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Unemployment or Overeducation: Which is a Worse Signal to Employers?

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July 2014

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ABSTRACT

Unemployment or Overeducation: Which is a Worse Signal to Employers?

This study aims at estimating the stigma effect of unemployment and overeducation within one framework. To this end, we conduct a field experiment in the Belgian labour market. We send out trios of fictitious male job applications to real vacancies. These applications differ only by the labour market history of the candidates. By monitoring the subsequent reactions from the employer side, we find evidence for a larger stigma effect of unemployment than overeducation. The stigma effect of overeducation is found to occur for permanent contract jobs but not temporary ones.

JEL Classification: J24, J60, C93

Keywords: unemployment signalling, overeducation signalling, transitions in youth

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1 Introduction

Many studies have revealed that adverse labour market outcomes early in one's career may have a substantial negative impact on future labour market success. This negative impact may result from not only (youth) unemployment (Arulampalam, 2001; Kletzer and Fairlie, 2003; Gregg and Tominey, 2005; Luijkx and Wolbers, 2009; Cockx and Picchio, 2013) but also early employment in jobs for which one is overeducated (Dolton and Silles, 2003; Baert et al., 2013).¹ These "scarring effects" may be explained by several mechanisms, such as human capital depreciation, psychological habituation and negative signalling. In this study, we specifically focus on the latter mechanism. Plagued with uncertainty about worker quality, employers may use job candidates' labour market history as a cheap indication of future productivity. In this context, both former unemployment and former employment in jobs for which one was overeducated may act as negative signals to employers.

From a theoretical perspective, the idea of unemployment signalling was conceptualised by the stigma effect model of Vishwanath (1989). Underlying her model is the idea that a candidate's unemployment duration may provide a signal about otherwise unobservable components of her/his productivity, i.e., high-ability workers may have shorter unemployment periods. That is, a longer period may reveal that prior firms learned the worker was unproductive. Recently, Kroft et al. (2013) tested this theory by a large-scale field experiment. They found, indeed, that the likelihood of receiving an invitation for a job interview (after sending out an

¹ A worker is considered to be overeducated if her/his education level is higher than the level that is typically required to perform adequately (McGuinness, 2006).

application) decreases significantly with the length of the worker's unemployment period.

On the other hand, there are also theoretical grounds for overeducation signalling: employment in a job below one's educational level may also serve as a negative signal to firms hiring workers for skilled jobs. Following the theoretical models of McCormick (1990) and Ma and Weiss (1993), overeducation may even act as a stronger negative signal to employers than unemployment. In McCormick (1990), more productive workers are assumed to find skilled work more satisfying or less arduous than less productive workers. Therefore, previous overeducation periods might be used by employers as a screening device for lower skills. This results in model equilibria in which taking an unskilled job is sufficiently damaging to the future employment prospects of a (skilled) worker that she/he will choose unemployment even if there is no disutility from work. This may at least partly explain persistent unemployment.

To the best of our knowledge, we are the first to estimate the stigma effect of unemployment and overeducation within one framework. That is, our research question is, "Which is the worse signal to employers: unemployment or overeducation?" In addition to its academic relevance, answering this question has clear policy implications. On the one hand, the choice between accepting overeducated employment and staying unemployed in search of a good match is a choice faced by many young unemployed, particularly in times of high unemployment. On the other hand, the relative stigma effects of unemployment and overeducation should be taken into consideration by policy makers designing active labour market policies targeted at the young unemployed. If, for instance, overeducation carries a more negative stigma than being unemployed,

then policy makers should take care to not provide incentives to young unemployed graduates to accept any job too early in the unemployment period.

To answer our research question, we conduct a field experiment in the Belgian (Flemish) youth labour market. We send out a total of 1680 fictitious male job applications to real vacancies. These applications differ only by the labour market history of the candidates: one graduated just a few months before the application, a second graduated one year earlier and had been unemployed since that time, and a third graduated at the same time as the second but had experienced overeducation in a job two levels below his education level following the Standard Occupation Classification of Statistics Netherlands (CBS, 2001). By monitoring the subsequent reactions from the employer side, the preference for a graduate with a particular labour market history is identified.

This article is structured as follows. In the next section, we provide the reader with some information on the experimental design used to gather the data. In Section 3, we analyse these data to answer our research question. A final section concludes.

2 Methods

We answer our research question by setting up a field experiment in Flanders, the northern, Dutch-speaking part of Belgium. We send fictitious job applications to real job openings. These applications differ only by the characteristic that is to be tested, namely, the recent labour market history of the candidate. By monitoring the subsequent call-back rates, unequal

treatment based on this characteristic is identified. This method, which is known as correspondence testing, has been extensively used (and refined) during the last decade to test for discrimination in the labour market. This approach allows the disentangling of employer discrimination from the supply-side determinants of labour market outcomes, such as employee preferences and network effects. Moreover, selection on individual unobservable characteristics is not an issue because the employers' decision-making information is controlled by the researcher. The study by Bertrand and Mullainathan (2004) on ethnic discrimination in the American labour market is a seminal work in this context. We differentiate ourselves from former applications of this methodology by applying it on grounds for discrimination for which unequal treatment is not forbidden by (Belgian) law. In what follows, we will successively elucidate the construction of the fictitious applications, the assignment of the treatment effect (the recent labour market history of the candidate) and the measurement of the call-back rate. At the end of this section, we elaborate on some limitations and ethical considerations inherent to our research design.

2.1 Construction of Applications and Matching with Vacancies

Between October 2013 and March 2014, we selected vacancies for starter jobs in the database of the Public Employment Agency of Flanders, which is the major job search channel in Flanders. From this database, we randomly selected 560 vacancies requiring no work experience. More concretely, we selected entry-level jobs for persons holding a secondary education degree in commerce (144 jobs), a bachelor's degree in business administration (252 jobs) or a master's degree in business economics (144). We will refer to the individuals applying for these jobs as "moderately educated", "highly

educated: Bachelor” and “highly educated: Master”, respectively. We did not apply for low-skilled jobs because low-educated individuals cannot be overeducated based on our definition of overeducation (cf. *infra*).

To each vacancy, three comparable job applications for male individuals, differing only in details and lay-out, were sent. We call these three versions the “Type A”, “Type B” and “Type C” applications. All fictitious applicants were single males who were born, living and studying in one of the suburbs of Ghent, the second-largest city of Flanders. They completed the appropriate degree for the posted job without experiencing grade retention. In addition, we added to all applications the following features: Belgian nationality; Dutch mother tongue; adequate French, English and German language skills; possession of a driver’s licence; computer skills; and summer employment experience. The cover letters indicated a person who was highly motivated and well-organised. For the highly educated candidates, sports club membership and cultural activities were also mentioned. We lastly appended a fictitious postal address (based on real streets in middle-class neighbourhoods) and a date of birth to all applications. Several example applications of the Public Employment Agency of Flanders, with different fonts and layouts, were used and calibrated for our purposes to ensure that our applications were realistic and representative. The resume and cover letter templates are available upon request.

2.2 Assignment of Labour Market History □

For each vacancy, we randomly assigned three different labour market histories to the Type A, Type B and Type C applications. Figure 1 schematises the trajectories of these three different profiles, which we will

refer to as “school-leaver”, “(formerly) unemployed” and “(formerly) overeducated”, respectively. All fictitious individuals were students before October 2012 and were unemployed at the start of our experiment, i.e., in October 2013. The only aspect in which they differed is their labour market activity between October 2012 and October 2013: the school-leaver was still in school during this year, the “(formerly) unemployed” was searching for a job² and the “(formerly) overeducated” was in a job two levels under his degree following the Standard Occupation Classification of Statistics Netherlands (CBS, 2001).³ This classification groups jobs according to a set of tasks to be executed and assigns to each occupation the educational level that is the most appropriate. The following five functional levels are considered: less than lower secondary (ISCED 0 or 1),⁴ lower secondary (ISCED 2), higher secondary (ISCED 3 or 4), lower tertiary (ISCED 5 – Bachelor) and higher tertiary (ISCED 5 – Master) education. More concretely, first, the overeducated profile holding a secondary education degree was employed in a job requiring less than lower secondary education, i.e., as a copying clerk. Second, the overeducated profile holding a Bachelor was employed in a job at a lower secondary level, i.e., as a data typist. Third, the overeducated profile holding a master’s degree held a job

² Baert et al. (2013) show that approximately 7% of the youth who start searching for a job after leaving school are unemployed for a year or more.

³ We opted for two levels of overeducation for the overeducated profile for two reasons. First, we needed to be sure that the overeducation status of the formerly overeducated was clear enough to be detected by the employers. Second, we wanted to test the stigmatising value of overeducation in the spirit of the model of McCormick (1990). Hence, we differentiate from career mobility effects resulting from gaining relevant experience in the context of the job for which one applies (cf. Sicherman and Galor, 1990). This is also why we did not introduce a profile of an individual who was adequately educated. Verhaest and Omeij (2003) show that, in Flanders, 21.6% of the moderately educated and 9.2% of the highly educated school-leavers start in a job two levels under their education level.

⁴ We employ the ISCED 1997 levels of education. ISCED stands for the International Standard Classification of Education.

at a secondary level, i.e., the job of an administrative clerk at a customer administration centre. The labour market status was mentioned in both the cover letter (in an explicit way)⁵ and the resume (in an implicit way via the reported school and labour market career).

FIGURE 1 ABOUT HERE

2.3 Measurement of Call-back Rate

We registered nine email addresses and mobile phone numbers, one for each profile at each education level. All applications were sent to the employer by email. To avoid detection, we applied to no more than one vacancy from the same employer.

Call-backs were received by telephone voicemail or email. The content of the responses is available on request. Because we included postal addresses with a non-existent street number in the applications, we could not measure call-back by regular mail. However, several human resource managers confirmed that employers rarely, if ever, invite job candidates by regular mail for selection interviews. To minimise inconvenience to the employers, we immediately declined invitations to job interviews. All call-backs received later than 30 days after sending out the application were

⁵ This was achieved, for instance, by the clause “Having just graduated with a master’s degree in business economics, I am very enthusiastic and motivated to start my professional career in this position, which perfectly matches my aspirations.” for the school-leaving profile, “After graduating with a master’s degree in business economics a year ago and searching for a job in the time since then, I am very enthusiastic and motivated to start my professional career in this position, which perfectly matches my aspirations.” for the unemployed profile and “I am very enthusiastic and motivated to continue my professional career in this position, which perfectly matches my aspirations.” for the overeducated profile.

discounted.

In our analysis, we distinguish between two definitions of positive call-back. Positive call-back *sensu stricto* means that the applicant is invited for an interview concerning the job for which he applied. Positive call-back *sensu lato* also includes, in addition to the former definition, the receipt of an alternative job proposal and a request to provide more information or to contact the recruiter.

2.4 Research Limitations

Before reporting and discussing the results of our research in the following section, we mention three limitations inherent to our research design. For an in-depth discussion of the strengths and weaknesses of correspondence tests, we refer to Riach and Rich (2002), Bertrand and Mullainathan (2004) and Pager (2007).

First, our research design is only effective in demonstrating unequal treatment at the initial stage of the selection process. Because we only measure call-backs for first interviews, we cannot translate our research results into divergences in job offers, let alone wages. Conditional on an invitation for a job interview, a profile with a particular labour market history eliciting lower invitation rates might have higher hiring chances. However, Bertrand and Mullainathan (2004) argue that, to the extent that the selection process has even moderate friction, one would expect that reduced interview rates would translate into reduced job offers and lower earnings. In the context of ethnic discrimination in the labour market, Cédiey et al. (2008) report that 85% of the total unequal treatment rate identified within a large-scale field experiment conducted in France that comprised all stages of the hiring process is observed before the employer

meets the candidate in an interview.

Second, we test for unequal treatment only within the chosen occupations and only within the vacancies posted on the VDAB database. It is possible that unequal treatment is more or less apparent in sectors other than those covered and is more or less apparent among employers who rely on other channels (such as social networks) to fill their vacancies.

Third, as mentioned before, to obtain our treatments of unemployment and overeducation captured by the employer, we assign a quite long period of unemployment and a quite severe degree of (prior) overeducation to the unemployed and overeducated profiles. Although we argued (see Section 2.2) that these profiles are not unrealistic, our results of unequal treatment based on these labour market histories might not be generalised to individuals with milder experiences of unemployment or overeducation.

2.5 Ethical Considerations

Correspondence tests raise ethical questions because they are characterised by deception and the impossibility of obtaining informed consent. Recruiters, our test-subjects, are made to believe that the submitted applications are real and, more importantly, that the candidates are genuinely interested in their jobs and are willing and able to accept a potential job offer. While we acknowledge the existence of the ethical considerations put forward by critics, there are several weighty arguments that justify the use of correspondence testing. We discuss these arguments in the following two paragraphs. For an in-depth elaboration on the ethical aspects of this type of field experiment, we refer to Riach and Rich (2004).

The first and foremost argument is methodological. If the employers

were informed about the set-up of the study, the whole purpose of the correspondence test would be undermined, as informed recruiters would change their behaviour, leading to biased results. Moreover, no other method is capable of collecting this type of direct and unbiased data on unequal treatment in the labour market. For the results to be transparent, objective and accurate, deception and a lack of informed consent are prerequisites.

Second, the level of inconvenience for the recruiter is minimised by promptly declining invitations for job interviews.⁶ The personal records of the recruiters and their companies are also not made public. No company is pilloried individually, nor is there any form of prosecution following the data collection. Furthermore, as Fix et al. (1993) note, our test-subjects cannot claim violations of privacy because their actions are commercial and their vacancies are made public.

3 Results

Table 1 describes the experimentally gathered data. In general, for 180 (76) vacancies, at least one of our three fictitious job applicants received a positive call-back in a broad (strict) sense. In 92 (30) of these vacancies, each of the three candidates received a positive call-back. Next, in 21 (13), 10 (1) and 18 (9) of the situations, only the school-leaving, unemployed and overeducated profiles, respectively, received a positive call-back. Finally, in

⁶ The reader might note that, in contrast to former applications of the correspondence testing methodology in which unequal treatment on grounds based on which discrimination is forbidden by the law, we cannot claim that unequal treatment based on recent labour market history inflicts damage on the society that may justify these costs. We can only bring to bear scientific and policy advisement advantages.

13 (9) of the vacancies, there was positive call-back sensu lato (sensu stricto) for only the school-leaver and the unemployed, in 21 (10) vacancies only for the school-leaver and the overeducated and in 5 (4) vacancies only for the unemployed and the overeducated.

Based on these statistics, we can calculate the call-back rate, i.e., the average probability of receiving a positive call-back, for each profile based on former labour market experience. These statistics are presented in the second, third and fourth columns of Table 2. Overall, the probability of obtaining any positive reaction is, as outlined in Panel A, 27% for the school-leaver,⁷ 22% for the (formerly) unemployed and 25% for the (formerly) overeducated. The interview invitation rate, on the other hand, is 12% for the school-leaver, 8% for the (formerly) unemployed and 10% for the (formerly) overeducated.

TABLE 1 ABOUT HERE

TABLE 2 ABOUT HERE

The aforementioned statistics suggest a preference for the school-leaver over the overeducation profile over the unemployment profile. However, we cannot assess the significance of their differences in call-back chances based on these statistics. Therefore, we follow the literature by calculating two measures comparing call-back outcomes profile-by-profile: the positive call-back ratio, as outlined in the last three columns of Table 2,

⁷ $(92 + 21 + 13 + 21)/540 = 0.27$.

and the net discrimination ratio, as presented in Table 3.

The positive call-back ratio between two profiles is calculated by dividing the call-back rate for a first profile by the corresponding call-back rate for a second profile. This ratio is 1.23 when comparing the call-back rates *sensu lato* for the school-leaver and the (formerly) unemployed. This means that the school-leaver received 23% more positive reactions from the employer side than the unemployed profile did. This ratio is significantly different from 1 at the 1% significance level. The corresponding ratio comparing the school-leaver and the (formerly) overeducated is 1.08. However, we cannot reject the null hypothesis that this ratio is different from 1. Finally, the positive call-back ratio, using the broad definition of positive call-back, is 0.88 when comparing the unemployed and overeducated profiles. This ratio is significantly different from 1 at the 5% significance level. This indicates that, within our experiment, the signal of former unemployment led to 12% less call-back than the signal of overeducation. Therefore, our overall results give statistically significant evidence for a preference by Flemish employers for our school-leaving and overeducated profiles over the unemployed profile. The positive call-back ratios using the strict definition of positive call-back lead to the same conclusion.

The net discrimination rate between two profiles is calculated in two steps. First, we reduce the number of applications for which the first profile (e.g., the school-leaver) received a positive call-back and the second profile (e.g., the unemployed) received none by the number of applications for which the reverse was true. Second, we divide the result of this calculation by the number of application pairs for which at least one of these two profiles received a positive call-back. The final result is a net measure of

the number of unfavourable unequal treatment acts that the latter applicant could expect to encounter per application for which at least one of the two profiles under investigation received a positive call-back. At the level of the total dataset, the net discrimination rates presented in Table 3 lead to exactly the same conclusions as the aforementioned positive call-back ratios. The net discrimination ratios indicate a preference for the school-leaving and overeducated profiles over the profile with a longer unemployment experience regardless of whether the broad or strict definition of positive call-back is used.

TABLE 3 ABOUT HERE

If we break down both measures by the education level of the fictitious candidates (and ipso facto by the skill-level of the posted jobs), we see that the preference for the school-leaver over the (formerly) unemployed is apparent at all education levels. However, these measures are not significant for the moderately educated using the sensu stricto definition of positive call-back. This is because at least one of the moderately educated profiles obtained an invitation for a job interview for only nine vacancies. Second, the overall preference for (formerly) overeducated over unemployed is the most dramatic (and only significant after dividing the data by education level) among the highly educated holding a master's degree. Third, we obtain weakly significant evidence for a negative signal of overeducation (compared with school-leaving) among the moderately educated. A potential explanation for the stigma effect of overeducation for the moderately educated and its absence for the highly educated may be the difference in labour market conditions across these segments. As

shown in Table 2, the overall call-back rate for the moderately educated is substantially lower than that for the highly educated segments. This low demand for moderately educated individuals is consistent with evidence on job polarization in Belgium (Goos et al., 2009). Moreover, as shown in the literature (Baert et al., Forthcoming), ethnic discrimination is generally higher in segments with low demand. This is also likely the case for discrimination against job-seekers with experience as overeducated workers.

Subsequently, we break down the positive call-back ratios and net discrimination rates by the contract type mentioned in the vacancy. On one hand, we find that for vacancies offering a permanent contract, school-leavers are preferred over both formerly unemployed and overeducated. Furthermore, for these vacancies, we cannot reject the null hypothesis that formerly unemployed and overeducated are treated equally. On the other hand, we obtain little significant evidence of unequal treatment in access to temporary positions. These differences in the stigma effect of overeducation may be explained by a need for stronger signals in the case of permanent contracts. Indeed, several theoretical contributions have shown that employers will be more likely to discriminate against bad employment histories when firing costs are higher (Canziani and Petrongolo, 2001; Kugler and Saint-Paul, 2004). Hiring a job-seeker with overeducation experience may thus be perceived as more risky for permanent contract jobs than for temporary ones.

4 Conclusion

In this study, we reported on the design and the results of a field experiment in which we sent out job applications from fictitious candidates only differing by their recent labour market activity to real job openings in Belgium. We distinguished between (i) a profile who graduated just a few months before the application, (ii) a second profile who graduated one year earlier and had been unemployed since that time and (iii) a third profile who graduated at the same time as the second one but experienced overeducation in a job two levels below his education level following the Standard Occupation Classification of Statistics Netherlands (CBS, 2001).

Overall, we found that the probability of receiving a positive reaction from the employer side was approximately 27% for the school-leaver, 22% for the candidate with an unemployment experience and 25% for the candidate with an overeducation experience. First, the difference in call-back rates between the school-leaver and the unemployed profile proved to be significant at the level of the total dataset and at the level of most of the subsamples defined by the education level of the candidate and the contract type of the vacancy. Second, the comparable difference between the school-leaver and the (formerly) overeducated was found to be significant when applying for vacancies offering a permanent contract but not for vacancies offering a temporary contract. Third, the difference in positive call-backs between the unemployed and overeducated profiles was significant at the level of the total dataset but lost its significance for many of the inspected subsamples. Furthermore, we find suggestive evidence for a positive relationship between the relative stigma effect of unemployment, compared with overeducation, and education level.

Our study contributes to and synthesises the literature about unemployment signalling on one hand and overeducation signalling on the other hand. First, our results confirmed the unemployment stigma effect model of Vishwanath (1989) and thereby also those by Kroft et al. (2013). Second, we also found evidence for overeducation signalling, albeit only for jobs with a permanent contract. Finally, as a main conclusion, we noted that, overall, the probability of later employment is more negatively affected by unemployment than by overeducation.

From a policy perspective, our results favour the fast activation of unemployed youth. Thus, they contrast with those of Baert et al. (2013), who showed that accepting an overeducated position prolongs the transition to an adequate job. Based on their results, these authors argue that policy-makers should take care not to provide incentives to young unemployed graduates to accept any job too early in the unemployment period because this may induce persistent overeducation. However, their results do not distinguish between stigma effects as a source of overeducation persistence and other suggested (supply-side) sources in the literature, such as habituation or reduced job search. Our study suggests that accepting lower-level jobs with low risks of habituation and reduced job search, such as short-term and part-time jobs, should not be problematic.

In this study, we focussed on the relative signalling effects of recent unemployment and overeducation on hiring chances, i.e., their relative signalling effects in the short term. One might expect that these effects decrease rapidly in magnitude in the mid- and long term. In addition, we focussed on the hiring chances of relatively severely overeducated workers. As predicted by the career mobility model of Sicherman and Galor

(1990), we expect the hiring chances of overeducated workers with more relevant work experience to be even less negatively affected. Testing whether these hypotheses can be confirmed would be a productive direction for future research.

Authorisation: The present research was reviewed and approved by the Ethical Affairs Committee of the Faculty of Economics and Business Administration of Ghent University.

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Figure 1 - Trajectories of the Fictitious Job Applicants

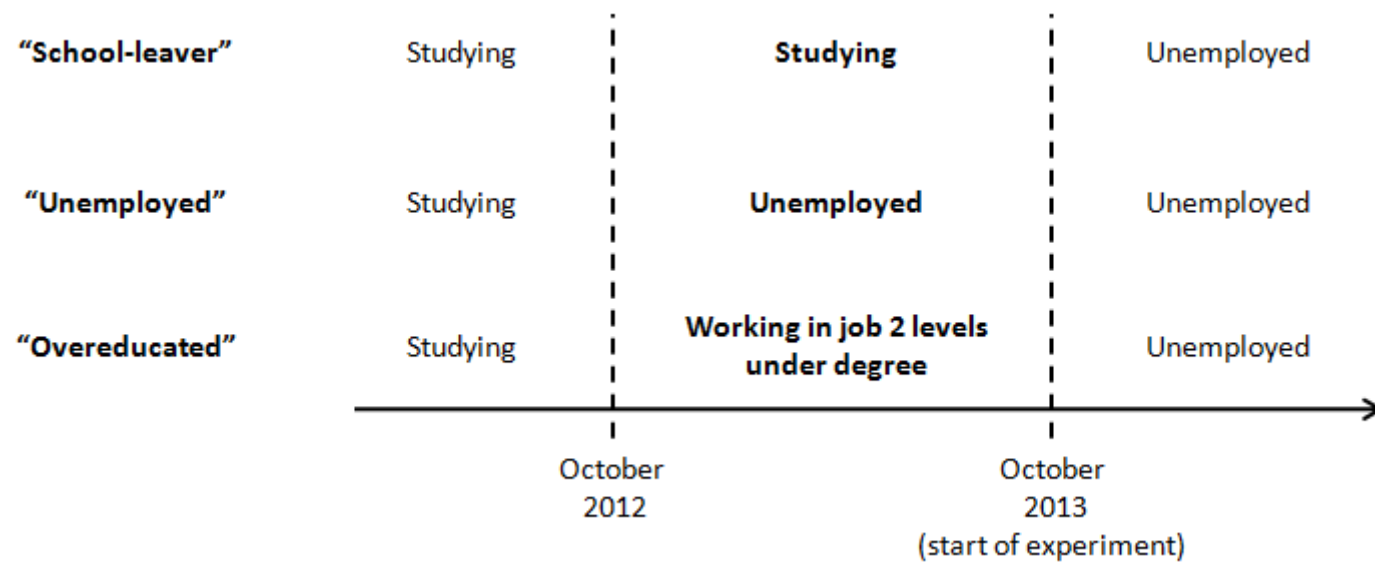


Table 1 – Probability of Positive Call-back by Labour Market History: Descriptive statistics

Applications	Number of vacancies	None of the three candidates positive callback	Each of the three candidates positive callback	Only the school-leaver positive callback	Only unemployed positive callback	Only overeducated positive callback	Only school-leaver and unemployed positive callback	Only school-leaver and overeducated positive callback	Only unemployed and overeducated positive callback
A. Positive call-back sensu lato: any positive reaction									
All vacancies	540	360	92	21	10	18	13	21	5
Classified by education level of the candidate									
Moderately educated	144	124	6	5	2	2	2	3	0
Highly educated: Bachelor	252	150	55	7	6	7	8	14	5
Highly educated: Master	144	86	31	9	2	9	3	4	0
Classified by contract type mentioned in the vacancy									
Permanent	447	307	71	18	9	11	10	17	4
Temporary	93	53	21	3	1	7	3	4	1
B. Positive call-back sensu stricto: invitation for a job interview									
All vacancies	540	464	30	13	1	9	9	10	4
Classified by education level of the candidate									
Moderately educated	144	135	2	3	1	2	1	0	0
Highly educated: Bachelor	252	204	20	6	0	4	7	7	4
Highly educated: Master	144	125	8	4	0	3	1	3	0
Classified by contract type mentioned in the vacancy									
Permanent	447	393	17	11	0	5	9	9	3
Temporary	93	71	13	2	1	4	0	1	1

Table 2 – Probability of Positive Call-back by Labour Market History: Call-back Rates and Call-back Ratios

Applications	Positive call-back rate school-leaver	Positive call-back rate unemployed	Positive call-back rate overeducated	Positive call-back ratio school-leaver/unemployed	Positive call-back ratio school-leaver/overeducated	Positive call-back ratio unemployed/overeducated
A. Positive call-back sensu lato: any positive reaction						
All vacancies	0.272	0.222	0.252	1.225*** [3.616]	1.081 [1.459]	0.882** [2.038]
Classified by education level of the candidate						
Moderately educated	0.111	0.069	0.076	1.600* [1.915]	1.455* [1.677]	0.909 [0.332]
Highly educated: Bachelor	0.333	0.294	0.321	1.135* [1.775]	1.037 [0.577]	0.914 [1.184]
Highly educated: Master	0.326	0.250	0.306	1.306*** [2.913]	1.068 [0.653]	0.818* [1.903]
Classified by contract type mentioned in the vacancy						
Permanent	0.260	0.210	0.230	1.234*** [3.208]	1.126** [1.989]	0.913 [1.314]
Temporary	0.333	0.280	0.355	1.192* [1.683]	0.939 [0.533]	0.788* [1.830]
B. Positive call-back sensu stricto: invitation for a job interview						
All vacancies	0.115	0.081	0.098	1.409*** [3.436]	1.170 [1.523]	0.830* [1.674]
Classified by education level of the candidate						
Moderately educated	0.042	0.028	0.028	1.500 [1.000]	1.500 [0.816]	1.000 [0.000]
Highly educated: Bachelor	0.159	0.123	0.139	1.290** [2.199]	1.143 [1.092]	0.886 [0.943]
Highly educated: Master	0.111	0.063	0.097	1.778*** [2.703]	1.143 [0.706]	0.643* [1.907]
Classified by contract type mentioned in the vacancy						
Permanent	0.103	0.065	0.076	1.586*** [3.592]	1.353** [2.278]	0.853 [1.043]
Temporary	0.172	0.161	0.204	1.067 [0.445]	0.842 [1.136]	0.789 [1.648]

The positive call-back ratio is calculated by dividing the call-back rate for a first group of candidates by the corresponding call-back rate for a second group of candidates. The t-test for the positive call-back ratio tests the null hypothesis that the probability of a positive answer is the same for candidates from both groups. Standard errors are corrected for clustering at the vacancy level. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level. t-statistics are bracketed.

Table 3 – Probability of Positive Call-back by Labour Market History: Net Discrimination Rates

Applications	Net discrimination rate school-leaver/unemployed	Net discrimination rate school-leaver/overeducated	Net discrimination rate unemployed/overeducated
A. Positive call-back sensu lato: any positive reaction			
All vacancies	0.167*** [12.789]	0.065 [2.123]	-0.101** [4.129]
Classified by education level of the candidate			
Moderately educated	0.333* [3.600]	0.278* [2.778]	-0.067 [0.111]
Highly educated: Bachelor	0.105* [3.125]	0.031 [0.333]	-0.074 [1.400]
Highly educated: Master	0.224*** [8.067]	0.054 [0.429]	-0.163* [3.556]
Classified by contract type mentioned in the vacancy			
Permanent	0.171*** [10.083]	0.099** [3.930]	-0.074 [1.723]
Temporary	0.152* [2.778]	-0.051 [0.286]	-0.189* [3.267]
B. Positive call-back sensu stricto: invitation for a job interview			
All vacancies	0.269*** [11.571]	0.120 [2.314]	-0.143* [2.793]
Classified by education level of the candidate			
Moderately educated	0.286 [1.000]	0.250 [0.667]	0.000 [0.000]
Highly educated: Bachelor	0.205** [4.765]	0.104 [1.190]	-0.095 [0.889]
Highly educated: Master	0.438*** [7.000]	0.105 [0.500]	-0.333* [3.571]
Classified by contract type mentioned in the vacancy			
Permanent	0.347*** [12.565]	0.222** [5.143]	-0.116 [1.087]
Temporary	0.056 [0.200]	-0.143 [1.286]	-0.200 [2.667]

The net discrimination rate is calculated by reducing the number of applications for which the former candidate was preferred by the number of applications for which the latter candidate was preferred, and this difference is then divided by the number of application pairs in which at least one received a positive call-back. The chi-square test for the net discrimination rate tests the null hypothesis that both candidates are treated unfavourably equally frequently. *** (**) (*) indicates significance at the 1% (5%) (10%) significance levels. χ^2 -statistics are bracketed.