitive to the choice of statistical model. For the LPM model, we have tried a number of different specifications with very similar results. To ensure that our results are not specific to the use of this particular model, we have also estimated the equivalent of equation (1) using the Probit model.[22] This yields very similar results; the marginal effect becomes equal to 0.033. Thus, our results appear stable with respect to changes in model specification.

To summarize the results so far, we can conclude that unemployed workers have a lower chance than employed workers to get contacted by an employer. Some of this difference is explained by the fact that unemployed workers have less education and less labor market experience and by differences in the type of job they wish to find. However, even after we control for these variables a non-negligible negative effect remains from being unemployed, thus, indicating that unemployment *per se* is considered as a negative signal.

4.3 The number of contacts received

We also know the number of contacts our applicants have received during their time in the Applicant Database. This means that we can take the analysis a bit further by asking: do unemployed workers get fewer contacts as well?

We want to estimate a model for the number of contacts received by the searchers in the Applicant Database with the dependent variable being the number of contacts received. We estimate the following specification with ordinary least squares:

$$Y = \alpha + \phi' t + \beta' S + \delta' Z + \gamma' X + \phi' T + \varepsilon, \qquad (2)$$

where Y now denotes the number of contacts. All the explanatory variables are defined as in specification (1). The results of the estimation are presented in Table 5.

[22] For a comparison of the LPM model with the Probit model see the discussion in Amemiya (1981).

Table 5. Ordinary least squares estimates of the number of contacts received

	$Y \geq 0$	$Y > 0$
Labor market status (S) (ref. employed):		
Unemployed	-0.127	-0.212
	(0.041)	(0.105)
University student	-0.247	-0.360
	(0.073)	(0.205)
In other training	-0.008	0.092
	(0.120)	(0.364)
On child leave	-0.029	-0.299
	(0.135)	(0.349)
Characteristics of the desired job (Z):		
Dummies for desired region	Yes	Yes
Dummies for desired occupation	Yes	Yes
Observable productive characteristics (X):		
Highest level of completed education (ref. primary):		
Secondary	-0.132	-0.040
	(0.059)	(0.210)
University	-0.027	0.081
	(0.068)	(0.226)
Work experience (ref. some):		
None	0.027	0.045
	(0.048)	(0.164)
Long	0.141	0.351
	(0.061)	(0.158)
Other skills:		
Managerial experience	0.174	0.172
	(0.057)	(0.134)
Telecommuting experience	0.147	0.146
	(0.094)	(0.190)
Research experience	0.124	0.138
	(0.136)	(0.270)
Driving licence	-0.037	-0.088
	(0.056)	(0.157)
Good computer skills	0.002	0.019
	(0.037)	(0.101)

	$Y \geq 0$	$Y > 0$
Good language skills – Swedish	0.034	0.110
	(0.079)	(0.232)
Good language skills – English	0.161	0.292
	(0.044)	(0.112)
Good language skills – G-F-S	0.237	0.525
	(0.074)	(0.176)
Other signals (T):		
Age (ref. age 20-25):		
Age 26-35	-0.270	-0.542
	(0.062)	(0.162)
Age 36-50	-0.397	-0.638
	(0.075)	(0.207)
Age 51-	-0.547	-0.917
	(0.090)	(0.236)
Ethnicity:		
Foreign name	-0.010	0.041
	(0.071)	(0.203)
Gender:		
Female	-0.208	-0.337
	(0.047)	(0.128)
Other variables:		
Weeks in the database	0.028	0.034
	(0.002)	(0.004)
(Weeks in the database)^2	-0.00004	-0.00007
	(0.00002)	(0.00003)
Constant	-0.050	0.455
	(0.113)	(0.393)
Numbers of observations	8043	2743
R^2	0.256	0.193

Note: The first column includes all applicants, the second only those that have received at least one contact. The reference category is an employed man with Swedish sounding name having primary education, some labor market experience and looking for unskilled work in Stockholm. Robust standard errors are in parentheses.

In column 1, we have the results of the regression for the full sample. We see that the results confirm what we saw in Table 4. Unemployed job seekers face a significantly worse outcome than employed job seekers. On average, an otherwise identical searcher gets contacted 0.13 times less if he is unemployed. As we did with the contact probability, we can calculate the effects for the

"typical" searcher. Such a searcher receives 1.10 contacts if he is employed and 0.97 contacts if he is unemployed. Thus, the contact probability is reduced by around 12 percent.

It is possible that applicants that do get at least one offer differ in some important way from those applicants that do not get any offers. To see if this is true, we run a regression including only those applicants that have received at least one contact. The results of that regression are presented in column 2. We see that the difference is even bigger; an unemployed worker receives approximately 0.21 fewer contacts than an employed applicant.

To see if the statistical model chosen affects the results, we have also estimated the model using two models that are often proposed in the literature; the Poisson model and the Negative Binomial model (see the discussion in Greene (1997)). Estimation of the equivalent of equation (2) for the whole sample, using both of these models, yields very similar estimates for the unemployment variable. The result that unemployed workers receive fewer contacts than employed searchers, therefore, seems very stable over different model assumptions.

To summarize, unemployed workers receive significantly fewer contacts than employed searchers. The probability to get contacted is lower for an unemployed worker and, even if a person gets contacted, he gets fewer offers if he is unemployed.

5 Concluding remarks

Firms hiring new workers are often not able to perfectly observe the productive abilities of their applicants. Instead, employers try to infer the productivity of job seekers by using whatever information they have available. Such information often includes signals; i.e. factors that firms believe are correlated with unobservable factors that affect productivity. One example of such a signal is the employment status of the applicant. If employers use employment status as a hiring criterion, an unemployed job seeker should face a lower probability to get contacted by a firm than an employed job seeker. The purpose of this paper has been to empirically investigate whether this theoretical implication is valid.

Using Swedish data from the Applicant Database, we have seen that an unemployed job seeker faces a lower probability to get contacted by a firm, and receives fewer contacts, than an employed job seeker. These effects remain

even after we control for a number of other factors that the firm can observe prior to its contact decision. Thus, the results of the empirical analysis give support to the proposition that firms view employment status as an important signal for productivity and that firms therefore, ceteris paribus, prefer to contact employed applicants rather than unemployed applicants.

The results in this study indicate that unemployed job seekers are at a disadvantage compared to employed job seekers in our sample from the Applicant Database. An important issue is whether the same is true for the whole labor market. Obviously, only further empirical analysis can answer such a question. However, *a priori* it is difficult to think of any particular reason why firms using the Applicant Database should be more prone to view unemployment as a negative worker characteristic than employers using other search channels.

Another important issue that should be addressed is what the aggregate implications are of the effects we have identified. From the analysis in Eriksson and Gottfries (2003), it is clear that in an economy where firms perceive unemployed applicants as less hirable than employed applicants there will be more wage pressure and higher unemployment. At the very least our study indicates that such effects may be an important factor that affects the dynamics of unemployment.

References

Agell, Jonas, and Helge Bennmarker, "Wage Policy and Endogenous Wage Rigidity: A Representative View from the Inside," Working Paper 2002:12, Institute for labour market policy evaluation, 2002.

Agell, Jonas, and Per Lundborg, "Survey Evidence on Wage Rigidity and Unemployment: Sweden in the 1990s, "*Scandinavian Journal of Economics*, 105 (2003), 15-29.

Amemiya, Takeshi, "Qualitative Response Models: A Survey," *Journal of Economic Literature*, 19 (1981), 1483-1536.

Andrews, Martyn J., Steve Bradley, and Richard Upward, "Estimating the Probability of a Match Using Microeconomic Data for the Youth Labour Market," *Labour Economics*, 8 (2001), 335-357.

Atkinson, John, Lesley Giles, and Nigel Meager, *Employers, Recruitment and the Unemployed*, Institute for Employment Studies Report 325, Brighton, 1996.

Bean, Charles R., "European Unemployment: A Survey," *Journal of Economic Literature*, 32 (1994), 573-619.

Behrenz, Lars, and Lennart Delander, "Arbetsgivarnas Rekryteringsbeteende – En Intervjuundersökning," in SOU 1996:34 "*Aktiv Arbetsmarknads-politik: Expertbilaga*," Expertbilaga till betänkande från Arbetsmarknadspolitiska kommittén, Stockholm, 1996.

Belzil, Christian, "Relative Efficiencies and Comparative Advantages in Job Search," *Journal of Labor Economics*, 14 (1996), 154-173.

Bewley, Truman F., *Why Wages Don't Fall During a Recession*, Harvard University Press, Cambridge, 1999.

Blau, David M., Philip K. Robins, "Job Search Outcomes for the Employed and Unemployed," *Journal of Political Economy*, 98 (1990), 637-655.

Carling, Kenneth, Per-Anders Edin, Anders Harkman, and Bertil Holmlund, "Unemployment Duration, Unemployment Benefits, and Labor Market Programs in Sweden," *Journal of Public Economics*, 59 (1996), 313-334.

Edin, Per-Anders, and Jonas Lagerström, "Blind Dates: Quasi-Experimental Evidence on Discrimination," Mimeo, Uppsala University, 2002.

Eriksson, Stefan, and Nils Gottfries, "Ranking of Job Applicants, On-the-job Search, and Persistent Unemployment," 2003, Forthcoming in Labour Economics.

Eriksson, Stefan, "Imperfect Information, Wage Formation, and the Employability of the Unemployed," Working Paper 2002:17, Institute for Labour Market Policy Evaluation, 2002.

Greene, William H., *Econometric Analysis*, Prentice-Hall International, NJ, 1997.

Holzer, Harry J., "Job Search by Employed and Unemployed Youth, "*Industrial and Labor Relations Review*," 40 (1987), 601-611.

Klingvall, Mats, *Arbetsgivarnas Attityder*, Ura 1998:9, Arbetsmarknads-styrelsen, Solna, 1998.

Appendix 1: Comparison of the characteristics of the unemployed

Table A1. Comparison of the characteristics of the unemployed in the Applicant Database and the unemployed in Händel (in fractions)

Variable	Unemployed Applicant Database	Unemployed Händel
Highest level of completed education:		
Primary	0.07	0.25
Secondary	0.49	0.59
University	0.44	0.16
Work experience:		
None	0.15	0.12
Some or long	0.85	0.88
Age:		
Mean (years)	33.8	43.8
Age 20-25	0.29	0.07
Age 26-35	0.33	0.22
Age 36-50	0.28	0.37
Age 51-	0.10	0.34
Gender:		
Female	0.49	0.50
Ethnicity:		
Foreign name	0.13	0.19

Note: The data from Händel is for the year 2000. The variable "foreign name" in the Applicant Database is compared to the variable "being born in a country other than Sweden" in Händel. The work experience variable in Händel distinguishes only between having no experience and having experience.

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