

1 During the last decade, economists have attempted to identify Sticky Floors in the labour market,
2 thereby building on the seminal work by Booth et al. (2003). Sticky Floors can be described as
3 the pattern that women are, compared to men, less likely to start to climb the job ladder. Thereby
4 Sticky Floors complement the well-known concept of Glass Ceilings which implies that women
5 are less like to reach the top of the job ladder.¹ Evidence for the existence of Sticky Floors has
6 been found in countries such as Italia (Filippin and Ichino, 2005), Spain (Gradín and del R  o,
7 2009), Thailand (Fang and Sakellariou, 2011) and the United States (Baker, 2003). In Belgium,
8 the country where the present study is accomplished, Deschacht et al. (2011) conclude, based on
9 their discrete time event history analysis of the Panel Study of Belgian Households data (1994-
10 2001), that women near the top face fewer obstacles to promotions than women in the lower- and
11 mid-career levels. In addition, Belgium is one of the 12 European countries in which
12 Christofides et al. (2013), investigating the gender wage gap across 24 EU member states, found
13 evidence for Sticky Floors.

14 From a policy perspective, it is important to determine the nature of the phenomenon of
15 Sticky Floors in order to design adequate policy actions. Based on the mentioned literature,
16 however, it is unclear whether Sticky Floors result from gender differences in human capital,
17 preferences and behaviour at the employee side or from preferences (and unequal treatment) at
18 the employer side. In our study, we contribute to the literature by investigating the importance of
19 employer preferences (and thereby discrimination) in explaining Sticky Floors, keeping
20 employee characteristics constant.²

21 More concretely, we aim at answering the question whether unequal treatment of equally
22 productive male and female job candidates by employers is heterogeneous by whether or not

¹ See Albrecht et al. (2003), Arulampalam et al. (2007), Booth (2009), Kassenboehmer and Sinning (2014), Reuben et al. (2012), Smith et al. (2013) and Weinberger (2011) for some seminal and recent contributions to the literature on Glass Ceilings. In addition, see Blau and DeVaro (2007), [Matteazzi et al. \(2014\)](#) and Yap and Konrad (2009) for more general contributions on gender differentials in promotions.

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

1 they apply for jobs implying a (first) promotion.³ Unfavourable treatment of females in the
2 access to these positions can be expected based on the theoretical models of discrimination
3 introduced by Becker (1957) and Arrow (1973).⁴ Discrimination against women applying for
4 higher positions could result from the general distaste that employers, co-workers and customers
5 may have to collaborate with women in these higher positions, potentially related to the
6 traditional overrepresentation of men in these positions. Furthermore, employers could expect a
7 higher average productivity from males relative to females in leading positions. This may relate
8 to the match between these positions and more “masculine” characteristics such as dominance,
9 autonomy and assertiveness on the one hand⁵ and the fact that females are documented as
10 having, on average, a less continuous and committed labour market participation related to the
11 traditional division of labour within the household and maternity leave (Baumle, 2009;
12 Blandford, 2003; Budig and England, 2001; Romeu Gordo, 2009). In addition to the theoretical
13 support by the frameworks of Becker (1957) and Arrow (1973), potential gender discrimination
14 by employers when taking hiring decisions implying a promotion for the job candidate squares
15 with the notion in the popular literature that men are promoted based on potential, while women
16 are promoted based on prior performance (Carter and Silva, 2011).

17 To the best of our knowledge, all former studies on gender differences in promotion
18 opportunities have used regression-based methods on observational data (typically household
19 survey or labour force data). The most common approach consists of Oaxaca-Blinder style
20 decompositions of wage differentials in a part explained by observables related to human capital

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

⁴ These theories are based on neoclassical assumptions and have been criticised concerning different aspects – see, e.g., Bergmann (1989) in the context of gender based discrimination in the labour market. In spite of the development of alternative approaches to theorising discrimination such as the models of opportunistic discrimination, implicit discrimination, noncompeting groups and lexicographic search by employers (Altonji and Blank, 1999; Bertrand and Mullainathan, 2004; Darity and Mason, 1998), however, many recent contributions to the discrimination literature are still guided by the theoretical framework of the models of taste-based and statistical discrimination (Borjas, 2009; Charles and Guryan, 2008). Moreover, while 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.

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

1 and occupational characteristics and an unexplained part pointing in the direction of
2 discrimination (Oaxaca, 1973; Blinder 1973). Residual gaps at the top of the wage distribution
3 are interpreted then as complementary with the Glass Ceiling concept while residual gaps at the
4 bottom of the wage distribution point in the direction of Sticky Floors. In their survey of
5 experimental advances in the study of gender differentials in the labour market, Azmat and
6 Petrongolo (2014) formulate two important drawbacks of using observational data to measure
7 gender discrimination. First, most observational data do not capture some of the determinants of
8 a workers productivity (e.g. motivation and intrinsic ability) which may be observed – and
9 valued – by employers. Stated otherwise, based on these non-experimental data, researchers
10 cannot control all variables employers take into account when making their hiring and
11 remuneration decisions. As a result, no conclusive evidence of discrimination can be provided
12 based on these data. Second, if pre-market investments in human capital or decisions to apply for
13 a job implying a promotion are affected by the expectation of future labour market
14 discrimination, the impact of discrimination is partly captured by observable human capital and
15 occupational characteristics.

16 To overcome the stated methodological problems, this study is novel in its approach to gather
17 original experimental data on gender differences in promotion opportunities and thereby lets – as
18 argued by Duflo (2006) – “the research question determine the data to be obtained instead of the
19 data determining the questions that can be asked.” More concretely, we send out 576 pairs of
20 fictitious job applications of individuals with about 5 years of job experience in their first and
21 current job to vacancies for jobs requiring at least some and at most 5 years of experience. The
22 two applications within each pair are similar, except for the revealed gender of the candidate, as
23 will be explained below. By monitoring the reaction from the employer side, unequal treatment
24 based on this single characteristic can be identified. This measure can be given a causal
25 interpretation because all the information the employer receives is under control of the
26 researcher so that selection on individual unobservables is eliminated. We send fictitious
27 applications to vacancies implying a promotion in terms of occupational level and/or job
28 authority compared with the current job of the candidate and to vacancies that are at the same
29 functional and authority level as the current job. Thereby, we are able to test whether unequal

1 treatment of young men and women in the labour market is heterogeneous by whether or not
2 jobs imply a promotion in comparison with employees' current position.⁶ If employer
3 preferences contribute to Sticky Floors, unequal treatment of male and female job candidates
4 should be relatively more to the disadvantage of women who apply for a job implying a
5 promotion. This is our research hypothesis.

6 **The Experiment**

7 **Causal Evidence of Gender Discrimination by means of a Correspondence Experiment**

8 In order to answer our research question, we conducted a correspondence experiment. Within
9 this experiment, pairs of fictitious job applications were sent to real vacancies. The applications
10 within each pair were, as will be explained below, very comparable except for the gender of the
11 applicant. By monitoring the subsequent call-back from the employer side, discrimination based
12 on this single characteristic could be measured and given a causal interpretation.

13 Correspondence experiments are widely viewed as providing the most clean and compelling
14 evidence of unequal treatment in hiring (Riach and Rich, 2002). As argued in the introduction,
15 any bias introduced by individual unobservable characteristics is eliminated because all the
16 information received by the employer is controlled by the researcher. Strict equivalence between
17 the fictitious job candidates is realised and unequal treatment in respect of employers is
18 disentangled from other explanations of differential hiring outcomes such as differences in
19 human capital and preferences at the employee side.

⁶ Stated otherwise, one can argue that a potential gender differential in call-back chances for a job implying a promotion at a new firm is comprised by a gender differential in hiring chances at a new firm and a gender differential in call-back for jobs implying a promotion. As we apply both for jobs implying a promotion and for jobs implying no promotion, our experimentally gathered data allows us to isolate the latter gender differential.

1 Concerning the identification of gender discrimination, the extensive correspondence
2 experiment conducted by Neumark et al. (1996) is seminal. Neumark et al. (1996) showed that,
3 in the Philadelphian labour market for waiters and waitresses of 1994, female job candidates
4 had, compared to males, a substantially lower estimated probability of receiving an interview in
5 high-price restaurants and a substantially higher probability of receiving one in low-price
6 restaurants (where earnings were also lower). In the same realm, Albert et al. (2011), Booth and
7 Leigh (2010), Carlsson (2011), Firth (1982), Petit (2007), Riach and Rich (1987), Riach and
8 Rich (2006) and Weichselbaumer (2004) studied hiring discrimination based on gender in Spain,
9 Australia, Sweden, the United Kingdom, France and Austria by means of a correspondence
10 experiment. None of these studies, however, attempted to investigate heterogeneity in labour
11 market discrimination by whether or not the jobs for which the fictitious applicants applied
12 would imply a promotion.

13 We conducted our experiment between October 2013 and March 2014 in the labour market
14 of Flanders, the northern, Dutch-speaking part of Belgium. During this period we randomly
15 selected 288 vacancies for jobs targeting Bachelors in business administration and 288 vacancies
16 for jobs targeting Masters in business economics in the database of the Public Employment
17 Agency of Flanders, the region's major job search channel. We restricted ourselves to vacancies
18 in the private sector requiring at most five years of work experience.⁷ Two job applications of
19 individuals with five years of work experience (in a first and current job), identical in terms of
20 productivity-relevant characteristics but different in their gender, were sent to the selected
21 vacancies. We opted for individuals with five years of experience because Sticky Floors are
22 related to the start of job ladder climbing. Moreover, jobs targeted at people with a tenure of five
23 years could be expected to be heterogeneous in promotion aspects compared to their current
24 (starters) job as “at least five years of work experience” is typically asked in (more) senior
25 positions.

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

1 The data gathering process was reviewed and approved by the Ethical Committee of the
2 Faculty of Economics and Business Administration of Ghent University at its meeting of 9 July
3 2013.

4 **Construction of Fictitious Applications**

5 For each of the aforementioned academic degrees held by our fictitious applicants, we created
6 two template applications comprising a resume and a motivation letter. We will refer to these
7 (template) applications as the Type A and Type B applications. These types were equal in all
8 productivity-relevant characteristics (such as educational qualifications, language skills and
9 computer skills). However, to avoid detection of the experiment, they differed in lay-out and
10 details. For instance, both candidates mentioned sports and cultural activities but the Type A
11 applicant referred to general sports activities and (drama club) acting while the Type B applicant
12 referred to fitness and tennis activities and playing saxophone. To ensure that our job
13 applications were realistic and representative, example applications of the Public Employment
14 Agency of Flanders were used and calibrated for our purposes.

15 The Type A and Type B applicants were single individuals born, studying and living in
16 comparable suburbs of Ghent, the second largest city of Flanders. These candidates graduated
17 from tertiary education in June 2008 without any grade retention experience. In line with the
18 vacancy to which the pair of applicants was sent, a specialisation was chosen.⁸ All of the
19 applicants had graduated from University College Ghent (Bachelor in business administration)
20 or Ghent University (Master in business economics). Since September 2008, the fictitious
21 applicants were employed in a starters job in line with their academic degree and specialisation
22 and with no job authority (see below for how we define the concept of job authority).⁹

⁸ For the Bachelor in business management, the specialisations used were: (i) accountancy and tax, (ii) finance and assurance, (iii) management of small- or medium-sized business, (iv) logistics, (v) marketing and (vi) legal practice. For the Master in business economics, the specialisations used were: (i) accountancy, (ii) finance and (iii) marketing.

⁹ The professions of “accountant” (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.

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

7 **Randomised Disclosure of Applicants' Gender**

8 To erase any dependence of gender differentials in call-backs on the application type, a typically
9 male and a typically female sounding name were alternately assigned to the Type A and Type B
10 applications. An appendix with the four combinations of resumes (Type A with female name;
11 Type A with male name; Type B with female name; and Type B with male name) for one of the
12 educational degrees (Bachelor in business administration with accountancy and tax as a
13 specialisation) is available online (Online Appendix A).

14 We sent the applications in an alternating order to the selected job postings, with a one-day
15 delay in between. This resulted in a randomisation procedure in which we alternated between
16 four pairs of applications: (i) first the Type A application with the female name and then (one
17 day later) the Type B application with the male name; (ii) first the Type A application with the
18 male name and then the Type B application with the female name; (iii) first the Type B
19 application with the male name and then the Type A application with the female name; (iv) first
20 the Type B application with the female name and then the Type A application with the male
21 name. To the first vacancy combination (i) was sent, to the second vacancy combination (ii), to
22 the third vacancy combination (iii), to the fourth vacancy combination (iv), to the fifth vacancy
23 again combination (i) and so on. This randomisation procedure was carried through for each of
24 the two educational degrees separately.

25 We chose "Elke De Vos" and "Anke De Vriendt" as the names of the female candidate
26 holding a Bachelor and the one holding a Master, respectively, and "Stijn Van Lancker" and
27 "Stijn Van De Voorde" as the names of the male candidates. We made sure that the chosen

1 names did not represent a different social background following Bloothoof and Onland (2011)
2 who linked the suffix of the name Dutch speaking parents choose for their children with these
3 children's later wages.

4 We matched to each assigned name a mobile phone number and an email address. The
5 voicemail messages were the telecommunication providers' standard (Dutch) messages ("Hello,
6 [Name of the fictitious candidate] cannot answer your call. Please leave a message after the
7 tone"). The names of the fictitious candidates were recorded by young people with a similar
8 social-economic background (i.e. native students in the Master in (business) economics at Ghent
9 University). The email addresses were registered with large and commonly used providers. All
10 fictitious job applications were sent to the selected real vacancies by email. In view of avoiding
11 detection, we applied to no more than one job posting from the same employer.

12 **Measurement of Call-back**

13 Call-backs were received by telephone voicemail and by email. As we mentioned postal
14 addresses with non-existent street numbers in the applications, we could not measure reactions
15 from the employer side by regular mail. However, several Flemish human resource managers
16 confirmed that, nowadays, employers rarely invite job candidates to selection interviews through
17 the latter channel. To minimise inconvenience to the employers, we immediately declined
18 positive call-back. By analogy with the corresponding testing literature, all reactions from the
19 employer side received later than 30 days after sending out the applications were discounted.
20 However, as we did not receive any positive reaction after 30 days, this turned out to be a
21 redundant restriction.

22 In our data-analysis, we distinguish between two definitions of positive call-back. Positive
23 call-back in a strict sense is defined as getting an invitation for an interview concerning the job
24 for which one applied – this definition was adopted by, e.g., Bertrand and Mullainathan (2004).
25 Positive call-back in a broad sense includes, in addition to the former definition, the request to
26 provide more information or to contact the employer or the receipt of an alternative job proposal
27 – this definition was adopted by, e.g., Kaas and Manger (2012).

1 **Variation in Occupational Level and Job Authority**

2 Sticky Floors may translate into lower probabilities for females to make promotion in four
3 dimensions: occupational level, job authority, wages and non-statutory benefits (Deschacht et al.,
4 2011). As the two latter job aspects are not mentioned in the job postings in the database of the
5 Public Employment Agency of Flanders, our experiment does not allow observing these aspects
6 at the vacancy level. Therefore, we will focus on promotions in terms of occupational levels and
7 the degree of job authority. However, at the end of the regression analysis below we will include
8 the average wage in the occupation as a proxy for the wage in the posted job as a variable
9 explaining call-back rates by gender.

10 Each of the 576 vacancies to which we sent two fictitious job applications was matched with
11 an indicator of the occupational level and with an indicator of the job authority level. This was
12 done immediately after sending out the first application to a selected vacancy (and ipso facto
13 before call-back was received). On the one hand, based on the information in the vacancy, all
14 vacancies were matched with an occupation in the ISCO-08 classification system – ISCO-08 is
15 the second-generation International Standard Classification of Occupations, based on a
16 resolution of experts on labour statistics held in December 2007 and endorsed by the Governing
17 Body of the International Labour Organization (ILO) in March 2008. More concretely, we
18 searched a best match between the name of the vacancy (i.e. the name of the job) and the
19 description of the tasks within the job in the vacancy on the one hand and four elements
20 mentioned in the ISCO-08 group definitions file
21 (<http://www.ilo.org/public/english/bureau/stat/isco/docs/gdstruct08.xls>) on the other hand:
22 definition, tasks included, included occupation names and excluded occupation names. A new
23 job at a higher ISCO-08 1-digit-level – to which we will refer in the remainder of this article as
24 its “occupational level” – than the current one was defined as a promotion in terms of
25 occupational level.¹⁰

¹⁰ The reader will notice that, due to our choice of the candidates current job and our procedure of matching these candidates with vacancies, both the current job and the job for which one applied were closely related to their academic degree and their specialisation. So, observed (potential)

1 On the other hand, the jobs for which our fictitious job candidates applied were classified in
2 three categories concerning job authority following Hachen (1990): jobs with no supervision
3 authority, i.e. no supervision or coordination tasks concerning the work of other workers (level
4 1); jobs with supervision authority but no influence on the wage or promotion opportunities of
5 other workers (level 2); and jobs with both supervision authority and influence on the wage or
6 promotion opportunities of other workers (level 3). As the current job of the candidates was at
7 level 1, a new job with at least supervision authority (i.e. at level 2 or level 3) was defined as a
8 promotion.

9 **Limitations of the Experimental Design**

10 Before answering our research question by means of a statistical analysis of the gathered data, in
11 this subsection, we discuss some limitations of our experimental research setting.

12 First, our design can be effective only in demonstrating gender discrimination in the first
13 stage of the recruitment process. Because we simply analyse the content of first call-backs, we
14 cannot translate our empirical results into divergences in job offers. Bertrand and Mullainathan
15 (2004) however argue that, even in the case the recruitment process has moderate friction, one
16 could expect that reduced interview chances translate into reduced job offer chances. Second,
17 our design is limited in its focus on promotion transitions to other firms. Unequal opportunities
18 in promotion transitions within firms, which cannot be investigated by means of an experiment
19 in the sense of the one outlined in this section, may be characterised by other dynamics. Third,
20 we test for unequal treatment only within the vacancies targeted at individuals with a Bachelor's
21 or Master's degree in business posted in the database of the Public Employment Agency of

occupational transitions are in rule vertical movements (i.e. transitions in job level) and not horizontal movements (i.e. transitions in job content). This is a desirable situation as, therefore, promotions in occupational level following our definition may not reflect non-promotional horizontal transitions. The most common promotions in occupational level observed in our data are those from accountant (ISCO-08 1-digit-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).

1 Flanders. It is possible that unequal treatment based on gender is more (or less) apparent among
2 employers who rely on other channels (such as social networks) for filling their vacancies or
3 among employers who have to fill vacancies targeted at other profiles. However, we are
4 specifically interested in the relationship between hiring discrimination against women and the
5 potential promotion implied by the jobs for which they apply. As this third limitation causes, by
6 construction, a similar shift in the discrimination measures for the selected jobs implying a
7 promotion and for those implying no promotion, our main research conclusions remain valid.

8 Fourth, the occupational level and job authority promotion dimensions defined in the
9 previous section may correlate with each other and with other vacancy characteristics. As a
10 consequence, descriptive statistics on heterogeneity in discrimination by these promotion
11 dimensions of the tested jobs might reflect heterogeneity of gender discrimination by other
12 dimensions. Therefore, we merge the gathered data with administrative data at the occupation-,
13 firm- and sector-level and analyse the merged data by means of a regression analysis controlling
14 for potential confounders.

15 **Results**

16 **Descriptive Data Analysis**

17 Table 1 and Table 2 describe the experimentally gathered data adopting the strict and broad
18 definition of positive call-back respectively. We provide the reader with two frequently used
19 statistical measures: the Positive Call-back Ratio (PCR) and the Net Discrimination Rate
20 (NDR) (Bertrand and Mullainathan, 2004; Neumark et al., 1996; Riach and Rich, 2002).

21 Overall, in 88 (195) of the 576 vacancies at least one candidate received a positive call-
22 back in strict sense (in broad sense). 32 (98) cases resulted in a positive call-back for both
23 candidates, 31 (51) in a positive call-back for just the male candidate and 25 (46) in a positive
24 call-back for the female candidate only. The overall PCR is obtained by dividing the total

1 percentage of applications for which male candidates received a positive call-back by the
2 corresponding percentage for the female candidates. At the level of the total dataset, the
3 positive call-back rate following the strict sense (broad sense) definition is 11%¹¹ (26%) for
4 male candidates and 10% (25%) for female candidates. The resulting PCR is 1.11 (1.03),
5 indicating that the male candidates got on average 11% (3%) more positive call-back in
6 reaction to their applications. These ratios are not significantly different from one and so we
7 conclude that, overall, employers did not discriminate based on sex.

8

9

[[Table 1 about here]].

10

[[Table 2 about here]].

11

12 To provide the reader with an initial answer to our research question, we split our sample
13 by the two aforementioned dimensions of promotion. First, we find significant evidence for
14 unequal treatment against females when they applied for jobs at a higher ISCO-08 level than
15 the level of their current job. In this case, the call-back ratio is 1.50 (1.23) saying that males
16 got about 50% more invitations for a job interview (23% more positive reactions in broad
17 sense). Stated otherwise, when applying for these jobs, women got about 33% less interview
18 invitations and 19% less positive reactions in broad sense. This finding is in line with our first
19 research hypothesis of more hiring discrimination against women when they apply for jobs
20 implying a promotion. Second, we find no significantly unequal treatment for both subsamples
21 by the promotion dimension related to job authority.

22 The overall NDR is calculated by subtracting the number of applications for which the
23 female candidate was preferred from the number of applications for which the male candidate
24 was preferred and dividing the result by the number of pairs in which at least one candidate
25 received a positive call-back. The result is a net measure of the number of discriminatory acts

¹¹ $0.11 = (32+31)/576$.

1 a female applicant could expect to encounter per application for which at least one candidate
2 received a positive call-back. Overall, the NDR is 0.07 (0.03) adopting the strict sense (broad
3 sense) definition of positive call-back. Based on a standard χ^2 test, we cannot reject the
4 hypothesis that the candidates of both sexes were treated unfavourably equally often.
5 However, if the NDR is broken down by the occupational level and job authority promotion
6 dimensions, we get results in line with those based on the PCR.

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

12 **Regression analysis**

13 As, by construction, both the male and female candidate exhibit the same observable
14 characteristics per vacancy, regressing positive call-back on the gender of the candidate (and
15 vacancy and employee characteristics) leads to the same empirical conclusion as the one based
16 on Panel A of Table 1 and Table 2. On the other hand, as mentioned above, the occupational
17 level and job authority promotion dimensions may correlate with each other and with other
18 vacancy characteristics and, therefore, the results presented in Panel B and Panel C of Table 1
19 may in fact reflect heterogeneity of gender discrimination by other dimensions. Moreover, due to
20 the finite size of our data, the promotion indicators of the posted jobs may even correlate with
21 the application type (A or B) to which the female candidate was assigned and with whether her
22 application was sent before or after the male application. Therefore, we further explore the
23 experimentally gathered data by means of a regression analysis. Summary statistics of the
24 variables used in this analysis are outlined in Table 3.

25

26

[[Table 3 about here]].

1

2 Table 4 and Table 5 present our regression results. We regress, by means of a linear
3 probability model, the probability of positive call-back on various sets of key and control
4 variables, included as such and in interaction with female sex of the candidate.¹² For reasons of
5 comparability of the regression results, all explanatory variables that are interacted with “Female
6 candidate” are normalised by subtracting the mean among the subpopulation of female
7 candidates and, for continuous variables, by dividing the result by the standard deviation among
8 this subpopulation. The estimation results for all variables interacted with female sex of the
9 candidate are presented in Table 4 (using positive call-back in strict sense as an outcome) and
10 Table 5 (using positive call-back in broad sense as an outcome).¹³ For each of the presented
11 models we computed multicollinearity diagnostics leading to variance inflation factors lower
12 than five, except for some sector dummies. In what follows, we first focus on the results of Table
13 4 and then compare these results with the ones in Table 5.

14

15

[[Table 4 about here]].

16

[[Table 5 about here]].

17

18 In models (1), (2) and (3), we regress positive call-back on the dummy indicating a female
19 gender of the candidate (model (1)); female sex of the candidate and a dummy indicating the
20 posted job implied a promotion in occupational level, included as such and in interaction with
21 female sex (model (2)); and female sex of the candidate and a dummy indicating the posted job
22 implied a promotion in job authority, included as such and in interaction with female sex (model
23 (3)). By construction, the estimations presented in columns (1), (2) and (3) of Table 4 reflect
24 those presented in Panel A, Panel B and Panel C of Table 1. For instance, based on column (1),

¹² We also performed estimations with vacancy fixed-effects and probit estimations. The results for these exercises are closely comparable to those presented in the main text and are available on request.

¹³ We do not present the main effects for these variables for reasons of concision.

1 we learn that revealing a female gender lowers the chance on an invitation for a job interview
2 with about one percentage point, which squares with the comparison of the positive call-back
3 rates for males (11%) and females (10%) mentioned in the previous subsection. Furthermore,
4 column (2) indicates that the gender gap in job interview invitation is about six percentage points
5 higher (and relatively more to the detriment of females) in jobs implying a promotion in
6 occupational level compared to jobs implying no promotion in this respect.

7 Next, in model (4), we combine the explanatory variables included in model (2) and model
8 (3). As a consequence, the finding of less positive call-back for women when they apply for jobs
9 at a better ISCO level is even enforced. On the other hand, the coefficient for the interaction with
10 the job authority promotion dimension increases and even turns positive, albeit insignificantly
11 so. This is due to the positive correlation between the variables indicating a promotion in the
12 occupational level and job authority dimensions (Pearson $r = 0.56$). Clearly, when not
13 controlling for the former interaction, the latter interaction picks up part of the fact that hiring
14 chances are lower for women in jobs implying a promotion in occupational level.

15 In model (5), we extend the set of variables included as such and in interaction with female
16 sex of the applicant. On the one hand, to control for the aforementioned potential correlation
17 between these variables and the promotion indicators of the selected jobs, we include variables
18 indicating applications that were the first one of the pair sent to the vacancy and that used the
19 Type B template – as the templates differ by academic degree, we adopt a Type B dummy for
20 each degree.

21 On the other hand, we include a set of variables capturing employee and vacancy
22 characteristics which may affect call-back rates and may be correlated, at least due to the finite
23 size of our data, with the promotion indicators of the posted jobs (see Table 3). First, we include
24 an indicator of the education level of the applicant (a dummy indicating a Master's degree) as
25 both theoretical and empirical studies show that discrimination decreases with the level of
26 education (Baert et al., 2015; Bursell, 2007; Taubman and Wales, 1974; Wood et al., 2009).
27 Second, we adopt variables indicating temporary and part-time contracts, as uniformly
28 mentioned in the vacancies in the database of the Public Employment Agency of Flanders. If
29 females have a relatively higher access to temporary and part-time jobs and these kinds of jobs

1 are less present in the tested vacancies implying a promotion in occupational level – Table 3
2 shows that this is the case – this could drive the results presented in Panel B of Table 1. Third,
3 and related to the recent theory of erotic capital as a personal asset besides economic, cultural
4 and social capital and the empirical evidence on gender differentials in labour market
5 discrimination (Baert, 2014; Hakim, 2010), we add a proxy for the gender of the key decision
6 maker in the first stage of the recruitment procedure, i.e. the gender of the mentioned contact
7 person in the vacancy. Fourth, we include, from model (5) on, the natural logarithm of the
8 average number of workers in the firm in 2010 as a proxy of its size.¹⁴ We do this as some
9 former contributions to the empirical literature on labour market discrimination against ethnic
10 minorities report a negative relationship between firm size and hiring discrimination related to
11 the fact that larger firms are more likely to have a dedicated human resources function and have
12 therefore, on average, more standardised procedures for recruitment (Kaas and Manger, 2012;
13 Wood et al., 2009). Fifth, we include the fraction of female workers in the job as one could
14 expect that, as typically male (female) characteristics are **perceived as** particularly productive
15 in traditionally male (female) occupations, unequal treatment should be more in favour of
16 women in female-dominated occupations (**Booth and Leigh, 2010**; Weichselbaumer, 2004).¹⁵
17 Sixth, to erase any correlation between the promotion indicators of the selected jobs and the
18 (other) characteristics of the sectors in which they were selected, we include 2-digit sector
19 dummies.¹⁶ In total, 57 sectors are represented in the data. As is the case for all other mentioned
20 variables, these dummies are included both as such and in interaction with female sex of the
21 candidate.

22 Column (5) of Table 4 shows the estimation results for model (5). We observe a substantial
23 but insignificant coefficient with the expected sign for the interaction between female sex of the

¹⁴ This proxy was obtained from the Bel-first database (Bureau Van Dijk) after looking up the company number of the firm in the databases of the Flemish business magazine Trends and the Belgian organisation of Self-Employed and Small and Medium Sized Enterprises UNIZO.

¹⁵ This variable is proxied by the average proportion of females in each occupation, following the ISCO-08 classification, in the European Social Survey (sixth round).

¹⁶ We use the Statistical Classification of Economic Activities in the European Community (“NACE”) at the 2-digit-level. The sector code was, based on the name and the address of the firm mentioned in the vacancy, found in the aforementioned databases of Trends and UNIZO.

1 candidate and the variable “Temporary contract”. More importantly, however, is that the
2 estimate for the interaction between female sex of the candidate and the dummy indicating
3 occupational level promotion jobs hardly changes by introducing the mentioned variables. We
4 also run model (5) without sector dummies leading to very similar results, which are available on
5 request.

6 Last, in model (6) we extend the set of explanatory variables included in model (5) with the
7 average wage in the job following the ISCO-08 classification at the 3-digit level in 2010.¹⁷ We
8 get, however, no significant coefficient for this variable. This may point in the direction of no
9 heterogeneity in gender discrimination by the wage of the offered job. Just as well, however, this
10 finding might be explained by the fact that the average wage in the job following the ISCO-08
11 classification is not a good proxy for the wage in the particular posted job. Moreover, even when
12 employer discrimination is as such not heterogeneous by the wage level in the occupation, one
13 could expect that our main finding of an unequal access for males and females to (better paid)
14 positions at a higher functional level should translate into gender differences in pay.

15 The results outlined in Table 5, using the broad sense definition of positive call-back as an
16 outcome variable, lead to the same conclusion concerning the interactions between female sex of
17 the candidate and the promotion indicators of the selected jobs. Thereby, we can conclude that
18 the regression analysis presented in the current subsection confirms the descriptive findings of
19 the former subsection.

20

Conclusion

21 In this study, we contributed to the literature by investigating the importance of employer
22 preferences in explaining Sticky Floors, i.e. the pattern that women are, compared to men, less

¹⁷ Source: Directorate-general Statistics and Economic information of Belgium. We use the 2010 statistics since those of later years are not yet available.

1 likely to start to climb the job ladder. It was novel in its approach to gather original experimental
2 data on gender differences in promotion opportunities. More concretely, we conducted a field
3 experiment in which pairs of fictitious job applications of male and female Bachelors in business
4 administration and Masters in business economics with about 5 years of work experience in their
5 first and current job were sent to real job postings in Belgium. As we sent applications to both
6 vacancies implying a promotion in terms of occupational level and/or job authority and to
7 vacancies at the same level, we were able to test whether unequal treatment of young men and
8 women in the labour market was heterogeneous by whether or not jobs imply a promotion in
9 comparison with employees' current position. We found significant evidence for hiring
10 discrimination against females when they applied for jobs at a higher occupational level. For
11 these jobs, females got, compared to males, about 33% less invitations for a job interview and
12 19% less positive reactions in broad sense. On the other hand, we found no significant
13 heterogeneity in hiring discrimination by the job authority level of the posted job. In addition,
14 based on regression analysis, we also found no evidence for heterogeneity in equal treatment
15 of males and females by the average wage in the occupation mentioned in the vacancy.

16 From a policy perspective, we cannot deny that our results point in the direction of
17 discrimination of young women, albeit only when they apply for jobs implying a promotion in
18 occupational level. In Belgium, as in many other OECD countries, the legal framework to punish
19 labour market discrimination is available,¹⁸ so that the main benefit seems to lie in a more
20 vigorous *detection* of unequal hiring chances for promotion jobs. One could investigate whether
21 this could not happen based on a systematic application of the method we have used in this
22 study. An alternative policy option, which can be introduced voluntarily by individual firms or
23 imposed by the government, is anonymising job applications. Åslund and Skans (2012) showed,
24 by means of a quasi-experiment in Gothenburg, that removing names from job applications may
25 indeed increase first call-back and job offers for female job candidates. However, Krause et al.
26 (2012) and Behaghel et al. (Forthcoming) argue that policy makers should be aware of

¹⁸ See Bassanini and Saint-Martin (2008) for a detailed description of the legal and institutional anti-discrimination framework in 23 OECD countries.

1 unintended effects of anonymised job applications (for instance with respect to affirmative
2 action)¹⁹ and that – therefore – the method of implementation is crucial.

3 As employees at a higher occupational level imply higher investment and (temporary) exit
4 costs, our results may be related to the career penalty of motherhood (Budig and England, 2001;
5 Correll et al., 2007; Kmec, 2011;). In this respect, broadening the concept of discrimination, to
6 include dimensions about how jobs are structured and rewarded that have a disparate impact on
7 mothers, could be fruitful. In addition, tax incentives could be provided to employers for
8 reintegrating women who return to their job after maternity leave.

9 Given our experimental design, our results can, by construction, not be explained by theories
10 of (“old-boys”-)networking and sector segregation (Forret and Dougherty, 2004; Groot and
11 Maassen van den Brink, 1996; Ludsteck, 2014). Although we cannot rule out the possibility that
12 these mechanisms contribute to Sticky Floors as well, our results suggest that awareness
13 campaigns targeted at these mechanisms will not be sufficient in fighting gender inequalities in
14 promotion opportunities.

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¹⁹ While various developed countries (such as 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 positions (or lower) (Bertrand, 2014; Fagan et al., 2012).

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9

Table 1. The Probability of Positive Call-back in Strict Sense: Descriptive Analysis

Data selection	Jobs (No.)	Neither candidate positive call-back (No.)	Both candidates positive call-back (No.)	Only male positive call-back (No.)	Only female positive call-back (No.)	PCR	t	NDR	χ^2
A. All jobs									
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

Notes. See subsection “Variation in Occupational Level and Job Authority” for a definition of the used promotion dimensions. The Positive Call-back Ratio (PCR) is calculated by dividing the percentage of applications for which male candidates received a positive call-back by the corresponding percentage for the female candidates. The t-test for the PCR tests the null hypothesis that the probability of positive call-back is the same for candidates from both gender groups. As 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. The 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 call-back. The chi-square test for the NDR tests the null hypothesis that both candidates are treated unfavourably just as frequently. *** (**) (*) indicates significance at the 1% (5%) ((10%)) significance level.

Table 2. The Probability of Positive Call-back in Broad Sense: Descriptive Analysis

Data selection	Jobs (No.)	Neither candidate positive call-back (No.)	Both candidates positive call-back (No.)	Only male positive call-back (No.)	Only female positive call-back (No.)	PCR	t	NDR	χ^2
<i>A. All jobs</i>									
All jobs	576	381	98	51	46	1.035	0.507	0.026	0.258
<i>B. Breakdown by occupational level promotion dimension</i>									
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
<i>C. Breakdown by job authority promotion dimension</i>									
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

Notes. See subsection “Variation in Occupational Level and Job Authority” for a definition of the used promotion dimensions. The Positive Call-back Ratio (PCR) is calculated by dividing the percentage of applications for which male candidates received a positive call-back by the corresponding percentage for the female candidates. The t-test for the PCR tests the null hypothesis that the probability of positive call-back is the same for candidates from both gender groups. As two applicants contacted the same firm, the probability of the male applicant receiving a positive reaction 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. The 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 call-back. The chi-square test for the NDR tests the null hypothesis that both candidates are treated unfavourably just as frequently. *** (**) (*) indicates significance at the 1% (5%) (10%) significance level.

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

	All jobs	Jobs implying a promotion in occupational level	Jobs implying a promotion in job authority
First application sent within pair of female sex	0.500 (0.500)	0.506 (0.501)	0.520 (0.501)
Application Type B of female sex	0.500 (0.500)	0.530 (0.500)	0.544 (0.499)
Master's 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)
% 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, 2-digit-level)	65.54 (17.51)	66.86 (17.29)	66.32 (17.31)

See subsection "Regression Analysis" for a definition of the listed variables. The reported statistics are averages and standard deviations in parentheses.

Table 4. The Probability of Positive Call-back in Strict Sense: Regression Analysis

	(1)	(2)	(3)	(4)	(5)	(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, Master (norm.)					0.061 (0.063)	0.061 (0.063)
Female candidate * Application Type B, Bachelor (norm.)					0.046 (0.072)	0.044 (0.071)
Female candidate * Master's degree (norm.)					-0.030 (0.053)	-0.032 (0.053)
Female candidate * Temporary contract (norm.)					0.071 (0.059)	0.071 (0.059)
Female candidate * Part-time contract (norm.)					0.019 (0.053)	0.019 (0.053)
Female candidate * Male recruiter (norm.)					-0.003 (0.035)	-0.002 (0.036)
Female candidate * Log(average FTE in firm) (norm.)					0.017 (0.017)	0.017 (0.017)
Female candidate * % female workers in occupation (norm.)					-0.003 (0.017)	-0.002 (0.017)
Female candidate * Average wage in occupation (norm.)						0.009 (0.024)
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
Observations	1152	1152	1152	1152	1074	1074

Notes. See subsections “Variation in Occupational Level and Job Authority” and “Regression Analysis” for a definition of the variables adopted in the regressions. The variables that are interacted with “Female candidate” are also included without interaction with this variable. Except for “Female candidate”, all variables are normalised (norm.) by subtracting the mean among the population of female candidates. Continuous variables are further normalised by dividing by the standard deviation among this subpopulation. Standard errors, corrected for clustering at the vacancy level, are in parentheses. *** (**) (*) indicates significance at the 1% (5%) (10%) level. From model (5) on, 78 observations are dropped due to missing values for the added control variables.

Table 5. The Probability of Positive Call-back in Broad Sense: Regression Analysis

	(1)	(2)	(3)	(4)	(5)	(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, Master (norm.)					0.092 (0.097)	0.093 (0.097)
Female candidate * Application Type B, Bachelor (norm.)					0.053 (0.102)	0.051 (0.102)
Female candidate * Master's degree (norm.)					-0.042 (0.080)	-0.046 (0.080)
Female candidate * Temporary contract (norm.)					0.059 (0.089)	0.059 (0.090)
Female candidate * Part-time contract (norm.)					-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 * % 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
Observations	1152	1152	1152	1152	1074	1074

Notes. See subsections “Variation in Occupational Level and Job Authority” and “Regression Analysis” for a definition of the variables adopted in the regressions. The variables that are interacted with “Female candidate” are also included without interaction with this variable. Except for “Female candidate”, all variables are normalised (norm.) by subtracting the mean among the population of female candidates. Continuous variables are further normalised by dividing by the standard deviation among this subpopulation. Standard errors, corrected for clustering at the vacancy level, are in parentheses. *** (**) (*) indicates significance at the 1% (5%) (10%) level. From model (5) on, 78 observations are dropped due to missing values for the added control variables.