Do employers discriminate less if vacancies are difficult to fill? Evidence from a field experiment

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Abstract

We empirically examine the relationship between labour market tension and hiring discrimination. To this end we conduct a correspondence test in the Flemish youth labour market. In line with theoretical expectations we find that hiring discrimination against Turkish school leavers decreases with the bottleneck status and the required skill level of occupations. Our findings are robust across various statistical analyses.

Keywords: ethnic discrimination, hiring discrimination, field experiments, labour market tension.
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1 Introduction

Correspondence experiments have been extensively used (and refined) during the last decade in order to measure directly the magnitude of hiring discrimination in the European labour market. Pervasive levels of ethnical labour market discrimination are found for Greece, Ireland, Sweden and the UK (Drydakis and Vlassis, 2010; McGinnity et al., 2009; Bursell, 2007; Carlsson and Rooth, 2007; Wood et al., 2009). Besides, recent correspondence studies conclude that there is evidence of varying degrees of discrimination based upon, for example, (i) gender in Austria, France and Spain, (ii) beauty in Sweden and (iii) sexual orientation in Austria, Greece and Sweden (Weichselbaumer, 2004; Duguet and Petit, 2004; Albert et al., 2011; Rooth, 2007; Weichselbaumer, 2003; Drydakis and Vlassis, 2009; Achmed at al., 2011).

Most of the aforementioned experimental studies refer to Becker's (1957) taste for discrimination model, as a theoretical framework that, together with Arrow's (1973) statistical discrimination theory, supports their results. Employers may have a preference to work with particular employees (e.g. native employees). If they maximize utility (and not only profits), they are prepared to hire these particular workers, even if these employees are of low productivity or have high reservation wages. Becker (1957) argues, however, that taste discrimination cannot exist under perfect competition. Discriminating employers will hire, from a profit maximizing perspective, both the wrong workers and the wrong number of workers. Free entry of non-discriminating firms will force them out of the market. Conversely, discrimination may persist in case of imperfect competition. Cahuc and Zylberberg (2004) show how employers with market power have, to some extent, an opportunity to select workers according to there preferences without being forced out of the market. Recent contributions show how employers are permitted to exercise monopsony power in labour markets composed of many competing firms.[1] In addition, already in 1970, Ashenfelter argued that the

[1]First, search frictions confer some market power on employers since these costs prevent employees from bringing the full weight of competition to bear on firms (Burdett and Mortensen, 1998). Black (1995) shows how frictions lead to hiring discrimination by constructing an equilibrium search model where some employers have a preference for particular workers. Second, monopsony power may arise from limitations on worker mobility, geographically or between types of employment (Brueckner et al., 2002; Manning, 2003;

higher perceived discrimination cost to employers when the labour market tension is high, is a main driver of the evolution of labour market discrimination over time.[2] Recently, Biddle and Hamermesh (2012) formally investigated this positive relationship between discrimination and labour market tension in an equilibrium search model with employer discrimination. Their model captures the idea that higher arrival rates of employees at vacancies lower the cost of discriminating because a faster arrival of the next workers means less foregone output when a minority worker is turned away.[3]

To the best of our knowledge, we are the first to directly examine in an empirical way how hiring discrimination varies with the extent of labour market tension (and thereby labour market competition).[4] To this end we conduct a correspondence test for ethnic discrimination in the youth labour market in Flanders.[5] Fictitious job applications, randomly assigned to individuals with a Flemish sounding respectively a Turkish sounding name were sent out each to 382 vacancies for jobs that required no experience. We classify these jobs on two labour market competitiveness measures. First, a direct measure of labour market tension: the so called bottleneck status of occupations. A bottleneck occupation is an occupation for which the number of potential job candidates is low. Or, conversely, the number of job opportunities for employees with the right qualifications for this kind of occupations is high. As, therefore, the market power for employers filling vacancies for bottleneck occupations will be smaller, our hypothesis is that

Cahuc and Zylberberg, 2004). Last, heterogeneous employee preferences over different non-wage characteristics give employers market power (Bhaskar and To, 1999; Booth and Coles, 2007). Recent work by Hirsch and Jahn (2012) shows that the entire ethnic wage gap in Germany, after controlling for observed heterogeneity, can be explained by monopsonistic discrimination when taking into account estimated labour supply elasticities that differ by ethnicity.

[2]Ashenfelter (1970) refers to Ryack (1961) as establishing this relationship.

[3]An additional model supporting this relationship is lexicographic search by employers. If labour market tension is low, employers may receive so many applications that they might use quick heuristics in reading these applications. One such heuristic could be to simple read no further when they see a foreign sounding name (Bertrand and Mullainathan, 2004).

[4]Recent work by Freeman and Rodgers III (1999), Dustmann et al. (2010), Biddle and Hamermesh (2012) and Kaas and Manger (2012), however, also empirically relates ethnic and gender wage gaps and labour market tension indirectly by studying how cyclical downturns and industry-specific demand shocks affect wage differentials.

[5]Flanders is the Dutch speaking Northern part of Belgium. It is the Belgian region with the highest number of residents before Wallonia and Brussels.

discrimination, if apparent in the labour market, should be less pervasive in bottleneck occupations. A second factor determining the labour market competitiveness is the required skill level for the occupation. If the labour market tension is lower for high-skilled labour, as is the case for the labour market in which we conduct our experiment (cf. infra), our hypothesis is that discrimination should be lower when attracting employees for for high-skilled jobs, ceteris paribus.

In addition to our main research focus, we contribute to the empirical literature of ethnical discrimination in three ways. First, we provide evidence on hiring discrimination in the Flemish labour market. Flanders, and by extension Belgium, is an interesting case. On the one hand, Belgium is characterised by a comprehensive and recently modified anti-discrimination legislation. On the other hand, unemployment levels among ethnic minorities are, relative to the native-born, among the highest across OECD countries (OECD, 2008).[6] Second, we focus on school leavers. Statistics by Baert and Cockx (2012), using the SONAR survey covering the transition from school to work of 9000 youngsters in Flanders, born in 1976, 1978 or 1980, show that youngsters whose grandmother on mother's side has a non-Western nationality have on average about 25 percentage points more chance on being unemployed three months after leaving school compared with native youngsters, regardless their educational attainment. The recent economic and financial crises only may have aggravated their unfavourable labour market situation (Dustmann et al., 2010). Not surprisingly the OECD calls them a target group for intensive labour market assistance and also Scarpetta et al. (2010) actively encourage the mentoring of young people from immigrant backgrounds. Also from a methodological point of view the choice for school

[6] In the 1990's the International Labour Office conducted a series of discrimination studies on the basis of situation tests by native and foreign individuals with similar characteristics. All three Belgian regions were among the regions under study. One of the methodologies used was correspondence testing. Discrimination was found to be a significant (and, compared with other OECD countries, more pronounced) impediment to the employment of foreigners in Belgium (Arrijn et al., 1998). However, OECD (2008) argues that the results of the ILO studies have had a stronger policy impact in Belgium than elsewhere. Affirmative action in combination with the mentioned anti-discrimination legislation could have led to a diminution of labour market discrimination. Therefore, as suggested by OECD (2008), the ILO study for Belgium is now somewhat dated and an update by means of equally pertinent empirical evidence is needed.

leavers has an advantage. Controlling for human capital is easier for them since we do not have to take into account labour market experience (beyond student work). Third, our study is also noteworthy from a methodological viewpoint since we adopt the econometric framework as outlined by Neumark (2010) to correct for the potential bias introduced by (ethnic) group differences in the variance of unobservable job-relevant characteristics.

Our results confirm our theoretical hypotheses. Name-based discrimination is found for the low-skilled in favour of native school leavers, especially in low-skilled non-bottleneck occupations. For this type of occupations Turkish job seekers need to send 3.5 times more applications than their Flemish counterparts in order to get one invitation for a job interview. In contrast, we find hardly any hiring discrimination against Turkish school leavers for high-skilled bottleneck jobs. For low-skilled bottleneck occupations and high-skilled non-bottleneck occupations the discrimination coefficients lie between these two extremes.

This article is structured in the following way. In the next section we outline our experimental methodology. Thereafter we present a statistical examination of the resulting data set. A final section concludes.

2 Methodology

2.1 Detecting ethnical discrimination by a correspondence test

Correspondence experiments to test for discrimination in the labour market have been extensively used (and refined) during the last decade. Within these experiments carefully matched pairs of fictitious written job applications, randomly assigned to individuals who reveal their minority status by their name or another individual characteristic, are sent to real job openings and the subsequent callback is monitored. Concerning the identification of ethnical discrimination the correspondence test conducted by Bertrand and Mullainathan (2004) are seminal.

These field experiments have been widely viewed as providing the most convincing evidence on discrimination (Pager, 2007; Riach and Rich, 2004).

Using non-experimental data, researchers possess far less data than employers do. Native and foreign employees that appear similar to researchers based on this standard data, may look very different to employers. In our case, selection on individual unobservable characteristics is not an issue since the employers' decision making information is controlled for by the researcher. Thereby strict equivalence between applicants is insured. Moreover, this approach allows disentangling employer discrimination from supply side determinants of labour market outcomes, such as employee preferences and network effects.

Our experiment was conducted between November 2011 and March 2012. Two similar applications, one with a Flemish sounding and one with a Turkish sounding name were sent out each to 382 vacancies for jobs that required no experience. About half of them were sent to jobs for relatively low-skilled (holding only secondary education degree) and about half of them to jobs for relatively high-skilled (holding a professional bachelor in business administration) school leavers. For each group, a substantial subgroup of the applications were sent to job openings in bottleneck occupations.

2.2 Selection of vacancies

We selected occupations for which the demand was high in four different categories: (i) low-skilled non-bottleneck, (ii) low-skilled bottleneck, (iii) high-skilled non-bottleneck and (iv) high-skilled bottleneck occupations. Vacancies for bottleneck occupations take longer to fill than average. Each year a list of bottleneck occupations is published by the Public Employment Service of Flanders (VDAB). This list is obtained combining three statistical criteria and is then assessed by a number of labour market specialists. These three criteria are (i) at least 10 vacancies for the occupation concerned, (ii) the vacancy filling rate must be lower than the median filling rate for all occupations together, (iii) the median duration time for filling a vacancy must be greater than the median for all occupations together. These statistics are driven by the relatively size of the pool of adequately skilled workers, the wage level and the working conditions in the particular occupations (VDAB, 2009). Combining the lower arrival rates of employees

at vacancies for bottleneck occupations and the fact that keeping a vacancy open is costly, discrimination should be more costly and therefore lower for bottleneck occupations.

In addition, Herremans et al. (2011a) and Herremans et al. (2011b) show that the labour market tension in Flanders has historically been lower for high-skilled jobs than for low-skilled jobs. In 2011 there were on average 3.5 unemployed for each vacancy while there were only 1.8 high-skilled unemployed for each high-skilled job opening. Beyond this macro-economic statistic, it seems logical that the more qualifications are required for an occupation, the smaller the potential pool of adequate job candidates is. This should result in lower discrimination rates among high-skilled minorities. In addition, the higher geographical mobility or higher search intensities (due to, e.g., relatively lower search costs) of high-skilled workers may reduce employer monopsony power and therefore discrimination (Pissarides and Wadsworth, 1994; Freeman and Rodgers III, 1999; Dohmen, 2005).[7,8]

All vacancies were collected from the VDAB database, a major job search channel in Flanders, in November and December 2011 and in February and March 2012 were collected. We restricted ourselves to vacancies for which no work experience was required and which were posted less than 14 days before the start of the experiment.[9] Concerning the low-skilled occupations we selected vacancies in industrial cleaning and teleselling (bottleneck occupations) and in manufacture and administration (non-bottleneck occupations). All these vacancies were posted for (technical and vocational) secondary education graduates. Concerning the high-skilled occupations we selected all

[7]In addition, however, also factors that are not related to labour market competition may influence different magnitudes of discrimination between low- and high-skilled youngsters. First, higher education may act as a prejudices reducing screening device (Taubman and Wales, 1974). Carlsson and Rooth (2007) argue that high-skilled occupation tasks are often very specific in nature and, hence, individual productivity is more evident from reading a high-skilled individual's application when compared to that of a low-skilled individual. Second, the invitation for the first interview may be a less selective step in the selection procedures for high-skilled jobs (Wood et al., 2009).

[8]Within the aforementioned correspondence studies of Carlsson and Rooth (2007), Bursell (2007) and Wood et al. (2009) fictitious applications were sent to both high-skilled and low-skilled occupations. In line with our hypothesis, the discrimination ratio's tend to be lower for the investigated high-skilled occupations across these articles.

[9]This choice was made in view of achieving a sufficiently high level positive feedback given the fact that interviews with several human resources managers revealed that filled vacancies are not always immediately removed from the VDAB database.

vacancies for professional bachelors in business administration.[10] Some of them were vacancies in bottleneck occupations (accountants and logistic planners) and some others were non-bottleneck occupations (tax workers, finance and insurance clerks, marketeers and specialists in legal procedure).

2.3 Construction of applications

We generated two template types for the cv's and cover letters to be send for (i) all high-skilled jobs, (ii) the manufacturing jobs, (iii) the industrial cleaning jobs and the (iv) teleselling and administrative jobs. The two application types were equally allocated between the native and foreign names. First, both application types within each group of occupations on the one hand had to be identical in all job-relevant characteristics and on the other hand had to differ by inessential details and by lay-out. Second, these applications had to be realistic and representative. Third, in order to obtain reasonable callback rates, the applicants had to be well qualified for the job openings. A number of example applications of the VDAB, with different fonts and layouts, were used and calibrated for our purposes.

Both low- and high-skilled testers were single males, born, living and studying in one of the suburbs of Ghent, the capital of the province East-Flanders and the second largest city of Flanders with about 240000 inhabitants in 2010. Low-skilled school leavers were 18 years old and high-skilled school leavers 21 years old. Both had the Belgian nationality.[11] Therefore, the ethnicity of both youngsters was only signalled through their name. The reason for using Turkish names was on the one hand that the Turkish are the most important ethnic minority in Ghent[12] and on the other hand that the high unemployment levels among ethnic minorities in Belgium, as mentioned in the introduction, are even more pronounced for ethnic minorities from the non-EU-15 countries OECD (2008). Moreover, there is a clear

[10] In fact individuals with a professional bachelor degree in business administration, that is obtained after three successful years of tertiary education, are rather middle-high-skilled than high-skilled. However, this degree is among the most prestigious hold by a substantial amount of Turkish youngsters.

[11] At the moment of our experiment, Belgium's access to citizenship provisions were among the most liberal in the OECD (OECD, 2008).

[12] In 2010 the number of naturalised Turkish citizens was about 10000.

distinction between typical Flemish and Turkish names.[13]

Low-skilled applicants dropped out of school in June 2012 with a secondary education degree (vocational secondary education for manufacturing jobs and cleaning jobs and technical secondary education in commerce for administrative and teleselling jobs). They obtained their education in the same type of school, with a comparable reputation. High-skilled applicants left school in June 2012 with a professional bachelor degree (cum laude) from the largest university college of Flanders in business administration after completing an internship. We matched their graduation option (accountancy and tax, finance and insurance, logistics, marketing and legal practice) with the particular occupation. All applicants graduated without grade retention. In addition we added to each application type the following features: Dutch mother tongue[14], adequate French and English language skills, driving license, computer skills and summer employment experience. Moreover, the cover letters signalled a person that was motivated, structured and capable. For the high-skilled school leavers also sport club membership and student leadership were added. Last, we added a fictitious postal address (based on real streets in moderate neighborhoods) and date of birth to the applications. The cv and cover letter templates are available on request.

For each vacancy, together with the randomly assigned name followed an email address and a mobile phone number. We registered an individual email address and a mobile phone number for each of the four names at large internet and telecommunication providers. All applications were mailed to the employer. They were sent in alternating order[15] with a one-day delay in between. We logged for each sent application the number of announced

[13]Based on frequency data on first names and surnames we choose for "Thomas Mertens" and "Jonas Vermeulen" as Flemish sounding names and "Emre Sahin" and "Okan Demir" as Turkish sounding names. By constructing one Flemish and one Turkish name for both a low-skilled and a high-skilled individual, we could apply for one low-skilled and one high-skilled vacancy from the same employer without risking detection. We assured that these names were not stereotypical ones.

[14]Given these identical applications are randomly assigned to the Flemish and Turkish names, the Turkish applicants are native Dutch speakers and do not literacy of Turkish language in their CV. Thereby, we are able to isolate the effect of ethnicity from potential language effects. Statistics by Baert and Cockx (2012) show that Dutch was spoken at parental home among three quarters of the foreign pupils in the data set of their aforementioned study.

[15]Alternating in both the application type and the ethnicity of the individual.

(similar) job positions by the vacancy, the province of the workplace, the occupation type, the gender of the recruiter (when available), the application type and the date of the application.

2.4 Measurement of callback

Callbacks for interviews were received via telephone voicemail or email. The content of the responses are available on request. Since we included fake postal addresses in the applications, callback via regular mail could not be measured. 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 invitations were immediately declined. All callback later than 40 days after sending the application was neglected. This, however, turned out to be an artificial restriction since no response was received after 40 days.

We distinguished between two definitions of positive callback. Positive callback sensu stricto means that the applicant is invited for an interview concerning the job for which he applied. This definition is mostly used in the literature and therefore our benchmark definition. Positive callback sensu lato means that he was invited for an interview concerning the job for which he applied or another opportunity proposed by the employer or that he was asked to provide more information or to call the recruiter back.

2.5 Research limitations

In short we assess some research limitations inherent to the experimental design. For an in-depth discussion of the strengths and weaknesses of correspondents tests we refer to Bertrand and Mullainathan (2004), Riach and Rich (2004) and Pager (2007) and for an elaboration on the ethical aspects of this kind of tests to Riach and Rich (2002).

First, our experimental design can be effective only in demonstrating discrimination at the initial stage of the selection process. Since we simply measure callback rates for first interviews, we cannot translate our research results into gaps in job offers, let alone into gaps in wages. However, Bertrand and Mullainathan (2004) argue that to the extent that the selec-

tion process has even moderate frictions, one would expect that reduced interview rates would translate into reduced job offers and lower earnings. Second, we only investigate discrimination within the outlined occupations and within vacancies posted at the VDAB database. Possibly, discrimination is more or less apparent in other sectors than the ones covered and is more or less apparent among employers who rely on other channels (e.g. social networks) for filling their vacancies. It is unclear whether these limitations, taken together, may lead to an overestimation or rather an underestimation of discrimination in the Flemish youth labour market. Important is, however, to keep in mind that we are especially interested in the discrimination heterogeneity by labour market tension. If, therefore, the mentioned limitations introduce a similar shift in the discrimination measures for all four occupation categories by labour market tension, our main research conclusions are still credible.

Last, as demonstrated by Heckman (1998), our design does not allow to distinguish between taste-based discrimination on the one hand and statistical discrimination on the other hand. Kaas and Manger (2012) and Carlsson and Rooth (2008) show how, to some extent, both forms of discrimination can be disentangled within the correspondence test framework. Given our major research question, however, disentangling both effects is not a purpose.

3 Results

3.1 Descriptive analyses

In this section we follow the literature by providing the reader with descriptive statistics both on unequal treatment of Flemish and Turkish job candidates and on – related – the relative callback probability for both groups. Given our research focus, we split these statistics up by bottleneck status and by required skill-level of the occupations.

Table 1 gives the aggregated results for the field experiment adopting the benchmark definition of positive callback. Table 4 (in appendix) shows the same statistics using the definition sensu lato. For each vacancy (to which

two applications were sent), there are four possible outcomes: (i) positive callback for neither candidate, (ii) positive callback for both candidates, (iii) only positive callback for the Flemish candidate and (iv) only positive callback for the Turkish candidate. Overall, in 81 (141) of the 382 observations at least one applicant received positive callback sensu stricto (sensu lato). In 29 (45) observations only the Flemish candidate got positive callback and in 8 (15) cases only the Turkish candidate. The net discrimination is then calculated as the difference in observations in which the Flemish respectively the Turkish candidate was treated favourable expressed as a fraction of the total number of observations where at least one applicant received positive callback. Overall the net discrimination is 0.26 (0.21) adopting the sensu stricto (sensu lato) definition of positive callback. A standard χ^2 test of the hypothesis that the applicants of both ethnicities were treated unfavourable equally often is conducted. This hypothesis is rejected at the 1% level. Therefore, this statistic indicates that discrimination against Turkish school leavers is apparent in the Flemish youth labour market.

Table 1 and Table 4 (in appendix) also give the same type of data description for each of the four occupation categories by labour market tension. For the remainder of this section, we will focus, unless otherwise stated, on the one hand on this split-up of our results and on the other hand on the definition sensu stricto of positive callback – the results obtained by adopting the alternative definition go, however, in the same direction across all presented statistics. We note that the net discrimination varies in line with our theoretical expectations over the occupation categorisation by labour market tension. The net discrimination is hardly different from zero for high-skilled bottleneck occupations. In sharp contrast, this statistic is 0.67 for low-skilled non-bottleneck occupations: while in 11 of the 60 observations only the Flemish applicant received positive call back, in only 1 observation only the Turkish applicant received positive call back. For the intermediate categories, the net discrimination lies between these two values. This indicates a negative relation between the net discrimination and the labour market tension concerning particular occupations. The higher the competition to attract employees, the lower the discrimination rate.

Table 2 tabulates callback rates by ethnicity. The presented statistics

Table 1: Unequal treatment of Flemish and Turkish job candidates (positive callback, sensu stricto).

Occupations	**Jobs**	**Neither callback**	**Both callback**	**Only Flemish callback**	**Only Turkish callback**	**ND**	χ^2
	(No.)	(No.)	(No.)	(No.)	(No.)		
All	382	301	44	29	8	0.26	11.92***
Low-skilled, non-bottleneck	60	45	3	11	1	0.67	8.33***
Low-skilled, bottleneck	141	120	11	8	2	0.29	3.60*
High-skilled, non-bottleneck	104	80	14	7	3	0.17	1.60
High-skilled, bottleneck	77	56	16	3	2	0.05	0.20

Note. ND: net discrimination. The null hypothesis is that both individuals are treated unfavourable equally often. ***(**)((*)) indicates significance at the 1% (5%) ((10%)) level.

go in the same direction as the former ones, namely the direction of increasing discrimination if the labour market tension is lower. The callback rate is for the Flemish respectively Turkish population defined as total the number of positive callbacks relative to the total number of sent applications. The callback ratio is than obtained by dividing the Flemish callback rate by the Turkish callback rate. Obviously the callback ratio is only significantly different from 1 for the individuals who apply for a low-skilled non-bottleneck occupation. As candidates' names are randomly assigned, this gap can only be attributed to the ethnicity manipulation. Applicants with Flemish sounding names need to send about 4 applications to get one positive callback whereas applicants with Turkish sounding names need to send about 15 applications for this type of occupations. In contrast, the call back is very similar for both populations for high-skilled bottleneck occupations. Also the callback rates for the intermediate categories are not significantly different for both groups. However, the ratio's for these occupations are higher compared with the ratio for the former category. Probably, there are both too few vacancies as well as too low callback rates to give rise

Table 2: Positive callback rates (sensu stricto) for Flemish and Turkish job candidates.

Occupations	**Callback rate Flemish**	**Callback rate Turkish**	**Callback ratio**	**t**
All	0.19	0.14	1.40	1.93**
Low-skilled, non-bottleneck	0.23	0.07	3.50	2.14***
Low-skilled, bottleneck	0.13	0.09	1.46	1.04
High-skilled, non-bottleneck	0.20	0.16	1.24	0.69
High-skilled, bottleneck	0.25	0.23	1.06	0.19

Note. The null hypothesis is that the callback rate is equal for both individuals. ***(**)((*)) indicates significance at the 1% (5%) ((10%)) level.

to significant results.

3.2 Empirical analyses

In this section ethnic differences in positive callback rates are analysed estimating various statistical regressions with the callback dummy (sensu stricto, unless otherwise stated) as the dependent variable. All of these regressions include controls for the vacancy and application characteristics as outlined in Table 6 (in appendix). Throughout the empirical analyses, in "Model 1" we regress the callback dummy on these controls and on a dummy indicating Turkish ethnicity. In "Model 2" – which carries our main research interest – we regress the callback dummy on the controls and on the ethnic indicator variable interacted with the four occupation categories by labour market tension. The data include the 382 observations for Flemish and Turkish applications giving a total of 764 observations.

Table 3 presents the key results for OLS-regressions with white heteroskedasticity-consistent standard errors adjusted for clustering of the observations at the vacancy level.[16] These results are in line with the statistics

[16]We present the estimates for Model 1 and Model 2 by running a linear probability model as our benchmark results. Since we are interested in the effect on the callback rate

outlined in Table 2. First, the highly significant parameter estimate for the dummy indicating Turkish ethnicity in Model 1 confirms the presence of discrimination against Turkish youth in the Flemish labour market. In our experimental data set, overall, a Turkish sounding name lowers the probability of getting positive callback by 6 percentage points, ceteris paribus. Second, also the estimates for Model 2 square with the interpretation of our descriptive statistics. A Turkish sounding name lowers the probability of receiving positive callback by 17 percentage points after applying for a low-skilled bottleneck occupation, by 4 percentage points after applying for a low-skilled bottleneck occupation or a high-skilled non-bottleneck occupation and by 1 percentage point after applying for a high-skilled bottleneck occupation.

Table 3: The probability of positive callback (sensu stricto) for an interview: OLS estimates.

Variables	**Positive callback, sensu stricto**	
	Model 1	**Model 2**
Turkish name	−0.06*** (0.02)	
Turkish name * low-skilled, non-bottleneck		−0.17*** (0.05)
Turkish name * low-skilled, bottleneck		−0.04* (0.02)
Turkish name * high-skilled, non-bottleneck		−0.04 (0.03)
Turkish name * high-skilled, bottleneck		−0.01 (0.03)
Vacancy and application controls	Yes	Yes
Observations	764	764

Note. White heteroskedasticity-consistent standard errors, corrected for clustering at the vacancy level, in parentheses. ***(**)((*)) indicates significance at the 1% (5%) ((10%)) level.

Concerning the parameter estimates for the control variables, the chance on receiving positive callback is significantly lower for vacancies where the province of the workplace is Antwerp or Limburg and where the sector is fi-

of Turkish ethnicity respectively Turkish ethnicity interacted with the four occupation categories and these indicator variables at interest are adopted in a saturated way (and the control variables are, given our experimental setting, not correlated with them) the linear probability model coincides with the conditional expectation of positive callback given these indicator variables. Therefore, the average partial effect (on the callback rate) of having a Turkish sounding name while applying for a particular occupation category is estimated in a robust way by the linear probability model and can be given a causal interpretation (Angrist, 2008).

nance and tax, marketing or cleaning, ceteris paribus.[17] Positive callback is not significantly determined by the application type, which underlines that the pairs of applications do not significantly differ in job-relevant characteristics.

Next, Table 7 presents the corresponding results when focusing on positive callback sensu lato. We note that a Turkish sounding name lowers the probability of getting positive callback sensu lato by 17 percentage points after applying for a low-skilled bottleneck occupation, by 9 percentage points after applying for a low-skilled bottleneck occupation and by 4 percentage points after applying for a high-skilled non-bottleneck occupation or a high-skilled bottleneck occupation. Thus, based on this alternative definition, and in contrast with the findings for the low-skilled, the callback high-skilled school leavers receive seems not to be determined by the bottleneck status of the occupations they apply for.

In line with the literature we investigate which, if any, of the vacancy and application characteristics are correlated with the ethnic difference in positive callback rates. To this end, we regress the callback dummy (sensu stricto) on the control variables and on the interaction of these controls with the dummy indicating Turkish ethnicity. By inspecting Table 8 we find that if the recruiter is female, the probability of positive callback is lower for applicants with a foreign sounding name.[18] This contrasts with Carlsson and Rooth (2007) and Carlsson and Rooth (2008). All other interaction effects are not statistically significant.

Last, as a robustness check, we reproduce the results of Table 3 by running probit and heteroskedastic probit regressions instead of OLS regressions. To the best of our knowledge, we are the first to apply the latter methodology within the context of correspondence research. The advantage of heteroskedastic probit modelling is that this allows the variance of the error term to vary with ethnicity. Heckman and Siegelman (1993) show that even in our experimental methodology in which the ethnic group averages of both observed and unobserved group job-relevant characteristics are identi-

[17] Detailed estimation results comprising the parameter estimates for the control variables are available on request.

[18] Obviously, some potential interaction variables are dropped to avoid multicollinearity problems.

cal by construction, not controlling for group differences in the variance of unobservable job-relevant characteristics (and thereby of unobservable determinants of positive callback) can lead to substantial spurious evidence of discrimination.[19] including First, the average marginal effects for the probit regressions (Table 9, in appendix) are closely comparable to the estimated effects based on the linear probability model. Second, the estimates of the Turkish callback rates running the heteroskedastic probit regressions (Table 10) are between 2 and 3 percentage points higher for each of the four occupation categories, when compared with the benchmark results. However, using a likelihood-ratio test we cannot reject the null hypothesis of homoskedasticity with respect to the dummy indicating Turkish ethnicity.

4 Conclusion

Our experimental research suggests that, in line with theoretical expectations, discrimination is negatively correlated with labour market tension, as captured directly by bottleneck status and indirectly by required skill level of job openings. We argue that is due to lower employer monopsony power in tight labour markets.

From a policy point of view, our results indicate that labour market discrimination is still apparent in the Flemish labour market. Employers with market power select workers according to preferences that are not related to productivity. Therefore there might be scope for further affirmative action or reinforcement of the anti-discrimination legislation. On the other hand,

[19]Neumark (2010) explicitly addresses this critique and provides a statistical procedure in order to recover unbiased estimates of discrimination. The intuition is as follows. As shown by Neumark (2010) the fundamental problem is that by standard OLS or probit regressions we cannot separately identify the estimate of discrimination from an ethnic difference in variance of unobservables. The solution to this problem is to use the variation in observable job-relevant characteristics in order to capture the relative variance of the unobservable job-relevant characteristics for both ethnic groups. This boils down to the estimation of a heteroskedastic probit model which allows the variance of the error term to vary with ethnicity. Identification of unbiased estimates of discrimination is proved under the assumption that the parameter estimates of the observable job-relevant characteristics are the same for Flemish and Turkish population (Neumark, 2010). Given this assumption, we also estimated the heteroskedastic probit model using various subsets of controls. This, however, did not lead to different results when compared to the ones presented in 10 based on heteroskedastic probit regressions on the full set of vacancy and application characteristics.

a better promotion of the opportunities of bottleneck occupations among risk groups might be fruitful. In addition, further investments in job search cost reducing and mobility enhancing policy may lower monopsony power among employers and thereby discrimination.

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Appendix A: Additional tables

Table 4: Unequal treatment of Flemish and Turkish job candidates (positive callback, sensu lato).

Occupations	**Jobs**	**Neither callback**	**Both callback**	**Only Flemish callback**	**Only Turkish callback**	**ND**	χ^2
	(No.)	(No.)	(No.)	(No.)	(No.)		
All	382	242	80	45	15	0.21	15.00***
Low-skilled, non-bottleneck	60	42	6	11	1	0.56	8.33***
Low-skilled, bottleneck	141	98	24	16	3	0.30	8.89***
High-skilled, non-bottleneck	104	58	26	12	8	0.09	0.80
High-skilled, bottleneck	77	44	24	6	3	0.09	1.00

Note. ND: net discrimination. The null hypothesis is that both individuals are treated unfavourable equally often. ***(**)((*)) indicates significance at the 1% (5%) ((10%)) level.

Table 5: Positive callback rates (sensu lato) for Flemish and Turkish job candidates.

Occupations	**Callback rate Flemish**	**Callback rate Turkish**	**Callback ratio**	**t**
All	0.33	0.25	1.32	2.31***
Low-skilled, non-bottleneck	0.28	0.12	2.43	2.01**
Low-skilled, bottleneck	0.28	0.19	1.48	1.71*
High-skilled, non-bottleneck	0.37	0.33	1.12	0.57
High-skilled, bottleneck	0.39	0.35	1.11	0.49

Note. The null hypothesis is that the callback rate is equal for both individuals. ***(**)((*)) indicates significance at the 1% (5%) ((10%)) level.

Table 6: Description of the variables used in the empirical analyses.

Dummy variable	**Value**
Multiple vacancies	1 if multiple (similar) job positions are announced by the vacancy, else 0.
Province East-Flanders	1 if the workplace is located in the province East-Flanders, else 0.
Province Antwerp	1 if the workplace is located in the province Antwerp, else 0.
Province West-Flanders	1 if the workplace is located in the province West-Flanders, else 0.
Province Flemish Brabant	1 if the workplace is located in the province Flemish Brabant, else 0.
Province Limburg	1 if the workplace is located in the province Limburg, else 0.
Sector accounting and tax	1 if the vacancy is matched with a bachelor in business with "accounting and tax" as graduation option, else 0.
Sector finance and insurance	1 if the vacancy is matched with a bachelor in business with "finance and insurance" as graduation option, else 0.
Sector logistics	1 if the vacancy is matched with a bachelor in business with "logistics" as graduation option, else 0.
Sector marketing	1 if the vacancy is matched with a bachelor in business with "marketing" as graduation option, else 0.
Sector legal practice	1 if the vacancy is matched with a bachelor in business with "legal practice" as graduation option, else 0.
Sector manufacture	1 for a low-skilled job in manufacturing, else 0.
Sector cleaning	1 for a low-skilled job in industrial cleaning, else 0.
Sector teleselling	1 for a low-skilled job in teleselling, else 0.
Sector administration	1 for a low-skilled job in administration, else 0.
Gender recruiter unknown	1 if the gender of the recruiter is unknown, else 0.
Male recruiter	1 if the gender of the recruiter is male, else 0.
Female recruiter	1 if the gender of the recruiter is female, else 0.
Application type 1	1 if the first application type for high-skilled jobs is used, else 0.
Application type 2	1 if the second application type for high-skilled jobs is used, else 0.
Application type 3	1 if the first application type for manufacturing jobs is used, else 0.
Application type 4	1 if the second application type for manufacturing jobs is used, else 0.
Application type 5	1 if the first application type for industrial cleaning jobs is used, else 0.
Application type 6	1 if the second application type for industrial cleaning jobs is used, else 0.
Application type 7	1 if the first application type for teleselling and administration jobs is used, else 0.
Application type 8	1 if the second application type for teleselling and administration jobs is used, else 0.
Application in November	1 if the application is sent in November 2011, else 0.
Application in December	1 if the application is sent in December 2011, else 0.
Application in February	1 if the application is sent in February 2012, else 0.
Application in March	1 if the application is sent in March 2012, else 0.
Low-skilled, non-bottleneck	1 for a low-skilled, non-bottleneck job, else 0.
Low-skilled, bottleneck	1 for a low-skilled, bottleneck job, else 0.
High-skilled, non-bottleneck	1 for a high-skilled, non-bottleneck job, else 0.
High-skilled, bottleneck	1 for a high-skilled, bottleneck job, else 0.

Table 7: The probability of positive callback (sensu lato) for an interview: OLS estimates.

Variables	**Positive callback, sensu lato**	
	Model 1	**Model 2**
Turkish name	−0.08** (0.02)	
Turkish name * low-skilled, non-bottleneck		−0.17*** (0.05)
Turkish name * low-skilled, bottleneck		−0.09*** (0.03)
Turkish name * high-skilled, non-bottleneck		−0.04 (0.04)
Turkish name * high-skilled, bottleneck		−0.04 (0.04)
Vacancy and application controls	Yes	Yes
Observations	764	764

Note. White homoskedasticity-consistent standard errors, corrected for clustering at the vacancy level, in parentheses. ***(**)((*)) indicates significance at the 1% (5%) ((10%)) level.

Table 8: The probability of positive callback (sensu stricto) for an interview: OLS estimates with additional interactions

Variables	**Positive callback, sensu stricto**			
	Model 1		**Model 2**	
Turkish name	−0.07	(0.04)		
Turkish name * low-skilled, non-bottleneck			−0.27**	(0.12)
Turkish name * low-skilled, bottleneck			−0.06	(0.06)
Turkish name * high-skilled, non-bottleneck			0.01	(0.08)
Turkish name * high-skilled, bottleneck			−0.01	(0.04)
Turkish name * multiple vacancies	−0.10	(0.07)	−0.09	(0.07)
Turkish name * province Antwerp	0.03	(0.04)	0.01	(0.04)
Turkish name * province West-Flanders	−0.03	(0.06)	−0.07	(0.06)
Turkish name * province Flemish Brabant	0.02	(0.09)	0.02	(0.09)
Turkish name * province Limburg	0.05	(0.11)	0.03	(0.11)
Turkish name * sector finance and insurance	−0.04	(0.06)	−0.10	(0.10)
Turkish name * sector logistics	0.05	(0.10)	0.01	(0.11)
Turkish name * sector marketing	0.09	(0.08)	0.03	(0.10)
Turkish name * sector legal practice	−0.03	(0.07)	−0.10	(0.10)
Turkish name * sector cleaning	0.01	(0.08)	0.01	(0.08)
Turkish name * sector administration	−0.09	(0.09)	0.12	(0.15)
Turkish name * male recruiter	0.01	(0.03)	0.01	(0.03)
Turkish name * female recruiter	−0.21***	(0.07)	−0.20***	(0.07)
Turkish name * application type 2	0.00	(0.02)	0.00	(0.02)
Turkish name * application type 4	0.02	(0.14)	0.23	(0.20)
Turkish name * application type 6	0.12	(0.08)	0.11	(0.09)
Turkish name * application type 8	−0.05	(0.11)	−0.06	(0.12)
Turkish name * application in December	0.00	(0.04)	0.01	(0.04)
Turkish name * application in February	−0.01	(0.04)	−0.01	(0.04)
Turkish name * application in March	0.00	(0.06)	0.00	(0.06)
Vacancy and application controls	Yes		Yes	
Observations	764		764	

Note. White homoskedasticity-consistent standard errors, corrected for clustering at the vacancy level, in parentheses. ***(**)((*)) indicates significance at the 1% (5%) ((10%)) level.

Table 9: The probability of positive callback (sensu stricto) for an interview: Probit estimates, average marginal effects.

Variables	**Positive callback, sensu stricto**	
	Model 1	**Model 2**
Turkish name	−0.06∗∗∗ (0.02)	
Turkish name * low-skilled, non-bottleneck		−0.19∗∗∗ (0.06)
Turkish name * low-skilled, bottleneck		−0.05∗ (0.03)
Turkish name * high-skilled, non-bottleneck		−0.04 (0.03)
Turkish name * high-skilled, bottleneck		−0.01 (0.02)
Vacancy and application controls	Yes	Yes
Observations	764	764

Note. Average marginal effects are reported. Standard errors, corrected for clustering at the vacancy level and calculated using the delta method, in parentheses. ***(**)((*)) indicates significance at the 1% (5%) ((10%)) level.

Table 10: The probability of positive callback (sensu stricto) for an interview: Heteroskedastic Probit estimates, average marginal effects.

Variables	**Positive callback, sensu stricto**	
	Model 1	**Model 2**
Turkish name	−0.05∗∗∗ (0.02)	
Turkish name * low-skilled, non-bottleneck		−0.15∗ (0.08)
Turkish name * low-skilled, bottleneck		−0.00 (0.06)
Turkish name * high-skilled, non-bottleneck		−0.01 (0.04)
Turkish name * high-skilled, bottleneck		0.02 (0.04)
Vacancy and application controls	Yes	Yes
Observations	764	764

Note. Average marginal effects are reported. Standard errors, corrected for clustering at the vacancy level and calculated using the delta method, in parentheses. ***(**)((*)) indicates significance at the 1% (5%) ((10%)) level. Using a likelihood-ratio test we cannot reject the null hypothesis of homoscedasticity with respect to the dummy indicating Turkish ethnicity (p-value = 0.52).