

DO EMPLOYER PREFERENCES CONTRIBUTE TO STICKY FLOORS?

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The authors investigate the importance of employer preferences in explaining sticky floors, the pattern in which women are less likely, as compared to men, to start to climb the job ladder. The authors perform a randomized field experiment in the Belgian labor market and test whether hiring discrimination based on gender is heterogeneous by whether jobs imply a promotion (compared to the applicants' current position). The findings show that women receive 33% fewer interview invitations when they apply for jobs that imply a first promotion at the functional level. By contrast, the results show that their hiring chances are not significantly affected by the authority level of the job.

During the past decade, economists have attempted to identify sticky floors in the labor market, thereby building on the seminal work by Booth, Francesconi, and Frank (2003). Sticky floors can be described as the pattern in which women are, compared to men, less likely to start to climb the job ladder. Therefore, sticky floors complement the well-known concept of glass ceilings, the pattern in which women are less likely to reach the top of the job ladder.¹ Evidence for the existence of sticky floors has been found in countries such as Italy (Filippin and Ichino 2005), Spain (Gradín and del Río 2009), Thailand (Fang and Sakellariou 2011), and the United

¹For some seminal and recent contributions to the literature on glass ceilings, see Albrecht, Björklund, and Vroman (2003); Arulampalam, Booth, and Bryan (2007); Booth (2009); Weinberger (2011); Reuben, Rey-Biel, Sapienza, and Zingales (2012); Smith, Smith, and Verner (2013); Kassenboehmer and Sinning (2014). For more general contributions on gender differentials in promotions, see Blau and DeVaro (2007); Yap and Konrad (2009); Matteazzi, Pailhé, and Solaz (2014).

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KEYWORDS: gender discrimination, hiring discrimination, labor market transitions, European labor markets, sticky floors

States (Baker 2003). In Belgium, the country where the present study was done, Deschacht, Baerts, and Guerry (2011) concluded, based on their discrete time-event historical analysis of the Panel Study of Belgian Households data (1994 to 2001), that women near the top of the job ladder face fewer obstacles to promotions than women on the lower- and mid-career levels. In addition, Belgium is one of the 12 European countries in which Christofides, Polycarpou, and Vrachimis (2013), investigating the gender wage gap across 24 EU member states, found evidence for sticky floors.

From a policy perspective, determining the nature of the phenomenon of sticky floors is important to design adequate policy actions. The studies mentioned, however, do not allow us to determine whether sticky floors result from gender differences in human capital, preferences and behavior on the employee side, or preferences (and unequal treatment) on the employer side. In our study, we contribute to the literature by investigating the importance of employer preferences (and thereby discrimination) in explaining sticky floors, keeping employee characteristics constant.²

Specifically, our aim is to answer the question: Is the unequal treatment of equally productive male and female job candidates by employers heterogeneous by whether or not they are applying for jobs that imply a (first) promotion?³ The unfavorable treatment of females in the access to these positions can be expected based on the theoretical models of discrimination introduced by Becker (1957) and Arrow (1973).⁴ Discrimination against women applying for higher positions could result from the general distaste that employers, coworkers, and customers may have for collaborating with women in these higher positions, potentially related to the traditional overrepresentation of men in these positions. Furthermore, employers could expect a higher average productivity from males relative to females in leading positions. This may relate to the match between these positions and more “masculine” characteristics such as dominance, autonomy, and

²Throughout this article the terms *employer preferences* and *employer discrimination* are used to point to the general concept of employers' unequal appraisal and treatment of women and men in the labor market. Therefore, these concepts do not refer to the narrower theoretical concept of Becker's (1957) “employer discrimination.”

³This implies that we do not investigate unequal treatment in promotions within the firm. We come back to this issue later in the article.

⁴These theories are based on neoclassical assumptions and have been criticized concerning several aspects; see, for example, Bergmann (1989) in the context of gender-based discrimination in the labor market. In spite of the development of alternative approaches to theorizing discrimination, such as the models of opportunistic discrimination, implicit discrimination, noncompeting groups, and lexicographic search by employers (Darity and Mason 1998; Altonji and Blank 1999; Bertrand and Mullainathan 2004), many recent contributions to the discrimination literature are still guided by the theoretical framework of the models of taste-based and statistical discrimination (Charles and Guryan 2008; Borjas 2009). Moreover, whereas some newer models are particularly applicable to the case of ethnic discrimination, the models of Becker (1957) and Arrow (1973) can be applied to the case of gender discrimination in a natural way.

assertiveness, on the one hand,⁵ and the fact that females are documented as having, on average, a less continuous and committed labor-market participation, which is related to the traditional division of labor in the household and maternity leave (Budig and England 2001; Blandford 2003; Baumle 2009; Romeu Gordo 2009), on the other. In addition to the theoretical support of the Becker (1957) and Arrow (1973) frameworks, potential gender discrimination by employers when taking hiring decisions that imply a promotion for the job candidate squares with the notion in the popular literature that men are promoted based on potential whereas women are promoted based on prior performance (Carter and Silva 2011).

To the best of our knowledge, all previous studies on gender differences in promotion opportunities have used regression-based methods on observational data (typically household-survey or labor-force data). The most common approach has consisted of Oaxaca–Blinder-style decompositions of wage differentials, with a part explained by observables related to human capital and occupational characteristics and an unexplained part pointing in the direction of discrimination (Blinder 1973; Oaxaca 1973). Residual gaps at the top of the wage distribution were then interpreted as complementary with the glass ceiling concept, whereas residual gaps at the bottom of the wage distribution pointed in the direction of sticky floors. In their survey of experimental advances in the study of gender differentials in the labor market, Azmat and Petrongolo (2014) formulated two important drawbacks of using observational data to measure gender discrimination. First, most observational data do not capture some of the determinants of a workers' productivity (e.g., motivation and intrinsic ability) that may be observed—and valued—by employers. Stated otherwise, based on these nonexperimental data, researchers cannot control for all the variables employers take into account when making their hiring and remuneration decisions. As a result, no conclusive evidence of discrimination can be provided based on these data. Second, if premarket investments in human capital or decisions to apply for a job implying a promotion are affected by the expectation of future labor-market discrimination, the impact of discrimination is partly captured by observable human capital and occupational characteristics.

To overcome these methodological problems, this study is novel in its approach to gathering original experimental data on gender differences in promotion opportunities and thereby, argued by Duflo, lets “the research question determine the data to be obtained instead of the data determining the questions that can be asked” (2006: 2). Specifically, we sent out 576 pairs of fictitious job applications for individuals with about five years of job experience in their first and current job to vacancies for jobs requiring at least some and at most five years of experience. The two applications in

⁵For instance, Oakley (2000) argued that the less assertive forms of communication used by women might be inappropriate for functioning in the upper echelons of many corporations.

each pair are similar, except for the revealed gender of the candidate. By monitoring the reaction from the employer side, we can identify unequal treatment based on this single characteristic. This measure can be given a causal interpretation because all the information the employer receives is under the control of the researcher so that selection on individual unobservables is eliminated. We sent fictitious applications to vacancies that implied a promotion in terms of occupational level and/or job authority compared to the current listed job of the candidate and to vacancies at the same functional and authority levels as the current job. Thereby, we are able to test whether unequal treatment of young men and women in the labor market is heterogeneous by whether jobs imply a promotion compared to the applicants' current position.⁶ If employer preferences contribute to sticky floors, the unequal treatment of male and female job candidates should be relatively more to the disadvantage of women who apply for a job implying a promotion. This is our research hypothesis.

The Experiment

Causal Evidence of Gender Discrimination by Means of a Correspondence Experiment

To answer our research question, we conducted a correspondence experiment. In this experiment, pairs of fictitious job applications were sent to real job vacancies. The applications in each pair were comparable except for the gender of the applicant. By monitoring the subsequent callbacks from the employer side, we can measure discrimination based on this single characteristic and give it a causal interpretation.

Correspondence experiments are widely viewed as providing the cleanest and most compelling evidence of unequal treatment in hiring (Riach and Rich 2002). As we argue in the introduction, any bias introduced by individual unobservable characteristics is eliminated because all the information received by the employer is controlled by the researcher. Strict equivalence between the fictitious job candidates is realized, and unequal treatment by employers can be disentangled from other explanations of differential hiring outcomes, such as differences in human capital and preferences at the employee side.

Concerning the identification of gender discrimination, the extensive correspondence experiment conducted by Neumark, Bank, and Van Nort (1996) is seminal. Neumark et al. showed that, in the 1994 Philadelphia labor market for waiters and waitresses, female job candidates had, compared to males, a substantially lower estimated probability of receiving an

⁶Stated otherwise, we can argue that a potential gender differential in the chances of receiving a callback for a job that implies a promotion at a new firm is composed of a gender differential in the hiring chances at a new firm and a gender differential in callbacks for jobs implying a promotion. As we apply both for jobs implying a promotion and for jobs implying no promotion, our experimentally gathered data allow us to isolate the latter gender differential.

interview in high-price restaurants and a substantially higher probability of receiving one in low-price restaurants (where earnings were also lower). In the same realm, Firth (1982), Riach and Rich (1987, 2006), Weichselbaumer (2004), Petit (2007), Albert, Escot, and Fernández-Cornejo (2011), Booth and Leigh (2010), and Carlsson (2011) studied hiring discrimination based on gender in Australia, the United Kingdom, Austria, France, Spain, and Sweden by means of correspondence experiments. None of these studies, however, attempted to investigate heterogeneity in labor-market discrimination by whether or not the jobs that the fictitious applicants applied for implied a promotion.

We conducted our experiment between October 2013 and March 2014 in the labor market of Flanders, the Dutch-speaking northern part of Belgium. During this period, we randomly selected 288 vacancies for jobs targeting Bachelors' degrees (BA) in business administration and 288 vacancies for jobs targeting Masters' degrees (MA) in business economics in the database of the Public Employment Agency of Flanders, the region's major job-search channel. We restricted ourselves to vacancies in the private sector requiring at most five years of work experience.⁷ Two job applications for individuals with five years of work experience (in a first and current jobs), identical in terms of productivity-relevant characteristics but different in their gender, were sent to the selected vacancies. We opted for individuals with five years of experience because sticky floors are related to the start of job-ladder climbing. Moreover, job searches that target people with a tenure of five years can be expected to be heterogeneous in promotion aspects compared to the applicants' current (starter) job because "at least five years of work experience" is typically asked for in announcements for (more) senior positions.

The data-gathering process was reviewed and approved by the Ethical Committee of the Faculty of Economics and Business Administration of Ghent University at its meeting of July 9, 2013.

Construction of Fictitious Applications

For each of the aforementioned academic degrees held by our fictitious applicants, we created two template applications comprising a resume and a motivation letter. We refer to these (template) applications as the Type A and Type B applications. The two types were equal in all productivity-relevant characteristics (e.g., educational qualifications, language skills, and computer skills); however, to avoid detection of the experiment, they differed in layout and details. For instance, both candidates mentioned sports and cultural activities, but the Type A applicant referred to general sports

⁷The database of the Public Employment Agency of Flanders covers both the private and public sectors. We were forced, however, to restrict ourselves to vacancies in the private sector because in Flanders vacancies in the public sector almost always ask potential job candidates to provide the recruiter with formal proofs of their educational degrees. Because we did not want to falsify these degrees, we were not able to apply for public-sector vacancies.

activities and (drama-club) acting whereas the Type B applicant referred to fitness and tennis activities and playing the saxophone. To ensure that our job applications were realistic and representative, example applications of the Public Employment Agency of Flanders were used and calibrated for our purposes.

The Type A and Type B applicants were single individuals born, studying, and living in comparable suburbs of Ghent, the second largest city of Flanders. These candidates graduated from tertiary education in June 2008 without any grade-retention experience. In line with the vacancy to which the pair of applications was sent, a specialization was chosen.⁸ All the applicants had graduated from University College Ghent (BA in business administration) or Ghent University (MA in business economics). Since September 2008, the fictitious applicants had been employed in a starter job in line with their academic degree and specialization but with no job authority (see the subsection on Variation in Occupational Level and Job Authority for how we define *job authority*).⁹

Furthermore, we added to the Type A and Type B applications the following characteristics: Belgian nationality, driver's license, adequate information-technology (IT) skills, Dutch mother tongue, adequate English and French language skills, and sports and cultural activities. In their motivation letters, the job candidates indicated they were highly interested, motivated, and organized. Last, we appended a fictitious postal address (the combination of a real street in a middle-class neighborhood and a non-existent street number) and a date of birth to all application templates.

Randomized Disclosure of Applicants' Gender

To erase any dependence of gender differentials in the callbacks on the application type, a typically male- and a typically female-sounding name was alternately assigned to the Type A and Type B applications. An appendix with the four combinations of resumes (Type A with female name, Type A with male name, Type B with female name, and Type B with male name) for one of the educational degrees (BA in business administration with accountancy and tax as the specialization) is available in the online Appendix.¹⁰

We alternated the order in which we sent the applications to the selected job postings, with a one-day delay in between. This resulted in a randomization procedure in which we alternated among four pairs of applications: 1)

⁸For the BA in business management, the specializations used were 1) accountancy and tax, 2) finance and assurance, 3) management of small- or medium-size business, 4) logistics, 5) marketing, and 6) legal practice. For the MA in business economics, the specializations used were 1) accountancy, 2) finance, and 3) marketing.

⁹The professions of accountant (International Standard Classification of Occupations [ISCO]-08 code 3313), file administrator assurances (code 4312), management assistant (code 3343), legal file administrator (code 3411), dispatcher (code 3331), and junior marketer (code 3322) were used.

¹⁰See <http://users.ugent.be/~sbaert/DoEmployerPreferencesContributetoStickyFloorsONLINEAPPENDIX.pdf>.

first the Type A application with the female name and then (one day later) the Type B application with the male name; 2) first the Type A application with the male name and then the Type B application with the female name; 3) first the Type B application with the male name and then the Type A application with the female name; 4) first the Type B application with the female name and then the Type A application with the male name. To the first vacancy, combination 1) was sent; to the second vacancy, combination 2) was sent; to the third vacancy, combination 3) was sent; to the fourth vacancy, combination 4) was sent; to the fifth vacancy, again combination 1) was sent; and so on. This randomization procedure was carried through for each of the two educational degrees separately.

We chose “Elke De Vos” and “Anke De Vriendt” as the names of the female candidate holding a BA and a MA, respectively, and “Stijn Van Lancker” and “Stijn Van De Voorde” as the names of the male candidates, holding a BA and MA, respectively. We made sure that the chosen names did not represent different social backgrounds, following Bloothoof and Onland (2011), who linked the suffix of the name Dutch-speaking parents choose for their children with these children’s later wages.

We matched to each assigned name a mobile phone number and an e-mail address. The voicemail messages were the telecommunication providers’ standard (Dutch) messages (“Hello, [Name of the fictitious candidate] cannot answer your call. Please leave a message after the tone”). The names of the fictitious candidates were recorded by young people with a similar social-economic background (i.e., native students in the MA in [business] economics program at Ghent University). The e-mail addresses were registered with large and commonly used providers. All fictitious job applications were sent to the selected real vacancies by e-mail. To avoid detection, we applied to no more than one job posting from each employer.

Measurement of Callbacks

Callbacks were received by telephone voicemail and by e-mail. Because we used postal addresses with nonexistent street numbers in the applications, we could not measure reactions on the employer side sent by regular mail. However, several Flemish human resource managers confirmed that, nowadays, employers rarely invite job candidates to selection interviews through regular mail. To minimize the inconvenience to the employers, we immediately declined all positive callbacks. Following the corresponding testing literature, we discounted all reactions from the employer side received later than 30 days after sending out the applications. Because we did not receive any positive reaction after 30 days, this turned out to be a redundant restriction.

In our data analysis, we distinguish between two definitions of *positive callback*. *Positive callback* in a *strict sense* is defined as getting an invitation for an interview concerning the job for which the applicant applied; this definition was adopted by, for example, Bertrand and Mullainathan (2004). *Positive*

callback in a *broad sense* includes, in addition to the first definition, a request to provide more information, a request to contact the employer, or the receipt of an alternative job proposal; this definition was adopted by, for example, Kaas and Manger (2012).

Variation in Occupational Level and Job Authority

Sticky floors may translate into lower probabilities for females to be promoted in terms of four dimensions: occupational level, job authority, wages, and nonstatutory benefits (Deschacht et al. 2011). Because the last two job aspects are not mentioned in the job postings in the database of the Public Employment Agency of Flanders, our experiment does not allow us to observe these aspects at the vacancy level. Therefore, we focus here on promotion in terms of occupational level and the degree of job authority. At the end of the regression analysis, however, we include the average wage in the occupation as a proxy for the wage in the posted job as a variable explaining callback rates by gender.

Each of the 576 vacancies to which we sent the two fictitious job applications was matched with an indicator of the occupational level and with an indicator of the job-authority level. This was done immediately after sending out the first application to a selected vacancy (and ipso facto before any callback was received). First, based on the information in the vacancy, all vacancies were matched with an occupation in the International Standard Classification of Occupations (ISCO)-08 classification system; ISCO-08 is the second-generation classification system, based on a resolution by experts on labor statistics in December 2007 and endorsed by the Governing Body of the International Labour Organization (ILO) in March 2008. To do this, we searched for a best match between the name of the vacancy (i.e., the name of the job) and the description of the tasks of the job in the vacancy, on the one hand, and four elements mentioned in the ISCO-08 group definitions file (International Labour Organization 2013), on the other: definition, tasks included, included occupation names, and excluded occupation names. A new job at a higher ISCO-08 one-digit level (called here its occupational level) than the current job in the application was defined as a promotion in terms of occupational level.¹¹

¹¹The reader will notice that, because of our choice of the candidates and current job and because of our procedure of matching these candidates with vacancies, both the current job and the job for which the candidates applied were closely related to their academic degree and their specialization. So, observed (potential) occupational transitions are, as a rule, vertical movements (i.e., transitions in job level) and not horizontal movements (i.e., transitions in job content). This is a desirable situation because, therefore, promotions in occupational level following our definition may not reflect nonpromotional horizontal transitions. The most common promotions in occupational level observed in our data are those from accountant (ISCO-08 -level 3) and file administrator assurances (level 4) to financial professional (level 2); from management assistant (level 3) and legal file administrator (level 3) to administration professional (level 2); from dispatcher (level 3) to manufacturing, mining, construction, and distribution manager (level 1); and from junior marketer (level 3) to sales, marketing, and public-relations professional (level 2).

The jobs for which our fictitious job candidates applied were classified into three categories of job authority, following Hachen (1990): jobs with no supervision authority, that is, no supervision or coordination tasks concerning the work of other workers (level 1); jobs with supervision authority but no influence on the wage or promotion opportunities of other workers (level 2); and jobs with both supervision authority and influence on the wage or promotion opportunities of other workers (level 3). Because the current job of the candidates was set at level 1, a new job with at least supervision authority (i.e., at level 2 or level 3) was defined as a promotion.

Limitations of the Experimental Design

Before addressing our research question by means of a statistical analysis of the gathered data, we discuss some limitations of our experimental research setting.

First, our design can be effective only in demonstrating gender discrimination in the first stage of the recruitment process. Because we simply analyze the content of first callbacks, we cannot translate our empirical results into divergences in job offers. Bertrand and Mullainathan (2004), however, argued that, even in the case in which the recruitment process has moderate friction, one can expect that reduced chances of having an interview will translate into reduced chances of receiving a job offer.

Second, our design is limited in its focus on promotion transitions to other firms. Unequal opportunities in promotion transitions within firms cannot be investigated by means of an experiment such as this one and may be characterized by other dynamics.

Third, we test for unequal treatment only in the vacancies targeting individuals with a BA or MA degree in business posted in the database of the Public Employment Agency of Flanders. Possibly, unequal treatment based on gender is more (or less) apparent among employers who rely on other channels (such as social networks) for filling their vacancies or among employers who have to fill vacancies targeting other profiles. We are specifically interested, however, in the relationship between hiring discrimination against women and the potential promotion implied by the jobs for which they apply. Because this third limitation causes, by construction, a similar shift in the discrimination measures for the selected jobs that imply a promotion and for those that imply no promotion, our main research conclusions remain valid.

Fourth, our occupational-level and job-authority promotion dimensions may correlate with each other and with other vacancy characteristics. As a consequence, descriptive statistics on heterogeneity in discrimination using these promotion dimensions of the tested jobs might reflect heterogeneity of gender discrimination on other dimensions. Therefore, we merge the gathered data with administrative data at the occupation, firm, and sector levels and analyze the merged data by means of a regression analysis controlling for potential confounders.

Results

Descriptive Data Analysis

Tables 1 and 2 describe the experimentally gathered data, adopting the strict and broad definition of positive callback, respectively. We provide the reader with two frequently used statistical measures: the positive callback ratio (PCR) and the net discrimination rate (NDR) (Neumark et al. 1996; Riach and Rich 2002; Bertrand and Mullainathan 2004).

Overall, for 88 of the 576 vacancies at least one candidate received a positive callback in the strict sense (195 in the broad sense): 32 (98) vacancies resulted in a positive callback for both candidates, 31 (51) in a positive callback for the male candidate only, and 25 (46) in a positive callback for the female candidate only. The overall PCR is obtained by dividing the total percentage of applications for which male candidates received a positive callback by the corresponding percentage for the female candidates. At the level of the total data set, the positive callback rate in the strict sense is 11%¹² (in the broad sense, 26%) for male candidates and 10% (25%) for female candidates. The resulting PCR is 1.11 (1.03), indicating that the male candidates received on average 11% (3%) more positive callbacks in reaction to their applications. These ratios are not significantly different from 1, and so we conclude that, overall, employers did not discriminate based on gender.

To provide the reader with an initial answer to our research question, we split our sample using the two dimensions of promotion. First, we find significant evidence for unequal treatment of females when they applied for jobs at a higher ISCO-08 level than the level of their current job. In this case, the PCR is 1.50 (1.23), which means that males received about 50% more invitations for a job interview (positive callback, strict sense) and 23% more positive reactions (broad sense). Stated otherwise, when applying for these jobs, women received about 33% fewer interview invitations (strict sense) and 19% fewer positive reactions (broad sense). This finding is in line with our first research hypothesis of more hiring discrimination against women when they apply for jobs that imply a promotion. Second, we find no significantly unequal treatment for both subsamples using the promotion dimension related to job authority.

The overall NDR is calculated by subtracting the number of applications for which the female candidate was preferred from the number of applications for which the male candidate was preferred and dividing the result by the number of pairs in which at least one candidate received a positive callback. The result is a net measure of the number of discriminatory acts a female applicant could expect to encounter per application for which at least one candidate received a positive callback. Overall, the NDR is 0.07 for positive callback in the strict sense (0.03, broad sense). Based on a standard

¹²0.11 = (32 + 31)/576.

Table 1. The Probability of a Positive Callback (Strict Sense): Descriptive Analysis

Data selection	Number of jobs	Neither candidate had positive callback		Both candidates had positive callback		Only male candidate had positive callback		Only female candidate had positive callback		PCR ^e	t	NDR ^f	χ^2
		had positive callback	had positive callback	had positive callback	had positive callback	had positive callback	had positive callback						
A. All jobs	576	488	32	31	25	1.105	0.802	0.068	0.643				
B. Breakdown by occupational-level promotion dimension													
Jobs at same level as current job	248	206	18	9	15	0.818	1.226	-0.143	1.500				
Jobs at higher level than current job	328	282	14	22	10	1.500**	2.133	0.261**	4.500				
C. Breakdown by job-authority promotion dimension													
Jobs with no job authority	328	271	21	20	16	1.108	0.666	0.070	0.444				
Jobs with job authority	248	217	11	11	9	1.100	0.447	0.065	0.200				

^aThe positive callback ratio (PCR) is calculated by dividing the percentage of applications for which male candidates received a positive callback by the corresponding percentage for the female candidates. The *t*-test for the PCR tests the null hypothesis that the probability of a positive callback is the same for candidates of both genders. Because two applicants contacted the same firm, the probability of the male applicant receiving an invitation correlates with the probability of the female applicant candidate receiving one. Therefore, standard errors are corrected for clustering of the observations at the vacancy level.

^bThe net discrimination rate (NDR) is calculated by subtracting the number of applications for which the female candidate was preferred from the number of applications for which the male candidate was preferred and dividing by the number of pairs in which at least one candidate received a positive callback. The χ^2 test for the NDR tests the null hypothesis that both candidates are treated unfavorably just as frequently.

***, **, * indicates significance at the 1%; 5%; 10% significance level, respectively.

Table 2. The Probability of a Positive Callback (Broad Sense): Descriptive Analysis

<i>Data selection</i>	<i>Number of jobs</i>	<i>Neither candidate had positive callback</i>	<i>Both candidates had positive callback</i>	<i>Only male candidate had positive callback</i>	<i>Only female candidate had positive callback</i>	<i>PCR^a</i>	<i>t</i>	<i>NDR^b</i>	χ^2
A. All jobs	576	381	98	51	46	1.035	0.507	0.026	0.258
B. Breakdown by occupational-level promotion dimension									
Jobs at same level as current job	248	156	45	18	29	0.851	1.610	-0.120	2.574
Jobs at higher level than current job	328	225	53	33	17	1.229**	2.277	0.155**	5.120
C. Breakdown by job-authority promotion dimension									
Jobs with no job authority	328	209	60	28	31	0.967	0.390	-0.025	0.153
Jobs with job authority	248	172	38	23	15	1.151	1.300	0.105	1.684

^aThe positive callback ratio (PCR) is calculated by dividing the percentage of applications for which male candidates received a positive callback by the corresponding percentage for the female candidates. The *t*-test for the PCR tests the null hypothesis that the probability of a positive callback is the same for candidates of both genders. Because two applicants contacted the same firm, the probability of the male applicant receiving an invitation correlates with the probability of the female applicant candidate receiving one. Therefore, standard errors are corrected for clustering of the observations at the vacancy level.

^bThe net discrimination rate (NDR) is calculated by subtracting the number of applications for which the female candidate was preferred from the number of applications for which the male candidate was preferred and dividing by the number of pairs in which at least one candidate received a positive callback. The χ^2 test for the NDR tests the null hypothesis that both candidates are treated unfavorably just as frequently.

***, **, * indicates significance at the 1%; 5%; 10% significance level, respectively.

χ^2 test, we cannot reject the hypothesis that the candidates of both sexes were treated unfavorably equally often. In contrast, if we break the NDR down by the occupational-level and job-authority promotion dimensions, we get results in line with those based on the PCR.

An explanation for the finding of no significant heterogeneity in the job-authority dimension could be that, for supervising positions (i.e., middle management rather than management), soft and social (leading) skills, which are often related to women, outweigh the aforementioned more “masculine” characteristics for employers.

Regression Analysis

Because, by construction, both the male and female candidate exhibit the same observable characteristics for each vacancy, regressing the positive callbacks on the gender of the candidate (and on the vacancy and employee characteristics) leads to the same empirical conclusion as the one based on panel A of Tables 1 and 2. But, as previously mentioned, the occupational-level and job-authority promotion dimensions may correlate with each other and with other vacancy characteristics, and therefore, the results presented in panels B and C of Table 1 may, in fact, reflect the heterogeneity of gender discrimination on other dimensions. Moreover, because of the finite size of our sample, the promotion indicators of the posted jobs may even correlate with the application type (A or B) to which the female candidate was assigned and with whether her application was sent before or after the male candidate’s application. Therefore, we further explore the experimentally gathered data by means of a regression analysis. Summary statistics of the variables used in this analysis are outlined in Table 3.

Tables 4 and 5 present our regression results. We regress, by means of a linear probability model, the probability of a positive callback on various sets of key and control variables, both by themselves and in interaction with Female candidate.¹³ For comparability of the regression results, we normalized all the explanatory variables that are interacted with Female candidate by subtracting the mean among the subpopulation of female candidates and, for continuous variables, by dividing the result by the standard deviation of this subpopulation. The estimation results for all variables interacted with Female candidate are presented in Table 4 (using positive callback in the strict sense as an outcome) and in Table 5 (using positive callback in the broad sense as an outcome).¹⁴ For each of the presented models, we computed multicollinearity diagnostics leading to variance inflation factors less than five, except for some sector dummies.

¹³We also performed estimations using vacancy fixed effects and probit estimations. The results for these exercises are closely comparable to those presented in the main text, and they are available on request.

¹⁴For conciseness, we do not present the main effects for these variables here, but they are available on request.

*Table 3. Regression Variables (Employee and Vacancy Characteristics):
Summary Statistics*

<i>Variable</i>	<i>All jobs</i>	<i>Jobs implying a promotion in occupational level</i>	<i>Jobs implying a promotion in job authority</i>
First application sent within pair was the female applicant's	0.500 (0.500)	0.506 (0.501)	0.520 (0.501)
Application Type B was the female applicant's	0.500 (0.500)	0.530 (0.500)	0.544 (0.499)
MA degree	0.500 (0.500)	0.616 (0.487)	0.540 (0.499)
Temporary contract	0.127 (0.333)	0.116 (0.321)	0.109 (0.312)
Part-time contract	0.075 (0.263)	0.061 (0.240)	0.052 (0.223)
Male recruiter	0.325 (0.469)	0.305 (0.461)	0.270 (0.445)
Log(Average FTE in firm)	1.472 (1.048)	1.501 (1.085)	1.510 (1.003)
Percentage of female workers in occupation	0.550 (0.181)	0.497 (0.163)	0.490 (0.158)
Average wage in occupation in EUR	4,098 (1,043)	4,787 (855.6)	4,813 (1,066)
Sector number (NACE, two-digit-level)	65.54 (17.51)	66.86 (17.29)	66.32 (17.31)

Notes: Reported statistics are averages. Standard deviations are in parentheses. EUR, euro; FTE, full-time equivalency; NACE, Nomenclature Generale des Activites Economiques dans l'Union Europeenne.

Here, we first focus on the results of Table 4 and then compare these results with the ones in Table 5. We regress positive callback on the dummy Female candidate (Model 1); the dummy Female candidate and a dummy indicating that the posted job implied a promotion in occupational level, included both as such and in interaction with Female candidate (Model 2); and the dummy Female candidate and a dummy indicating the posted job implied a promotion in job authority, included both as such and in interaction with Female candidate (Model 3). By construction, the estimations presented in Models 1 to 3 of Table 4 reflect those presented in Table 1, panels A to C. For instance, based on Model 1, we learn that revealing a female gender lowers a candidate's chance for an invitation for a job interview about 1 percentage point, which squares with the comparison of the positive callback rates for males (11%) and females (10%) mentioned previously. Furthermore, Model 2 indicates that the gender gap in job-interview invitations is about 6 percentage points higher (and relatively more to the detriment of females) in jobs that imply a promotion in occupational level than in jobs that imply no promotion in this respect.

Next, in Model 4, we combine the explanatory variables included in Models 2 and 3. As a consequence, the finding of fewer positive callbacks for women when they apply for jobs at a better ISCO level is further enforced. In contrast, the coefficient for the interaction with the

Table 4. The Probability of a Positive Callback (Strict Sense): Regression Analysis

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Female candidate	-0.010 (0.013)	-0.010 (0.013)	-0.010 (0.013)	-0.010 (0.013)	-0.012 (0.013)	-0.012 (0.013)
Female candidate * Promotion in occupational level (norm.)		-0.061** (0.026)		-0.092*** (0.035)	-0.095** (0.040)	-0.106** (0.049)
Female candidate * Promotion in job authority (norm.)			0.004 (0.026)	0.055 (0.034)	0.067 (0.041)	0.063 (0.044)
Female candidate * First application sent within pair (norm.)					0.065 (0.048)	0.068 (0.048)
Female candidate * Application Type B, MA degree (norm.)					0.061 (0.063)	0.061 (0.063)
Female candidate * Application Type B, BA degree (norm.)					0.046 (0.072)	0.044 (0.071)
Female candidate * MA degree (norm.)						
Female candidate * Temporary contract (norm.)					-0.030 (0.053)	-0.032 (0.053)
Female candidate * Part-time contract (norm.)					0.071 (0.059)	0.071 (0.059)
Female candidate * Male recruiter (norm.)					0.019 (0.053)	0.019 (0.053)
Female candidate * Log(Average FTE in firm) (norm.)					-0.003 (0.035)	-0.002 (0.036)
Female candidate * Percentage female workers in occupation (norm.)					0.017 (0.017)	0.017 (0.017)
Female candidate * Average wage in occupation (norm.)					-0.003 (0.017)	-0.002 (0.017)
Linear probability model	Yes	Yes	Yes	Yes	Yes	Yes
Dependent variable: Invitation to a job interview	Yes	Yes	Yes	Yes	Yes	Yes
Sector fixed effects interacted with Female candidate	No	No	No	No	Yes	Yes
Number of observations	1,152	1,152	1,152	1,152	1,074	1,074

Notes: Variables that are interacted with Female candidate are also included without interaction with this variable. Except for Female candidate, all variables are normalized (norm.) by subtracting the mean among the population of female candidates. Continuous variables are further normalized by dividing by the standard deviation among this subpopulation. Standard errors, corrected for clustering at the vacancy level, are in parentheses. In Models 5 and 6, 78 observations are dropped because of missing values for the added control variables. FTE, full-time equivalency.

***, **, * indicates significance at the 1%; 5%; 10% level, respectively.

job-authority promotion dimension increases and even turns positive, albeit insignificantly so. This is attributable to the positive correlation between the variables indicating a promotion on the occupational-level and job-authority dimensions (Pearson's $r = 0.56$). Clearly, when we do not control for the former interaction, the latter interaction picks up part of the fact that hiring chances are lower for women in jobs that imply a promotion in occupational level.

In Model 5, we extend the set of variables included, both as such and in interaction with Female candidate. To control for the potential correlation between these variables and the promotion indicators of the selected jobs, we include variables indicating applications that were the first of the pair sent to the vacancy and that used the Type B template (because the templates differ by academic degree, we adopt a Type B dummy for each degree).

In addition, we include a set of variables capturing employee and vacancy characteristics that may affect the callback rates and may be correlated, at least because of the finite size of our data, with the promotion indicators of the posted jobs (see Table 3). First, we include an indicator of the education level of the applicant (a dummy indicating an MA degree) because both theoretical and empirical studies have shown that discrimination decreases with the applicant's level of education (Taubman and Wales 1974; Bursell 2007; Wood et al. 2009; Baert, Cockx, Gheyle, and Vandamme 2015). Second, we adopt variables indicating temporary and part-time contracts, which are uniformly mentioned in the vacancies in the database of the Public Employment Agency of Flanders. If females have a relatively higher access to temporary and part-time jobs and these kinds of jobs are less present in the tested vacancies that imply a promotion in occupational level—and Table 3 shows that this is the case—this could drive the results presented in Table 1, panel B. Third, and related to the recent theory of erotic capital as a personal asset in addition to economic, cultural, and social capital and the empirical evidence on gender differentials in labor-market discrimination (Hakim 2010; Baert 2014), we add a proxy for the gender of the key decision maker in the first stage of the recruitment procedure (i.e., the gender of the contact person mentioned in the vacancy announcement). Fourth, we include, in Models 5 and 6, the natural logarithm of the average number of workers in the firm in 2010 as a proxy of its size.¹⁵ We do this because some former contributions to the empirical literature on labor-market discrimination against ethnic minorities reported a negative relationship between firm size and hiring discrimination, related to the fact that larger firms are more likely to have a dedicated human resources function and therefore, on average, more standardized procedures for recruitment (Wood et al. 2009; Kaas and Manger 2012). Fifth, we

¹⁵This proxy was obtained from Bureau Van Dijk (2014) after looking up the company number of the firm in Trendstop (2014) and Unizo (2014).

include the fraction of female workers in the job because we might expect that, because typically male (female) characteristics are perceived as particularly productive in traditionally male (female) occupations, unequal treatment should be more in favor of women in female-dominated occupations (Weichselbaumer 2004; Booth and Leigh 2010).¹⁶ Sixth, to erase any correlation between the promotion indicators of the selected jobs and the (other) characteristics of the sectors in which they were selected, we include two-digit sector dummies.¹⁷ In total, 57 sectors are represented in the data. As is the case for all other mentioned variables, these dummies are included both as such and in interaction with Female candidate.

Table 4 shows the estimation results for Model 5. We observe a substantial but insignificant coefficient with the expected sign for the interaction between Female candidate and the variable Temporary contract. More important, however, is that the estimate for the interaction between Female candidate and the dummy indicating occupational-level-promotion jobs hardly changes when we introduce these variables. We also ran Model 5 without sector dummies, which led to very similar results.¹⁸

Last, in Model 6 we extend the set of explanatory variables in Model 5 with the average wage in the job, following the ISCO-08 classification at the three-digit level in 2010.¹⁹ We have, however, no significant coefficient for this variable. This may point in the direction of no heterogeneity existing in gender discrimination by the wage of the offered job. But, equally, this finding might be explained by the fact that the average wage in the job using the ISCO-08 classification is not a good proxy for the wage in the particular posted job. Moreover, even when employer discrimination as such is not heterogeneous by the wage level in the occupation, we would expect that our main finding of the unequal access for males and females to (better-paid) positions at a higher functional level should translate into gender differences in pay.

The results outlined in Table 5, using the broad sense definition of positive callback as an outcome variable, lead to the same conclusion concerning the interactions between Female candidate and the promotion indicators of the selected jobs. Thereby, we conclude that the regression analysis presented confirms our previous descriptive findings.

¹⁶This variable is proxied by the average proportion of females in each occupation, following the ISCO-08 classification, in the European Social Survey (sixth round; 2012).

¹⁷We use the Statistical Classification of Economic Activities in the European Community (Nomenclature Generale des Activites Economiques dans l'Union Europeenne [NACE]) at the two-digit level. The sector code, based on the name and the address of the firm mentioned in the vacancy, was found in the databases of *Trends* and UNIZO.

¹⁸Results available on request.

¹⁹Data from Directorate-General Statistics and Economic information of Belgium (2014). We use the 2010 statistics because those of later years are not yet available.

Table 5. The Probability of a Positive Callback (Broad Sense): Regression Analysis

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Female candidate	-0.009 (0.017)	-0.009 (0.017)	-0.009 (0.017)	-0.009 (0.017)	-0.010 (0.018)	-0.010 (0.018)
Female candidate * Promotion in occupational level (norm.)		-0.093*** (0.035)		-0.102*** (0.043)	-0.085* (0.051)	-0.109* (0.062)
Female candidate * Promotion in job authority (norm.)			-0.041 (0.034)	0.015 (0.042)	0.034 (0.049)	0.025 (0.052)
Female candidate * First application sent within pair (norm.)					0.160** (0.069)	0.163** (0.070)
Female candidate * Application Type B, MA degree (norm.)				0.092 (0.097)	0.093 (0.097)	0.093 (0.097)
Female candidate * Application Type B, BA degree (norm.)				0.053 (0.102)	0.051 (0.102)	0.051 (0.102)
Female candidate * MA degree (norm.)				-0.042 (0.080)	-0.046 (0.080)	-0.046 (0.080)
Female candidate * Temporary contract (norm.)				0.059 (0.089)	0.059 (0.089)	0.059 (0.089)
Female candidate * Part-time contract (norm.)				-0.005 (0.074)	-0.005 (0.074)	-0.006 (0.074)
Female candidate * Male recruiter (norm.)					-0.067 (0.046)	-0.066 (0.046)
Female candidate * Log(Average FTE in firm) (norm.)					-0.003 (0.022)	-0.002 (0.022)
Female candidate * Percentage female workers in occupation (norm.)					0.028 (0.020)	0.032 (0.021)
Female candidate * Average wage in occupation (norm.)						0.021 (0.031)
Linear probability model	Yes	Yes	Yes	Yes	Yes	Yes
Dependent variable: Any positive reaction	Yes	Yes	Yes	Yes	Yes	Yes
Sector fixed effects interacted with Female candidate	No	No	No	No	Yes	Yes
Number of observations	1,152	1,152	1,152	1,152	1,074	1,074

Notes: Variables that are interacted with Female candidate are also included without interaction with this variable. Except for Female candidate, all variables are normalized (norm.) by subtracting the mean among the population of female candidates. Continuous variables are further normalized by dividing by the standard deviation among this subpopulation. Standard errors, corrected for clustering at the vacancy level, are in parentheses. In Models 5 and 6, 78 observations are dropped because of missing values for the added control variables. FTE, full-time equivalency. ***, **, * indicates significance at the 1%; 5%; 10% level, respectively.

Conclusion

In this study, we have contributed to the literature by investigating the importance of employer preferences in explaining sticky floors, the pattern in which women are, compared to men, less likely to start to climb the job ladder. Our study is novel in its approach to gathering original experimental data on gender differences in promotion opportunities. Specifically, we conducted a field experiment in which pairs of fictitious job applications of young employees, one male and one female, with a BA in business administration or MA in business economics and with about five years of work experience in their first and current job were sent to companies with real job postings in Belgium. Because we sent applications to companies both with vacancies that implied a promotion in occupational level and/or job authority and with vacancies at the same level as the current job, we were able to test whether the unequal treatment of young men and women in the labor market was heterogeneous by whether jobs imply a promotion from the applicants' current position. We found significant evidence for hiring discrimination against females when they apply for jobs at a higher occupational level. For these jobs, female applicants received, compared to males, about 33% fewer invitations for a job interview and 19% fewer positive reactions (positive callback in the broad sense). In contrast, we found no significant heterogeneity in hiring discrimination by the job-authority level of the posted job. In addition, based on our regression analysis, we found no evidence for heterogeneity in the equal treatment of males and females by the average wage in the occupation mentioned in the vacancy.

From a policy perspective, we cannot deny that our results point in the direction of discrimination against young women, albeit only when they apply for jobs that imply a promotion in the applicant's occupational level. In Belgium, as in many other Organisation for Economic Co-operation and Development (OECD) countries, the legal framework to punish labor-market discrimination is available,²⁰ so that the main benefit seems to lie in the more vigorous *detection* of the unequal chances of being hired for jobs involving a promotion. Researchers could investigate whether this could happen based on a systematic application of the method we have used in this study. An alternative policy option, which could be introduced voluntarily by individual firms or imposed by the government, is anonymizing job applications. Åslund and Skans (2012) showed, by means of a quasi-experiment in Gothenburg, that removing the names from job applications may indeed increase the first callbacks and job offers for female job candidates. Krause, Rinne, and Zimmermann (2012) and Behaghel, Le Barbanchon, and Crépon (2015), however, argued that policymakers should be aware of the unintended effects of anonymized job applications

²⁰See Bassanini and Saint-Martin (2008) for a detailed description of the legal and institutional antidiscrimination framework in 23 OECD countries.

(e.g., with respect to affirmative action)²¹ and that therefore the method of implementation is crucial.

Because employees at a higher occupational level imply a higher investment and higher (temporary) exit costs, our results may be related to the career penalty of motherhood (Budig and England 2001; Correll, Benard, and Paik 2007; Kmec 2011). In this respect, broadening the concept of discrimination to include dimensions regarding how jobs are structured and rewarded that have a disparate impact on mothers could be fruitful. In addition, tax incentives could be provided to employers who reintegrate women who return to their jobs after maternity leave.

Given our chosen experimental design, our results cannot not be explained by theories of (“old-boy”) networking and sector segregation (Groot and Maassen van den Brink 1996; Forret and Dougherty 2004; Ludsteck 2014). Although we cannot rule out the possibility that these mechanisms contribute to sticky floors, our results suggest that awareness campaigns that target these mechanisms will not be sufficient in fighting gender inequalities in promotion opportunities.

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²¹Although several developed countries (e.g., Australia, Belgium, France, Finland, Spain, New Zealand, and Norway) have imposed gender quotas on the boards of big public institutions and/or private companies, we are not aware of gender quotas to guarantee the access of women into middle-management (or lower) positions (Fagan, González Menéndez, and Gómez Anson 2012; Bertrand, Black, Jensen, and Lleras-Muney 2014).

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