ECONSTOR
Make Your Publications Visible.

A Service of
ZBW
Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Hospido, Laura; Laeven, Luc; Lamo, Ana

Working Paper

The Gender Promotion Gap: Evidence from Central Banking

IZA Discussion Papers, No. 12306

Provided in Cooperation with:
IZA – Institute of Labor Economics

Suggested Citation: Hospido, Laura; Laeven, Luc; Lamo, Ana (2019) : The Gender Promotion Gap: Evidence from Central Banking, IZA Discussion Papers, No. 12306, Institute of Labor Economics (IZA), Bonn

This Version is available at:
https://hdl.handle.net/10419/196804

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 12306

The Gender Promotion Gap: Evidence from Central Banking

Laura Hospido
Luc Laeven
Ana Lamo

APRIL 2019

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 12306

The Gender Promotion Gap: Evidence from Central Banking

Laura Hospido
Banco de España and IZA

Luc Laeven
European Central Bank and CEPR

Ana Lamo
European Central Bank

APRIL 2019

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ISSN: 2365-9793

IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

The Gender Promotion Gap: Evidence from Central Banking*

We examine gender differences in career progression and promotions in central banking, a stereotypical male-dominated occupation, using confidential anonymized personnel data from the European Central Bank (ECB) during the period 2003-2017. A wage gap emerges between men and women within a few years of hiring, despite broadly similar entry conditions in terms of salary levels and other observables. We also find that women are less likely to be promoted to a higher salary band up until 2010 when the ECB issued a public statement supporting diversity and took several measures to support gender balance. Following this change, the promotion gap disappears. The gender promotion gap prior to this policy change is partly driven by the presence of children. Using 2012-2017 data on promotion applications and decisions, we explore the promotion process in depth, and confirm that during this most recent period women are as likely to be promoted as men. This results from a lower probability of women to apply for promotion, combined with a higher probability of women to be selected conditional on having applied. Following promotion, women perform better in terms of salary progression, suggesting that the higher probability to be selected is based on merit, not positive discrimination.

JEL Classification: J16, J31, J41, J63

Keywords: gender gaps, working histories, promotions, central banking

Corresponding author:
Laura Hospido
Bank of Spain
Research Division
DG Economics, Statistics, and Research
Alcalá 48
28014 Madrid
Spain

E-mail: laura.hospido@bde.es

* We are grateful to Stephanie Aaronson, Olympia Bover, Francesca Cornelli, Astrid Kunze, Alberto Martin, David Matsa, Javier Perez, Paola Sapienza, Antoinette Schoar and Margarita Tsoutsoura for useful comments, as well as seminar and conference participants at the Bank of England, BBVA Research, the Federal Reserve Bank of New York, Stockholm University, the SAEe in Getafe, Banco de España and the European Central Bank. We thank Marco Felici for excellent research assistance. Special thanks go the Directorate-General Human Resources of the ECB, in particular to Eva Murciano, Dennis Beermann and Aljaž Jelenko for providing us with the data. The views expressed are those of the authors and do not necessarily reect those of the European Central Bank, the Banco de España or the Eurosystem.

1 Introduction

Economics remains a male-dominated field. In the US, women account for 28.8 percent of PhD graduates but only a mere 13.9 percent of full professors in economics (CSWEP 2017). This under-representation of women is perhaps nowhere as visible as in central banks (Carney 2017; OMFIF 2019).[1] For instance, only one woman holds a seat on the 30-member General Council of the European Central Bank (ECB).[2]

Several explanations may account for the lack of women in high-level positions of the economics profession. One possibility is that the pool of potential applicants is male-dominated. Despite recent efforts to turn the tide, women remain less prone to study economics, and macroeconomics in particular (Ginther and Kahn 2004). An alternative explanation is that women are less likely to apply for promotions because of gender differences in the preference for competitive environments (Niederle and Versterlund 2007) or in bargaining abilities in the labour market (Blackaby et al. 2005), or more generally that "women don't ask" (Babcock and Laschever 2003). The presence of children and trade-offs between family and career may also hold back women from pursuing promotions (Bertrand 2013; Bertrand et al. 2015). Apart from these supply-side explanations, a third explanation is gender-based discrimination in promotion decisions. For instance, Goldin and Rouse (2000) find that women are more likely to be selected when the identity of candidates is being concealed.

Which of these explanations is more relevant? And can corporate diversity policies mitigate these biases? Despite a large body of literature on gender differences, there is no agreement on the importance of diversity policies and their impact on labour market outcomes. Many studies on the effects of diversity are based on cross-sectional comparisons, making it difficult to infer causality. And most studies rely on survey data across different firms or institutions and are therefore prone to selection bias and omitted variable bias. Moreover existing studies on corporate diversity policies have primarily focused on the impact of gender quotas at corporate board level, not policies that affect employees throughout the organization. A key open question is whether such policies improve labour market outcomes for women.

In this paper, we analyze the career progression of men and women at the ECB, one

[1] See https://www.ft.com/content/ and https://www.washingtonpost.com/news/.

[2] See https://www.ecb.europa.eu/ecb/orga/decisions/genc/html/index.en.html. The General Council consists of the President of the ECB, the Vice-President of the ECB, and the governors of the national central banks of the 28 EU Member States.

of the major central banks in the world, using confidential data from its personnel records and selection campaigns. This provides a unique setting to study alternative explanations for the differences in career choices and progression between men and women. Given the influence central banks wield over the economic well-being of the public at large, a better understanding of the factors that hold back women at these institutions is of vital importance.

We make three contributions to the literature. First, we are the first to exploit the complete personnel records of a large organization to analyze gender bias in career progression and promotion decisions. This allows a more comprehensive analysis of career progression across various job levels within an organization, in contrast to much of the literature that focuses on gender differences at corporate board or leadership levels.

Second, in contrast to much of the literature on promotion decisions, we simultaneously consider the role of promotion applications and decisions when identifying the drivers of the promotion gap. Analyzing promotion decisions without accounting for gender gaps in applications would bias the results. We are able to do so because we have information on both promotion applications and decisions, while existing literature has focused on only one of these dimensions.

Third, in 2010 the ECB issued a public statement supporting diversity and took several measures to support gender balance throughout its organization. Our dataset allows us to exploit this change to assess the impact of corporate diversity policies on promotion outcomes. While the economics literature has assessed the impact of gender quotas for corporate board seats on corporate decisions, to our knowledge we are the first to consider the impact of broad-based corporate diversity policies on female labour market outcomes.

Using personnel records comes with several data advantages. By focusing on differences within the same organization, we abstract from any unobserved differences across institutions or industries that each may display their unique biases. Another advantage is that we avoid any measurement error associated with survey data. Moreover these records cover the complete population of employees, including all potential internal applicants, thus mitigating the usual selection bias that hamper many existing studies.

Our findings are as follows. First, we show that a wage gap emerges between men and women within a few years of hiring, despite roughly similar initial conditions in terms of salary levels and other observables. This wage gap grows steadily with tenure. One important driver of this wage differential is the presence of children, consistent with previous literature. Second, we find that women are less likely to be promoted to a

higher salary band prior to the change in corporate diversity policy in 2010, while this promotion gap disappears following this change. Third, using detailed data on selection campaigns available since 2012, we examine the selection process for promotions and find that women are less likely to apply for promotion opportunities, even when they hold the same qualifications and work experience as men. Moreover we confirm that during this period women are as likely to be promoted as men. This points to a compositional effect whereby women conditional on applying are more likely to be promoted, other things equal. Following promotion, women perform better in terms of salary progression, suggesting that the higher probability to be selected is based on merit instead of positive discrimination. We do not find evidence that the composition of the selection committee, including the fraction of women on the panel, alters these results. Taken together, these results point to the effectiveness of corporate diversity policies in reducing gender bias in promotions and lend support to supply-side explanations for the existence of remaining gender differences in promotion outcomes. Consistent with this, we find that women are more likely to apply when they are supported by a mentor.

Our paper relates to a growing literature on gender gaps. Much of this literature has focused on measuring the wage gap between men and women, and seeking explanations for this gap. These explanations range from differences in abilities and preferences over jobs (e.g., Polacheck 1981, Azmat and Ferrer 2017) to (individual or universal) discrimination (e.g. Goldin and Rouse 2000). Women tend to be more risk averse and less competitive, with women performing more poorly in competitive environments and shying away from such competitive environments (Niederle and Vesterlund 2007, Buser et al. 2014, Brands and Fernandez-Mateo 2017), while men tend to be over-confident (Barber and Odean 2001, Bordalo et al. 2016). In terms of biases from social norms and discrimination, there is evidence that following deregulation of banking markets the wage premium of men decreased and the proportion of women in managerial positions increased (Black and Strahan 2001), that both men and women rate male job applicants higher for jobs that require math skills (Moss-Racusin et al. 2012, Reuben et al. 2014), that legislation that increases pay transparency reduces the gender pay gap (Bennedsen et al. 2018), and that women are more severly punished for financial misconduct (Egan, Matvos, and Seru 2017).

Career-family balance considerations and the presence of children also play an important role, with a close link between career interruptions and earnings growth (Lazear and Rosen 1990). Women remain dominant providers of child care within the household,

while many of higher-paying jobs have long hours and inflexible schedules, and many of the financially more rewarding careers require no job interruptions to stay on the "fast track" (Goldin 2014). Career interruptions and weekly hours worked have been found to be key factors driving the gender pay gap, with the presence of children being a main contributor to this (Bertrand et al. 2010). Women tend to find it difficult to *double up* between work and family, with those combining family with a career reporting to be more unhappy, sad, stressed and tired compared to those staying at home (Bertrand 2013). Differences in educational attainment are no longer an important driver with the fraction of female college graduates having caught up to the levels of men (Goldin et al. 2006).

Promotion applications and decisions have been less studied and have focused primarily on academia, arguably because of data availability and academic interest. For instance, Ginther and Hayes (1999) using data from the Survey of Doctoral Recipients from the National Science Foundation find that it takes women much longer to obtain tenure, while Ginther and Kahn (2004) find using the same survey that this is especially true in the field of economics when compared to other fields in social sciences or the humanities. Gender differences in productivity, the effect of children, and other observables can only partly explain the promotion gap. Blackaby et al. (2005) provide survey-based evidence for the UK that female academic economists are less likely to be promoted in part because they receive less outside offers, while Bosquet et al. (2018) analyze the national promotion system of French academic economists and show that women are less likely to enter promotion contests. An exception is Azmat and Ferrer (2017) who analyze the performance and career progression of lawyers using survey data of US law firms. They find that male lawyers perform better in terms of hours billed and new client revenue and that this enhances their subsequent promotion prospects. Our finding that salaries progress faster for women following promotion is reminiscent of the work by Card et al. (2018) who find that conditional on publication in a top academic journal, women have higher citations, implying that the bar for promotion is higher for women.

The role of mentoring in promotions has been primarily studied in the management and psychology literature. Mentoring has been found to positively influence the chance of a promotion (Hunt and Michael 1983, Dreher and Ash 1990), and there is some evidence that this may be particularly important for women, both in overcoming organizational barriers and in serving as role models (Noe 1988). Recent experience with mentoring programs for assistant professors in economics also point to preliminary benefits in publication and grant application outcomes (Blau et al. 2010). However, unlike us, none of these studies

consider career progression or promotions directly.

The impact of corporate diversity policies on labour market outcomes has been less studied and has primarily focused on the impact of gender quotas for corporate board seats. Evidence of the success of such policies is mixed. For instance, Bertrand et al. (2018) show that while the gender gap in earnings within boards fell following the establishment of such quotas in Norway, there was no such effect on the salaries of similarly qualified women who were not appointed to boards. Moreover, Ahern and Dittmar (2012) find that the Norwegian quota led to less experienced boards, prompting declines in firm valuation and performance, while Matsa and Miller (2013) find that the quota prompted changes in corporate decisions, with affected firms increasing salaries and employment levels. More generally, Matsa and Miller (2011) find that the share of women on corporate boards directly influences the share of female executives.

Other related work has studied the impact of gender composition of selection committees on the promotion gap. For instance, Bagues et al. (2017) analyze data from the Italian and Spanish national academic appointment systems and do not find evidence that a larger number of women on the evaluation committee enhances outcomes for female candidates. Moreover, male committee members become less favorable toward female candidates when women are on the committee, consistent with theories that the entry of women can contribute to strengthen male identity (Akerlof and Kranton 2000).

The paper proceeds as follows. Section 2 describes the institutional setting. Section 3 describes the dataset. Section 4 presents results on gender differences in pay, and section 5 presents results on gender differences in promotions, including the impact of the 2010 change in corporate diversity policy. Finally, section 6 concludes.

2 Institutional background

Our analysis is based on the personnel files of the ECB.[3] The ECB is the central bank for the 19 member states of the euro area and was established in 1998. Together with the 19 national central banks in the euro area it is responsible for price stability and the supervision of banks in the euro area. The ECB's workforce consists of over 2,500 staff and is drawn from the 28 European Union (EU) member states.

The ECB is an expert-based organization. Experts join at different salary bands,

[3] All data have been anonymized by the ECB's Human Resources (HR) directorate. No individual information can be identified by the authors.

depending on their level of education and previous work experience.[4] Because the ECB is a relatively young organization and offers competitive salaries and benefits, its attrition rate is relatively low (at about 0.8%). The ECB, similar to other major banks, has a substantial gender imbalance, especially at managerial levels and among economist staff. At end-2017, women accounted for 39.6% of staff at expert level, but 17.1% of senior managers.

Salaries are paid according to different salary bands, and salaries within each band increase in steps, such that each step is 0.25% higher than the previous one. Salary increases are the outcome of performance reviews. Salaries are reviewed annually based on each staff member's personal development and contribution to the performance of the organization. According to this, each staff member is granted a number of steps, ranging from 0 to 14. Career progression within a salary band is granted after performance reviews, while promotions to the next salary band require winning a selection campaign.

Promotions and hiring follow upon formal selection campaigns. A selection campaign consists of several stages, including job posting, job application, interviewing, shortlisting and selection. Applicants for openings at a certain salary band typically include a mix of candidates that already operate at this salary band elsewhere in the organization (i.e., lateral move) and candidates that operate at one salary band below the job opening (i.e., promotion), together with external candidates. Candidates at salary bands more than one level away from the posted band are rarely invited for an interview.

Selections follow an interview, often complemented with written exercises or other assessments. The selection committee typically consists of representatives of the hiring business area, the HR directorate, and another business area, who operate at levels above or at the same level as the advertized position. Following the interview, the selection committee agrees on a ranking of candidates, drawing up a short list of eligible candidates, and offers the position to the highest ranked candidate.

Our analysis focuses on expert staff across salary bands F/G, H and I. The typical job titles for these jobs include economist for salary band F, senior economist for salary band G, principal economist for salary band H, and adviser for salary band I. The minimum education requirement for salary band F/G and above is a master's degree. Salary band H is the highest salary band below managerial levels (that span salary bands I through L). The entry level for PhD economists is salary band F/G. Salary band F/G consists of two

[4] See https://www.ecb.europa.eu/careers/what-we-offer/benefits/html/index.en.html for the minimum (after tax) salary table.

bands–F and G– and progression from salary band F to G is based on performance and does not require a promotion decision. It generally takes at least seven years for someone entering salary band F to reach salary band H, comparable to the time it takes to reach tenure decisions in academia. Salary band I combines both senior experts at adviser level and the first level of management, i.e., unit chiefs or deputy heads of division. Job profiles below salary band F include analysts (salary band E) and assistants and other support staff (salary bands A through D).

The analysis is limited to the policy departments, the research department and the statistics department to ensure comparability across individuals.[5] This part of the ECB workforce is comparable in terms of educational attainment and academic publication record to economists at the U.S. Federal Reserve and major universities.[6] Within these departments, most staff hold a degree in economics, finance or statistics. The majority of staff who enter through bands F/G has no prior work experience, entering straight from university. The result is a relatively homogeneous workforce, facilitating the identification of gender effects.

Since 2010, the ECB has made a fundamental shift regarding gender diversity, taking several steps to raise the awareness of the importance of gender diversity and to enhance the diversity of its workforce. This shift in corporate policy is a key aspect of our analysis. In late 2010, the ECB's Executive Board announced this policy shift by issuing a public statement on diversity indicating that the ECB aims to be a workplace where staff members feel included and respected, and where their individual talents are valued, developed and rewarded. The public statement reads as follows: "Diversity is a key contributor to our success. As a European Union institution, the ECB aspires to be an organization in which diversity is welcomed and appreciated in all its facets for the richness that it offers. The facets of diversity include – but are not limited to – gender, nationality, religion, sexual orientation, ethnic origin, age, cultural background and disability". While the statement refers to diversity and inclusion in a broad sense, most of the diversity action plan centers around gender diversity.

Subsequently, the ECB launched a diversity action plan consisting of several measures

[5]Specifically the departments included in the analysis include Economics, Monetary Policy, Market Operations, Market Infrastructure, International, Financial Stability, Risk Management, Research, and Statistics. Remaining departments include the service areas, banknotes, banking supervision and the legal department.

[6]For instance, according to RePEc rankings, the ECB has a similar number of authors as the US Federal Reserve Board and the ranking of its research output is similar to that of the International Monetary Fund, the Federal Reserve Board, and the Federal Reserve Bank of New York; see https://ideas.repec.org/top/top.central.html.

that have been implemented over subsequent years. These measures span four broad areas: 1) Attracting female candidates; 2) Enhancing the internal pipeline of female candidates; 3) Facilitating work-life balance; and 4) Increasing accountability and commitment.

A key element of the diversity action plan has been the setting of gender targets for managerial positions. These targets, announced on June 4, 2013, are to be reached by year-end 2019. The targets are 35% of women in management positions (salary bands I-L) and 28% of women in senior management positions (salary bands K-L).

Another key focus of the diversity action plan has been to enhance the representation of women on selection panels, with the aim to reduce possible gender-biased biases or discrimination in promotion decisions. On March 18, 2013, the ECB amended its staff rules to introduce more flexibility in the selection of selection committee members by allowing the inclusion of one member from another business area if this enhances the gender diversity of the selection committee. Effectively, following this change most selection panels consisted of at least one female member. In addition, from that point on HR implemented a practice of ensuring at least two female panel members on selection committees for positions at the H-band level.

Finally, the diversity action plan also included a mentoring program, starting with a pilot in 2012 that was subsequently formalized in December 2014. Mentors are experienced staff members that are committed to providing support to more junior employees with a view to enhance their career development and upward mobility in the organization. Mentors can be both male and female, and participation in the program takes place on a voluntary basis. While the program is focused on women, with a view to achieve gender targets at managerial positions, it is also open to men. In practice, most of the mentees are women. A key focus of this mentorship program is to help women to overcome any social or cultural biases that slows down their career progression.

3 Data

The two datasets that we use in this paper are derived from the personnel records of the ECB and cover the period up to 2017. The information was provided on an anonymous basis and transformed in such a way that while individuals cannot be identified, much of the relevant information is preserved.

Sample Our analysis focuses on expert staff across four different salary bands (F, G, H, and I) in the policy areas, the research department and the statistics department, because these are business areas across which we observe considerable flows of staff over time. With this selected group we focus on a broadly homogeneous pool of staff in terms of human capital and experience, ensuring comparability across individuals.

Dataset 1: Working histories 2003-2017 The first dataset includes demographic characteristics and working histories of the employees over the period 2003 to 2017. We build a unique panel where the unit of analysis is the employee by month and year since entry to the ECB. Our salary measure is the number of salary steps, such that the first step of band A equals 1 and the variable continues as consecutive natural numbers, as reported in Table 1.[7] In practice, each number of steps corresponds to a salary level in euros. These salary steps are a measure of the base salary, excluding bonuses or allowances.

We focus the analysis on the period 2003 to 2017, as coherent information on salaries is available only since 2003. However, we have complete historical information to construct the work histories (for instance, tenure in the band and total experience) for each employee since entry into the ECB, going back all the way to the establishment of the ECB in 1998. Our panel consists of 1,084 workers and 85,516 monthly observations in total. From those records we can compute tenure, whether the employee has moved either department or business area, her salary band, etc. This enables us to explore the existence and potential drivers of gender pay gaps over the workers career. We also use this dataset to examine the probability of moving to a higher band (promotion) over the time span 2003 to 2017, and to assess whether the diversity policy changes have had any material effect on the gender promotion gap over this period.

Dataset 2: Recruitment campaigns 2012-2017 Our second dataset consists of information on each recruitment campaign that has taken place since 2012. For each campaign we have detailed information on every internal potential candidate, limited information on external candidates, information on recruitment panel composition and information on the position itself, namely salary band and business area.

Combining both datasets we can determine every potential internal candidate for each particular campaign. Given that we are interested in promotions from salary band F/G to salary band H, we exclude horizontal moves within the same salary band and use infor-

[7] The steps for our sample (F/G to I) go from 263 to 544.

mation from 61 promotion campaigns in total. In this sample of candidates and potential candidates per campaign, we can compute monthly probabilities of seeking a promotion, getting a promotion, whether the employee has applied previously for a promotion, how many times the employee has applied for a promotion, etc. This information allows us to explore in depth the promotion process from 2012, distinguishing between applications and promotion decisions.

3.1 Variable definitions

Based on these two datasets, we construct a number of variables for the empirical analysis. FEMALE is a dummy variable that takes a value of one if the employee is a woman and zero otherwise. TENURE WITHIN BAND is the number of years that the employee has been in the current salary band. SALARY BAND H (I) is a dummy variable that takes a value of one if the employee is currently in salary band H (I), and zero otherwise. AGE is the age of the employee in intervals of 5 years. In the regressions, we include age dummies for each bracket. SALARY STEPS indicates the salary level, in steps, of the employee. CHILDREN is a dummy variable that takes a value of one if the employee has dependent children, and zero otherwise. We also construct variables based on the number of children. TEMPORARY PROMOTION is a dummy variable that takes a value of one if the employee has had a temporary promotion to the level of the open position, and zero otherwise. Temporary promotions are different from permanent promotions because they are temporary (typically lasting a few months to one year) and do not follow a formal campaign. The focus in our analysis is on permanent promotions. TOP PERFORMER is a dummy variable that takes a value of one if the employee's salary award is among the top 25% of the salary increases in her business area at least once in the past two years, and zero otherwise. In addition to a salary award, high performing individuals can also receive a one-off cash bonus equivalent to up to 5% of annual salary. Bonuses are awarded to only a small fraction of individuals each year and because they do not alter salary levels have a small effect on life time earnings. BONUS is a dummy variable that takes a value of one if the employee received cash bonuses at least once in the past two years, and zero otherwise. Since 2012, employees can participate in a mentorship program, with the view to enhance their career progression. Most mentees are women. MENTEE takes a value of one if the employee participated in the mentorship program at east once in the past two years, and zero otherwise. Employees can also work part time. PART-TIME is a dummy variable that takes a value of one if the employee has worked part-time in

the last two years, and zero otherwise. The ECB offers maternity leave of 20 weeks per child to women. MATERNITY LEAVE is a dummy variable that takes value of one if the employee has taken maternity leave in the last two years, and zero otherwise. Employees receive a head of household allowance if they have a spouse with a gross annual income below a certain level (currently € 57,211) or if they do not have a spouse but one or more dependent children. HEAD OF HOUSEHOLD takes a value of one if the employee is the head of household, and zero otherwise. We know whether applicants are internal or external but otherwise have limited information on external candidates. SHARE OF EXTERNAL CANDIDATES is the ratio of external candidates to total candidates that have applied to a particular selection campaign. SIZE OF SELECTION PANEL is the number of panel members on the selection panel. SHARE OF FEMALE PANELISTS is the number of female panel members divided by the total number of panel members.

3.2 Descriptive statistics

Descriptive statistics of our main variables can be found in Table 2. The data cover 1,084 employees over the period 2003 to 2017, for a total of 85,516 observations. As in other economics professions, women are underrepresented, totaling 31.6% of all employees. Moreover, the number of women decreases at higher salary bands, from 31.6% in salary band F/G to 24.2% in salary band H and 16.8% in salary band I, pointing to a leaky pipeline in women's career progression. Men tend to be slightly older on average at 40 years, compared to 39 years for women, and salary levels tend to be somewhat higher for men, 381 steps for men against 357 steps for women.

The summary statistics also indicate that women are less likely to be promoted prior to 2011, with only 0.22% of women in the sample receiving a permanent promotion as opposed to 0.49% for men. However, after 2011, following the changes in corporate diversity policies, this difference disappears.

The bottom panel of Table 2 presents descriptive statistics for the campaigns dataset. This dataset covers 810 applicants and 61 promotions for a total of 23,259 potential applicant observations. The share of external candidates per campaign averages 10.4% and the share of female panelists per campaign averages 41.1%. Female applicants tend to have been longer in their salary band prior to applying for a promotion, for a total of 8.2 years as opposed to 7.2 years for men. Conditional on applying, women are more likely to win the campaign than men, with a probability of winning of 12.1% for women compared to 5.8% for men. Female applicants tend to have more experience (i.e., longer

tenure within the band), are more likely to have been top performers, and more likely to have children.

Selection bias is a common problem in many studies that compare the career progression of men and women. For instance, differences in prior work experience between men and women could introduce a bias. One advantage of our setting is that we have a highly homogenous workforce of economists that typically join the ECB straight out of graduate school without prior work experience, resulting in a sample of men and women with similar characteristics when they enter. Table 3 reports descriptive statistics of both men and women upon entry at salary level F/G, broken down by three different subperiods. We limit the sample here to the initial observations of employees that enter at salary band F/G (entry level). Our main variables of interest show no material differences between newly hired men and women at entry level, allaying concerns about selection bias in our sample. Male employees at entry are slightly older and are somewhat more likely to have children than females but these differences are small and not significant throughout the sample period. Most new employees enter at young age with graduate degrees and comparable salaries. Salary offers at the ECB for incoming staff are largely determined based on the number of years of schooling and work experience. While we do not have information on prior work experience, the data therefore suggests that most new employees have no prior work experience and that there are no material differences between prior work experience between men and women in our sample.

Attrition bias is also not a problem in our sample given the very low attrition rate of 0.4% in our sample. This low attrition rate is a result of the relatively young workforce at the ECB and its competitive benefits.

4 Gender wage gap over the career

In this section, we analyze the gender wage gap for professional staff over time. Salaries at the ECB are paid according to different salary bands and increase in steps. In this setting, salary steps are a good measure of career progression, both within the band and across bands. Progressing to the next band requires winning a promotion campaign.

The left-side panel of Figure 1 shows raw salary profiles by gender since entry in salary band F/G, the entry level for professional staff. The initial wage gender gap is small, as one would expect, given the similar initial conditions in terms of human capital and experience between men and women in our sample. This wage gap however increases

over time, as the career of the individuals progresses: the initial average wage gender gap of 5 salary steps (1.25%), increases up to 8 steps in just 1 year, to 25 steps in 5 years, and becomes almost 6 times bigger (30 steps or 7.25%) on average after 10 years. Interestingly, we also observe that wage gender gaps are much smaller for workers who stay in the same salary band (see right-side panel of Figure 1): 5 salary steps at entry, 6 steps after 1 year, 8 steps after 5 years, and 10 steps (about 2%) after 10 years. This suggests that promotions are potentially responsible for the career gender gap. Indeed, on average, the wage gender gap is 7% in favor of men for the whole sample, while it is 1.8% for those workers who stay within the same salary band.

Another usual suspect of driving the gender wage gap, namely having children, also appears to play a role according to the raw data. Figure 2 shows a narrower gender salary gap among workers without children than among those who have children.

4.1 Wage model

To account for individual features and other potential factors shaping gender wage gaps, we estimate a linear regression model for the log salary steps S_{it} of worker i at time t:

$$S_{it} = \alpha^S + \beta^S Female_i + X'_{it}\gamma^S + \delta^S_t + \epsilon^S_{it} \tag{1}$$

where the dummy $Female$ is equal to 1 for women, the vector X_{it} includes individual and job characteristics, such as age, directorate, salary band, tenure in the band, and family structure, δ_t are time dummies (year and month), and ϵ^S_{it} is a random error term with unrestricted correlation at the individual level. Model (1) is estimated by OLS, and β^S is our coefficient of interest.[8]

Regression results are shown in Table 4. All regressions include directorate and time dummies. Robust standard errors are clustered at the individual level.

According to Table 4, once we control for time dummies and observable characteristics of the workers (such as directorate, salary band, tenure in that band and age), we move from an unconditional gap of 7% to a conditional gender gap of 1.1% - 1.3%, similar to the conditional gap within the same salary band (1.5%). Indeed, if we omit the salary band variables from the regression (columns (3) and (4)), the estimated β increases to

[8] We do not include individual fixed effects in these regressions because we are interested in estimating the effect of *Female*. As shown in Table A.1, including individual fixed effects does not add much explanatory power and does not qualitatively alter the estimated coefficients on other covariates. We will be including individual fixed effects when we analyze differential effects in promotion outcomes in the next section.

3.6-6.4%, pointing to the importance of changing band (i.e., promotions) for the analysis. Promotions are precisely what we explore in the next section. We also find that those with a longer tenure in the band have higher salaries.

Thus far we have not considered the role of children. Children are commonly found to be a key driver of wage gaps. We therefore expand the regression with the inclusion of controls for the number and age of children. These results are reported in Table A.2. We find that the estimated coefficient for the *Female* variable hardly varies when adding controls for the number and age of children.

Next we split our sample between workers with and without children. The results are presented in Table 5. We now find that the overall gender wage gap is larger among workers with children (1.6%) whereas it is small and statistically insignificant for those workers without children (0.07%). Also, within the same salary band, the conditional gender gap for workers with children is more than double the gap for those without.

5 Gender differences in promotions

In this section we document gender differences in promotions using two complementary datasets: data on working histories and data on recruitment campaigns.

The first dataset allows defining promotion as a movement from band F/G to band H or I. The advantage of this dataset is that it covers all employees over the period 2003 to 2017, thus allowing to explore whether there have been any changes over time in the probability of men and women to be promoted. Moreover, this dataset can be used to test whether the corporate policies triggered by the 2010 public statement on diversity may have caused a change in the promotion gap. The disadvantage of this dataset on working histories is that it does not contain information on recruiting campaigns and therefore cannot be used to explore the promotion process in detail. In this dataset we only observe promotion outcomes, i.e., movements to a higher wage band.

The second dataset on recruitment campaigns has the advantage of offering detailed information on promotion applicants. This dataset, when combined with data on working histories, enables defining the set of potential candidates for each recruitment campaign and therefore allows to analyze the promotion process in more detail. The shortcoming of this second dataset, however, is that it is available only starting in 2012.

5.1 Probability of promotion: information on working histories (2003-2017)

The average monthly probability of promotion, defined in our sample of working histories as moving from band F/G to band H or I, is 0.004 between 2003 and 2017. This amounts to a promotion probability of 4.8% in annual terms, or about 48% after 10 years. Figure 3 shows that this unconditional probability of promotion is lower for women than for men. After 10 years, about 50 percent of men have been promoted to at least salary band H while the same is true for only 30 percent of women.

To control for employee heterogeneity and assess the drivers of this gender promotion gap, we estimate the following linear model for the probability that a given worker i moves from salary band F/G at time t to salary bands H or I at time $t+1$:

$$P_{it} = \alpha^P + \beta^P Female_i + Z'_{it}\gamma^P + \delta^P_t + \epsilon^P_{it} \tag{2}$$

where, as before, the dummy $Female$ is equal to 1 for women, Z_{it} is a vector of individual (either personal and family characteristics) and job (such as job characteristics and worker productivity measures) features, δ^P_t are time fixed effects, and ϵ^P_{it} is a random error term with unrestricted correlation at the individual level. Model (2) is estimated among staff in band F/G until the moment of the individual's promotion, and β^P is our coefficient of interest.

Regression results are shown in Table 6. All the regressions include directorate, time and age dummies. As before, robust standard errors are clustered at the individual level.

We find that, on average for the whole sample, the estimate of β^P is negative and significant (columns (1) and (2) of Table 6). The probability of promotion for women is substantially lower than for men, with a gap of 0.18%, or about 45% of the average probability of promotion of 0.4%. Moreover, the gap is larger for workers with children (more than half of the average) and turns insignificant when limiting the sample to the pool of workers without children (columns (4) and (3), respectively). We also find that employees that have recently been top performers or have received bonuses, proxying for performance, are more likely to be promoted. Having joined the ECB's mentoring program, however, does not appear to influence the probability of promotion.

5.1.1 Impact of the 2010 change in corporate diversity policies

In 2010, the ECB's Executive Board issued a public statement on diversity and announced a package of measures to support gender balance, to be implemented in subsequent years.

Figure 4 shows that this change in diversity policies had material effects on gender differences in promotion outcomes: the gender gap in promotions, defined as the difference in the promotion rates of men and women, narrowed from 2011 onwards. While prior to 2011, the gender promotion gap stood at over 36% after ten years since entry, this gap decreased to about 8% on average after 2011, or a decline of about 80 percent. We next assess more formally the impact of the 2010 change in diversity policies on the gender promotion gap. We follow two empirical strategies. First, we extend model (2) by allowing the female dummy coefficient to change after 2011 by including an interaction between the Female dummy variable and a dummy variable that takes value of one for post-2011 observations. The results are presented in Table 7. These regressions confirm that after 2011 women are as likely to be promoted as men (column (1)). While prior to 2011, the promotion rate of women was 0.28% lower than for men, after 2011 women had closed this gap. We also find that promotion rates decreases on average after 2011, possibly the low attrition rates made it increasingly difficult to get promoted. In columns (3) and (4) we split the sample based on whether the employee has dependent children or not. We find that promotion rates tend to be substantially lower for women with children. While for women without children, the promotion gap closes after 2011, this is not the case for women with children.

Second, we split the sample into two time subperiods: before and after 2011. These results are presented in tables A.3 and A.4. The difference between these two tables is that in the latter table we split the sample not only between the pre- and post-2011 periods but also by whether or not the employee has dependent children. Both sets of regression results confirm that the promotion gender gap disappeared after 2011, although this is mainly the case for women without children. Women with children continue to face a gender promotion gap after 2011. This suggests that the diversity policies have had their intended effects on promotion outcomes of women without children but that these policies have had no material impact on the promotion gap of women with children.

Our interpretation of the results critically depends on the shift in the promotion gap to have taken place around 2010 when the ECB announced its corporate diversity policies. To show that the decrease in the gender promotion gap took place in 2010 and not in outer years, we re-estimate model (2) using three-year rolling samples. The estimates of β^P for all possible three-year sample periods are displayed in Appendix Table A.5. These results support the interpretation of our main results: we consistently find that the three-year rolling estimates of β^P are negative and statistically significant at the beginning of

the sample until 2010, and that these estimates are no longer statistically significant from 2010 onwards.

5.1.2 The gender promotion gap and individual characteristics

Thus far we have shown that women have a slower career progression prior to the gender diversity policy change, resulting in lower salary levels. But what are the potential drivers of this finding? To what extent do individual traits drive this outcome? To this end, we enrich our empirical specification on promotion outcomes by considering differential effects along individual characteristics. Specifically, we include interactions between the female dummy variable and a vector of variables capturing other individual characteristics: an indicator whether the individual was a top performer in the past two years based on the annual performance review, an indicator whether the individual received a cash bonus in the past two years, an indicator whether the individual joined the mentorship program, and an indicator whether the individual has dependent children. Because we are interested in the interaction effect and not the level effect of being a woman, these regressions also include individual fixed effects. This allows us to more precisely estimate the interaction effects by abstracting from any time-invariant individual characteristics.

The results are presented in Table 8. Column (1) presents results for the full sample period 2003-2017. In terms of differential effects, we find that women with children are less likely to be promoted, consistent with the results in A.4. Next we split the sample in the period before and after the policy change. The results are presented in columns (2) and (3). We find that women with dependent children are less likely to be promoted prior to 2011, consistent with supply side explanations associated with the presence of children.[9] We also find that women that received a bonus are less likely to be promoted prior to 2011. This is consistent with the notion of a performance-reward bias whereby bonuses are used as a consolation prize for not being promoted.[10] Both the performance-reward bias and the effect of dependent children disappears in the period following the policy change. Indeed, following this change we no longer find a differential effect for women along any of the individual characteristics considered.

[9]This result is akin to the work by Bertrand et al. (2010) who find that the presence of children is a key contributor to the gender pay gap.

[10]This result is similar to that of Castilla (2008) who using personnel data from a large service organization finds evidence of a performance-reward bias, whereby women receive lower salaries than men with equal ratings on performance evaluations.

5.2 Getting promoted: information on recruitment campaigns (2012-2017)

The lack of a gender gap in promotions after 2011 cannot be interpreted trivially. To be promoted at the ECB, candidates have to go through a recruitment process and for that they need to apply first. Failure to detect gender differences in the probability of promotion can mask gender gaps in the probability of applying and/or the probability of winning the campaign once being a candidate. The analysis in this section therefore explores in more depth the selection process by using detailed data on promotion campaigns, which is available from 2012, to determine the underlying driver of the lack of a promotion gap.

5.2.1 Probability of winning a promotion campaign

Given the information on each recruitment campaign, we define a pool of potential candidates among employees in salary band F/G and compute the probability of getting the promotion to salary band H.[11] We only analyze promotions to salary band H.[12] We exclude external applications because we miss information on key individual traits for these candidates.[13]

We assume a linear model for the probability that a given worker i moves from band F/G to band H after winning a particular campaign c:

$$W_{ic} = \alpha^W + \beta^W Female_i + V'_{ic}\gamma^W + \delta^W_c + \epsilon^W_{ic} \tag{3}$$

where the dummy $Female$ is equal to 1 for women, V_{ic} is a vector of personal and family characteristics, worker productivity measures, and job features, δ^W_c are campaign fixed effects, and ϵ^W_{ic} is a random error term with unrestricted correlation at the individual level. Model (3) is estimated among potential candidates, and β^W is our coefficient of interest.

Table 9 reports OLS estimates of the probability of being promoted. All estimations include campaign, directorate and age dummies. Standard errors are clustered at the campaign level. Across specifications, we do not find a negative impact of being female

[11] We consider as potential candidates everyone in the sample that belongs to salary band F/G. Alternatively we consider a stricter definition, requiring potential candidates to also be in the same directorate as the campaign, and results are qualitatively very similar. Results are available upon request.

[12] The sample only includes a handful of promotions to salary band I and does not cover promotions to salary bands above I.

[13] In some specifications, we control for the fraction of external applicants in each campaign to account for the degree of external competition for jobs.

on the probability of winning the campaign. These estimations are indeed consistent with the results on promotion probabilities after 2011 in tables 7 and A.3.

If we do not include campaign dummies, we can check the importance of the panel composition or the share of external candidates. We do not find evidence that the gender composition of the selection panel influences the campaign outcome (column (6)). We do find however that the share of external candidates among the candidates has a negative impact on the probability of being promoted for internal candidates (column (5)), implying that external competition reduces promotion chances for internal candidates.

As mentioned before, any promotion process implies two stages: first, potential candidates need to apply, hence potential candidates that do not apply have probability zero of being promoted; and, second, conditional on being a candidate, there is some probability of getting the offer. Formally, the probability of winning the promotion, W, for any employee is the product of the probability of actually winning conditional on having applied, times the probability of applying for the promotion, $\Pr(W) = \Pr(W|A = 1) \times \Pr(A)$.

This has two implications for our empirical analysis. First, the estimation of model (3) in Table 9 might be biased, if part of the information on the underlying selection process into the candidates pool is not accounted for. Second, the interpretation and policy implications of any gender promotion gap, or its absence, would depend on the underlying probabilities $Pr(A)$ and $Pr(W|A = 1)$.

To address these issues, we first estimate the probability of applying for a promotion $\Pr(A)$, thus exploring a potential gender gap on the selection into the candidates pool. Then, we estimate the probability of promotion $Pr(W)$ by using the Heckman (1979) selection model approach.

5.2.2 Probability of applying

The decision to apply for a promotion campaign depends on the net balance between the candidate's cost of applying and the expected rewards from doing so. Apart from the observable characteristics of the candidate, both the cost and the reward can have a part that is subjective and difficult to identify, being largely based on the candidate's perception of the likelihood of being successful in the campaign. Such perception will be influenced by personal experience and individual traits, such as preferences for risk-taking and competition, work-life balance considerations (e.g. raising children), or bargaining skills that could incidentally affecting the probability of winning the campaign.

We consider a linear model for the probability that the potential candidate i applies

for a promotion in campaign c :

$$A_{ic} = \alpha^A + \beta^A Female_i + Y'_{ic}\gamma^A + \delta^A_c + \epsilon^A_{ic} \tag{4}$$

where, as before, the dummy $Female$ is equal to 1 for women, the vector Y_{ic} of individual characteristics includes personal and family characteristics, job features, and worker performance measures, δ^A_c are campaign fixed effects, and ϵ^A_{ic} is a random error term with unrestricted correlation at the individual level. Model (4) is estimated among the same set of potential candidates as model (3), and β^A is our coefficient of interest.

Table 10 presents the main results. All the specifications include campaign fixed effects and we consider personal and family characteristics, job features, and worker performance measures. We find that women are less likely to apply than men to an open vacancy.

The raw gender gap for campaign applications is around 1% and statistically significant. This gap remains broadly unchanged after controlling for individual and family characteristics, varying from 1.2% to 1.6% depending on the regression specification. The magnitude of this gap is substantially large, given that the average application rate in our sample of potential candidates is 3.8%.

Characteristics such as tenure within band, having received positive feedback from the direct boss in the last two years (in the form of being recognized as a top performer in the annual appraisals, and/or obtaining a bonus) significantly increases the likelihood of applying for a promotion. Results in Table 10 are also supportive of supply-side explanations for the existence of gender differences in promotion outcomes. Consistent with such explanations, we find a positive effect of joining the ECB mentorship program. On the contrary, having children or working part-time are both negatively associated with applying for promotion, suggesting that work-life balance considerations partly drive the decision to seek a promotion.[14] Promotions generally come with more responsibilities that may be more difficult to combine with aspirations to raise a family.

5.2.3 Probability of winning a campaign accounting for the probability of applying

Next, we model the probability of winning a selection campaign as before, except that we account for the fact that only people who applied for a vacancy have a positive probability of winning the campaign. That is, the latent probability of winning a campaign, W^*:

[14] Part-time workers predominantly feature women: 29% of female potential candidates work part-time, versus 7% in the case of male potential candidates.

$$W_{ic}^{*} = \alpha^{W^*} + \beta^{W^*} Female_i + V_{ic}' \gamma^{W^*} + \delta_c^{W^*} + \epsilon_{ic}^{W^*} \tag{5}$$

is only observed (that is $W_{ic} = W_{ic}^{*}$) if the probability of applying is different from zero:

$$A_{ic} = \alpha^{A} + \beta^{A} Female_i + Y_{ic}' \gamma^{A} + \delta_c^{A} + \epsilon_{ic}^{A} > 0 \tag{6}$$

Variables and parameters definitions are as in models (3) and (4) above. Model assumptions for the error terms in equations (5) and (6) are that:

$$\begin{aligned} \epsilon_{ic}^{W^*} &\sim N(0, \sigma) \\ \epsilon_{ic}^{A} &\sim N(0, 1) \\ corr(\epsilon_{ic}^{W^*}, \epsilon_{ic}^{A}) &= \rho \end{aligned}$$

Equation (5) is known as the outcome equation and equation (6) as the selection equation.

Identification requires some exclusion restriction, namely some variable that drives the selection into the applicants pool which is not a determinant of the probability of wining the campaign (the outcome equation). In our case, we consider indicators of whether the worker is head of household, whether she has children, and whether she has worked part-time any period during the last two years as valid selection variables. All three variables are expected to influence the decision to apply for promotion but they are not supposed to influence the promotion decisions because the selection panels do not have access to such information (campaign folders do not include information on marital status, children, household income, or leave).

Table 11 shows estimations of the probability of being promoted using the two-step Heckman model. The outcome equation has a linear specification, while the selection equation is a probit. Similarly to what we obtained before (table 9 and the results after 2011 in tables 7 and A.3), our estimates indicate that from 2012 onwards women are as likely to be promoted as men.

Our finding of no gender gap in the probability of promotion, $\Pr(W)$, combined with a negative gap in the probability of applying, $\Pr(A)$, suggests that there is a positive gap in the probability of being promoted conditional on having applied $\Pr(W|A = 1)$, as $\Pr(W) = \Pr(W|A = 1) \times \Pr(A)$. To assess this more formally, we estimate model (3) for the subsample of actual candidates (i.e., applicants), and obtain the results reported in Table 12. Conditional on having applied, women have indeed a higher probability of

winning the campaign relative to men. The effect is substantial: following application, the probability of promotion is 7% higher for women than for men. This is a large effect compared to the average probability of promotion among applicants of 8%.

Taken together, these results imply that after 2011 women appear as likely as men to be promoted. This result is, however, masking a lower probability of women to apply for promotions, and a higher probability to win the campaign conditional on applying.

5.2.4 Wage progression following promotion

We find that, conditional on applying, women have a higher probability to win a campaign. Is this due to positive discrimination of female candidates or does the application filter select into better suited female than male candidates? To distinguish between these alternative applications, we analyze the wage progression of candidates after they get promoted. Specifically, we estimate a linear regression model of log salary steps and include interaction terms between the Female and Salary band H (and I) dummy variables. A positive coefficient on these interaction terms indicates that women have a more rapid wage progression upon promotion. For these regressions we turn again to our main dataset covering the period 2003-2017. The results are presented in Table 13. The results in column (1) are for the entire sample period. We find that after promotion women perform better than men in terms of salaries, suggesting that the higher probability to be promoted is based on merit, not discrimination.

The critic could argue that the ECB's gender policy change favors women, and that as a result women get promoted no matter what and thus their compensation rises subsequently independent of fundamentals. If this were true, then we should see that the salary progression of women if anything is stronger after the policy change in 2010. However, when we split the sample in the period before and after the policy change in 2010 we find that the results if anything is stronger before than after 2011 (columns (2) and (3) respectively).

Does this mean that women make up much of the lost income prior to promotion following promotion? No. Figure 5 shows the evolution of the salary path of men and women after entering at the F/G level, and is based on the estimates in column (1) of Table 13, when evaluated at the mean for all the covariates except female, tenure and the salary band that are allowed to change. The right-hand side panel of Figure 5 shows the evolution of salaries for (average) men and women in salary band F/G as tenure progresses, setting the time it takes to be promoted to H band at six years for men and

nine for women, which is the average tenure in band F/G before promotion observed in our sample over the time span 2003-2017. While women close much of the salary gap with men after they get promoted, their accumulated income is still substantially lower due to lost income over the years prior to promotion. The left-hand side panel of Figure 5 shows the evolution of salaries for men and women, based on the estimates in Table 13, after setting the expected time it takes to be promoted for women equal to that for men, namely 6 years. This shows that if women were as likely to apply for promotion opportunities as men, men and women would enjoy the same salaries by year six upon entry in F/G and that much of the accumulated gender pay gap would disappear.

Taken together, this implies that while the promotion gap disappears following the policy change, the career paths of women that joined prior to the policy change do not fully catch up with those of men because of the lost ground prior to the policy change.

6 Conclusions

We have studied gender differences in career progress and promotions at the ECB using confidential anonymized personnel data from its professional staff over the period 2003 to 2017. A wage gap emerges between men and women within a few years of hiring, despite roughly similar entry conditions in terms of salary levels and other observables. In addition women are less likely to be promoted to higher salary bands before 2011. In the period after 2011, when the ECB announced a series of gender diversity policies, this gap is no longer significant. A more detailed analysis from 2012, using data on recruitment campaigns shows that women are less likely to apply for promotions, but conditional on applying, women are more likely to win the campaign. The latter does not appear to be due to positive discrimination, because following promotion women perform better in terms of wage progression than men. Overall, while women are able to close the wage gap with men following promotion, their lifetime income still suffers given the longer time it takes to get promoted. The gender promotion gap is particularly pronounced for women with children.

Taken together these results suggest that institutional efforts to boost the fraction of women in the ranks of male-dominated organizations should include measures aimed at lowering the barriers for women to seek and apply for promotion opportunities. Such measures could range from establishing mentoring programs and female networks to offering assertiveness and interview trainings to enhanced child support benefits and services.

Understanding the main drivers of the observed gender promotion gap is critically important to improve our understanding of how we can close the gender gap and ensure that women are adequately represented.

References

[1] Ahern, K. and A. Dittmar (2012): "The Changing of the Boards: The Impact on Firm Valuation of Mandated Female Board Representation, " *Quarterly Journal of Economics*, Vol. 127(1), pp. 137–197.

[2] Azmat, G. and R. Ferrer (2017): "Gender Gaps in Performance: Evidence from Young Lawyers," *Journal of Political Economy*, Vol. 125(5), pp. 1306–1355.

[3] Babcock, L. and S. Laschever (2003): *Women Don't Ask: Negotiation and the Gender Divide*, Princeton, NJ: Princeton University Press.

[4] Bagues, M., M. Sylos-Labini, and N. Zinovyeva (2017): "Does the Gender Composition of Scientific Committees Matter?" *American Economic Review*, Vol. 107(4), pp. 1207–38.

[5] Barber, B. and T. Odean (2001): "Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment," *Quarterly Journal of Economics*, Vol. 161(1), pp. 261–292.

[6] Bennedsen, M., E. Simintzi, M. Tsoutsoura, and D. Wolfenzon (2018): "Do Firms Respond to Gender Pay Gap Transparency? " *mimeo*, Cornell University.

[7] Bertrand, M. (2013): "Career, Family, and the Well-Being of College Educated Women," *American Economic Review*, Vol. 103(3), pp. 244–250.

[8] Bertrand, M., S. Black, A. Lleras-Muney and S. Jensen (2018): "Breaking the Glass Ceiling? The Effect of Board Quotas on Female Labor Market Outcomes in Norway," *Review of Economic Studies*, forthcoming.

[9] Bertrand, M., C. Goldin, and L. F. Katz (2010): "Dynamics of the Gender Gap for Young Professionals in the Financial and Corporate Sectors," *American Economic Journal: Applied Economics*, Vol. 2(3), pp. 228–55.

[10] Black, S., and P. E. Strahan (2001): "The division of spoils: rent-sharing and discrimination in a regulated industry," *American Economic Review*, Vol. 91, pp. 814–31.

[11] Blackaby, D., A. L. Booth, and J. Frank (2005): "Outside Offers And The Gender Pay Gap: Empirical Evidence From the UK Academic Labour Market," *Economic Journal*, Vol. 115(501), pp. F81–F107.

[12] Blau, Francine D., Janet M. Currie, Rachel T. A. Croson and Donna K. Ginther, 2010: "Can Mentoring Help Female Assistant Professors? Interim Results from a Randomized Trial," *American Economic Review* Vol. 100(2), pp. 348–352.

[13] Bordalo, P., K. Coffman, N. Gennaioli, and A. Shleifer (2016): "Beliefs about Gender," *mimeo*, Harvard University.

[14] Bosquet, C., P-P. Combes, and C. Garcia-Peñalosa (2013): "Gender and Competition: Evidence from Academic Promotions in France,"CESifo Working Paper, No. 4507.

[15] Bosquet, C., P-P. Combes, and C. Garcia-Peñalosa (2018): "Gender and Promotions: Evidence from Academic Economists in France," *Scandinavian Journal of Economics*, forthcoming.

[16] Brands, R. A., and I. Fernandez-Mateo (2017): "Leaning Out: How Negative Recruitment Experiences Shape Women's Decisions to Compete for Executive Roles, " *Administrative Science Quarterly*, Vol. 62(3), pp. 405–442.

[17] Buser, T., M. Niederle, and H. Oosterbeek (2014): "Gender, Competitiveness and Career Choices," *Quarterly Journal of Economics*, Vol. 129(3), pp. 1409–1447.

[18] Card, D., S. DellaVigna, P. Funk, and N. Irriberri (2018): "Are Referees and Editors in Economics Gender Neutral?, " *mimeo*, University of California at Berkeley.

[19] Carney, M. (2017): "Reflecting Diversity, Choosing Inclusion,"Speech given at the Bank of England. https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/reflecting-diversity-choosing-the-inclusion.pdf

[20] Castilla, E. J. (2008): "Gender, Race, and Meritocracy in Organizational Careers, " *American Journal of Sociology* Vol. 113, pp. 1479–1526.

[21] Committee on the Status of Women in the Economics Profession (CSWEP) (2017): "Annual Report," *The American Economic Association (AEA)*, https://www.aeaweb.org/content/file?id=6388

[22] De Paola, M., M. Ponzo, and V. Scoppa (2015): "Gender Differences in Attitudes Towards Competition: Evidence from the Italian Scientific Qualification,"IZA Discussion Paper, No. 8859.

[23] Dreher, G., and R. Ash (1990): "A Comparative Study of Mentoring Among men and Women in Managerial, Professional and Technical Positions, " *Journal of Applied Psychology*, Vol. 75, pp. 539–546.

[24] Egan, M., G. Matvos, and A. Seru (2017): "When Harry Fired Sally: The Double Standard in Punishing Misconduct, "Mimeo, Stanford University, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2931940

[25] Ginther, D. K. and K. Hayes (1999): "Gender Differences in Salary and Promotion in the Humanities," *American Economic Review*, Vol. 89(2), pp. 397–402.

[26] Ginther, D. K. and S. Kahn (2004): "Women in Economics: Moving Up or Falling Off the Academic Ladder," *Journal of Economic Perspectives*, Vol. 18(3), pp. 193–214.

[27] Ginther, D. K. and S. Kahn (2009): "Does Science Promote Women: Evidence from Academia 1973-2001,"NBER chapter in: *Science and Engineering Careers in the United States: An Analysis of Markets and Employment*, pp. 163–194.

[28] Goldin, C. (2014): "A Grand Gender Convergence: Its Last Chapter,"*American Economic Review*, Vol. 104(4), pp. 1091–1119.

[29] Goldin, C. and C. Rouse (2000): "Orchestrating Impartiality: the Impact of "Blind' Auditions on Female Musicians,"*American Economic Review* Vol. 40, pp. 715–42.

[30] Goldin, C., L. F. Katz, and I. Kuziemko (2006): "The Homecoming of American College Women: The Reversal of the Gender Gap in College,"*Journal of Economic Perspectives*, Vol. 20, pp. 133–156.

[31] Hunt, D. and C. Michael, (1983) "Mentorship: A Career Training and Development Tool,"*Academy of Management Review* Vol. 8, pp. 475–485.

[32] Lazear, E. P. and S. Rosen (1990): "Male-Female Wage Differentials in Job Ladders,"*Journal of Labor Economics*, Vol. 8(1), pp. S106–S123.

[33] Matsa, D. and A. Miller (2011): "Chipping Away at the Glass Ceiling: Gender Spillovers in Corporate Leadership,"*American Economic Review*, Vol. 101(3), pp. 635–639.

[34] Matsa, D. and A. Miller (2013): "A Female Style in Corporate Leadership,"*American Economic Journal: Applied Economics*, Vol. 5(3), pp. 136–169.

[35] Moss-Racusin, C. A., J. F. Dovidio, V. L. Brescoll, M. J. Graham, and J. Handelsman (2012): "Science Faculty's Subtle Gender Biases Favor Male Students,"*Proceedings of the National Academy of Sciences* Vol. 109, pp. 16474–16479.

[36] Niederle, M. and L. Vesterlund (2007): "Do Women Shy Away from Competition? Do Men Compete Too Much?,"*Quarterly Journal of Economics*, Vol. 122(3), pp. 1067–1101.

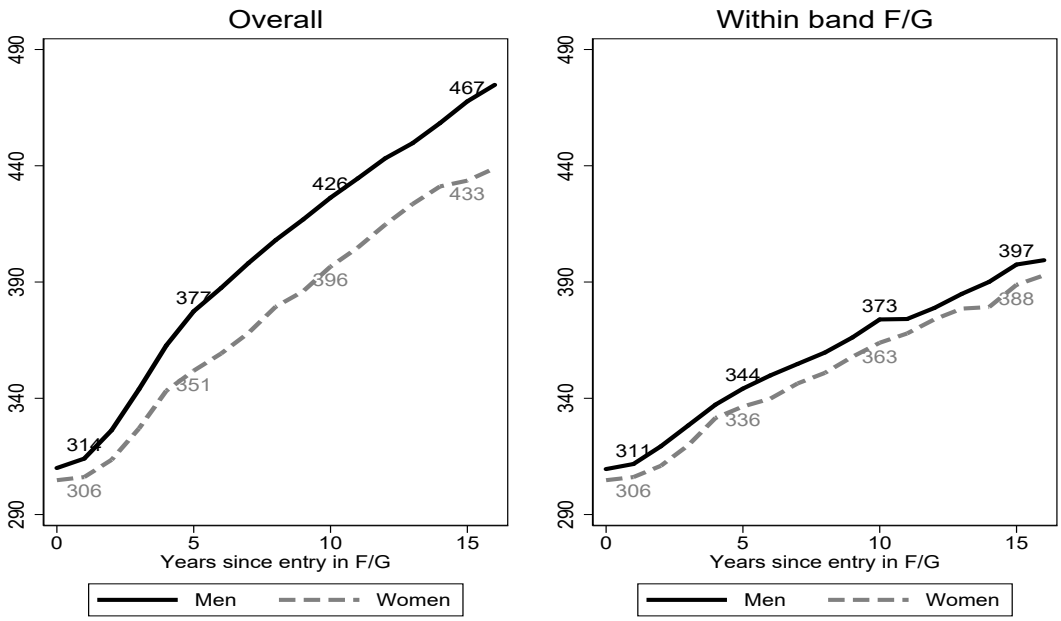
[37] Noe, R., (1988): "Women and Mentoring: A Review and Research Agenda,"*Academy of Management Review* Vol. 13, pp. 65–78.

[38] Official Monetary and Financial Institutions Forum (OMFIF) (2019): "Banking on Balance: Diversity in Central Banks and Public Investment,"Speech given at the Bank of England. https://www.omfif.org/media/5535358/gbi-2019.pdf

[39] Reuben, E., P. Sapienza, and L. Zingales (2014): "How Stereotypes Impair Women's Careers in Science,"*Proceedings of the National Academy of Sciences* Vol. 111, pp. 4403–4408.

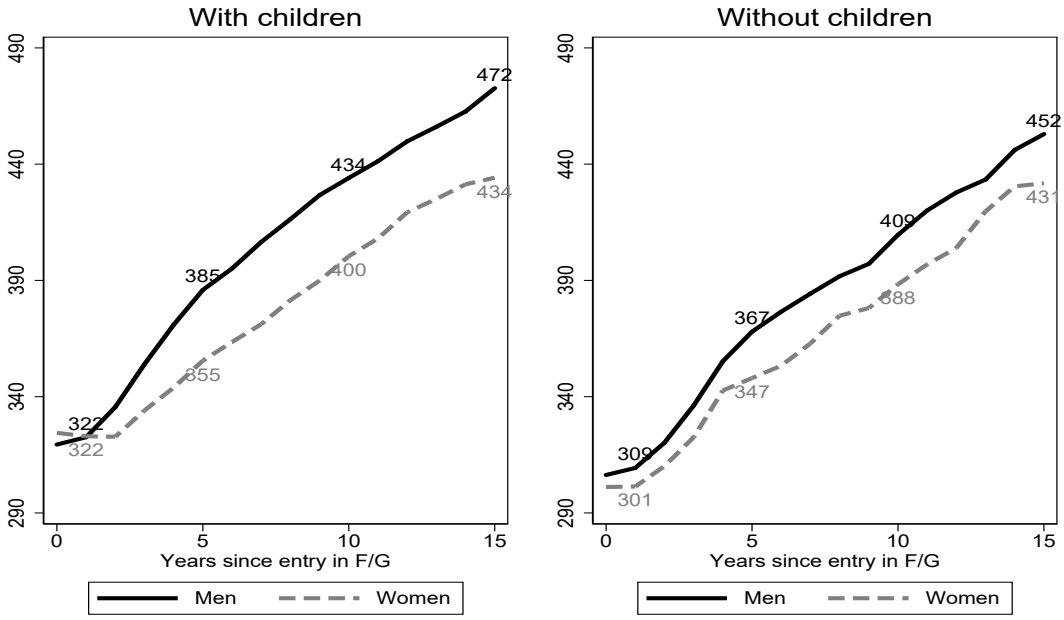
Figures and Tables

Figure 1: Wages since entry in F/G (2003-2017)



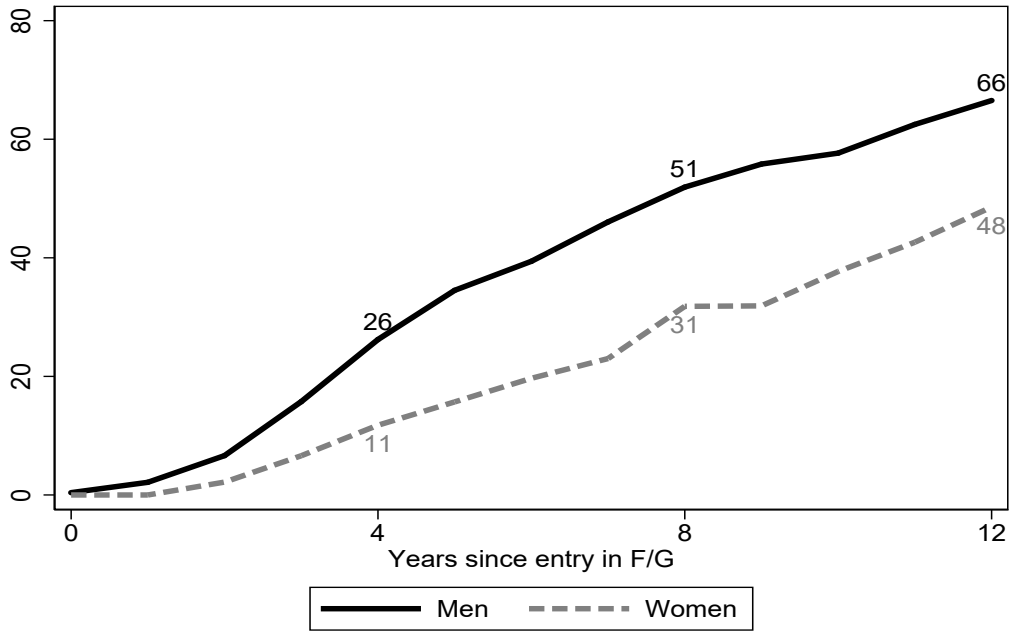
Notes: Left-panel: average step levels by gender since entry in F/G for all the employees in our sample. Right-panel: average step levels by gender since entry in F/G for those employees who stay in salary band F/G.

Figure 2: Wages since entry in F/G, children (2003-2017)



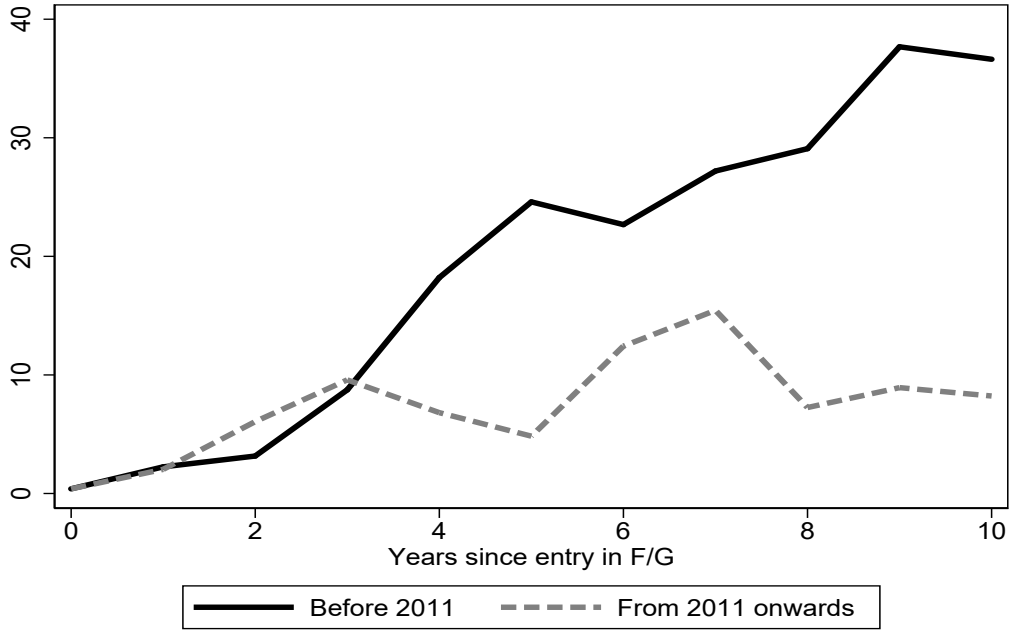
Notes: Left-panel: average step levels by gender since entry in F/G for employees with dependent children. Right-panel: average step levels by gender since entry in F/G for employees without dependent children.

Figure 3: Probability of promotion from salary band F/G, % (2003-2017)



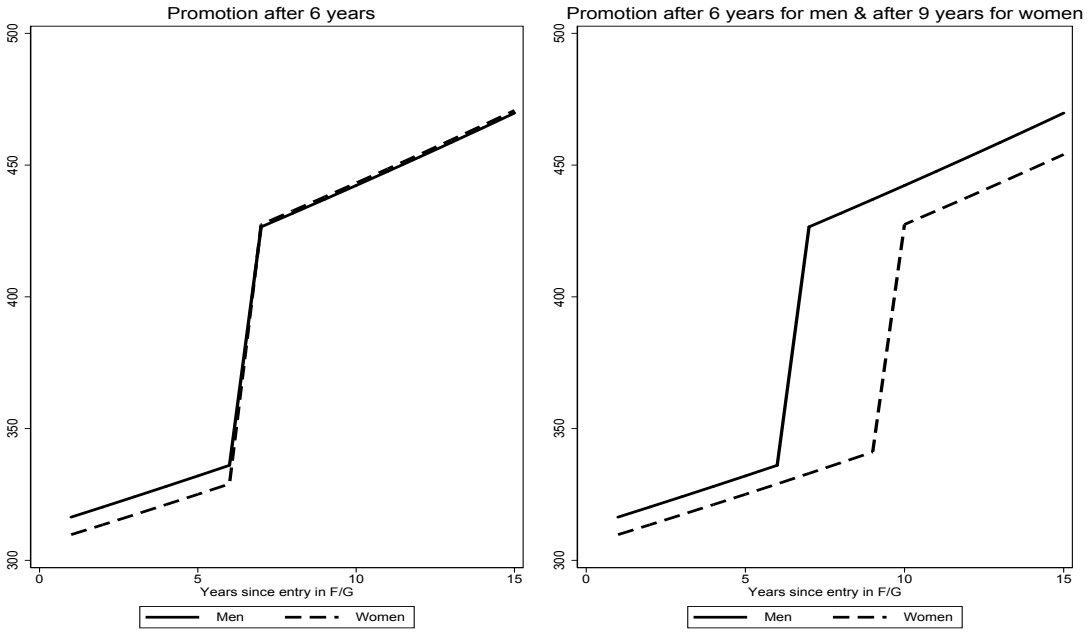
Notes: Average annual probability of promotion (moving from salary band F/G to H or I) by gender since entry in F/G for all the employees in our sample.

Figure 4: Gender gap in the probability of promotion from salary band F/G, % (before 2011 and from 2011 onwards)



Notes: Gender gap on the average annual probability of promotion (moving from salary band F/G to H or I) since entry in F/G before 2011 and from 2011 onwards.

Figure 5: Wage profile predictions



Notes: The graphs report predicted wage profiles from estimates in column (1) of Table 13, when evaluated at the mean for all the covariates except female, tenure and the salary band, which are allowed to vary. Left-panel: predicted average wage (step levels) by gender since entry in salary band F/G if both, males and females, are promoted to salary band H after six years in band F/G. Right-panel: predicted average wage (step levels) by gender since entry in salary band F/G if males are promoted after six years and females after nine.

Table 1: ECB salary structure in steps

	A	B	C	D	E	E/F	**F/G**	**G**	**H**	**I**
1	1	33	75	132	194	194	**263**	**333**	**419**	**454**
2	2	34	76	133	195	195	**264**	**334**	**420**	**455**
3	3	35	77	134	196	196	**265**	**335**	**421**	**456**
4	4	36	78	135	197	197	**266**	**336**	**422**	**457**
...										
55	55	87	129	186	248	248	**317**	**387**	**473**	**508**
56		88	130	187	249	249	**318**	**388**	**474**	**509**
...										
73		105	147	204	266	266	**335**	**405**	**491**	**526**
74			148	205	267	267	**336**	**406**	**492**	**527**
...										
89			163	220	282	282	**351**	**421**	**507**	**542**
90				221	283	283	**352**	**422**	**508**	**543**
91					284	284	**353**	**423**	**509**	**544**
92					285	285	**354**	**424**		
...										
98					291	291	**360**	**430**		
99					292	292	**361**	**431**		
101						294	**363**			
...										
167						360	**429**			
168							**430**			
169							**431**			

Notes: Equal steps denote equal salaries across bands. Each step is 0.25% higher than the previous one. Salaries are reviewed annually based on each employee's personal development and contribution to the performance of the ECB. According to that review, each employee is granted a number of steps. Figures in bold denote those included in the analysis.

Table 2: Descriptive statistics

		Total	[1] Male	[2] Female	Diff. [1]-[2]
Dataset 1: Working histories 2003-2017					
Observations	n, %	85,516	68.65%	31.35%	
Workers	n, %	1,084	68.36%	31.64%	
Observations in salary band F/G	n, %	58,544	64.17%	35.83%	
Observations in salary band H	n, %	17,685	75.81%	24.19%	
Observations in salary band I	n, %	9,287	83.21%	16.79%	
Age	mean	39.66	40.01	38.89	1.12***
Salary steps	mean	374.11	381.94	356.98	24.96***
Salary steps in F/G	mean	333.67	335.65	330.14	5.51***
Tenure within band	mean	5.12	5.08	5.22	-0.14***
Children (yes=1)	mean	0.55	0.55	0.55	0.00
Number of children	mean	1.91	1.96	1.81	0.15***
Permanent promotion	%	0.43%	0.47%	0.34%	0.13%**
Individuals with temporary promotions	%	8.11%	8.12%	8.11%	0.01%
Top performer (yes=1)	mean	0.54	0.51	0.58	-0.07***
Bonus (yes=1)	mean	0.27	0.27	0.28	-0.01***
Mentee (yes=1)	mean	0.03	0.01	0.06	-0.04***
Before 2011:					
Permanent promotion	%	0.40%	0.49%	0.22%	0.28%***
Top performer (yes=1)	mean	0.57	0.56	0.59	-0.03***
Bonus (yes=1)	mean	0.11	0.11	0.10	0.01**
Mentee (yes=1)	mean	-	-	-	-
From 2011:					
Permanent promotion	%	0.45%	0.45%	0.45%	0.00%
Top performer (yes=1)	mean	0.51	0.47	0.57	-0.10***
Bonus (yes=1)	mean	0.41	0.40	0.42	-0.03***
Mentee (yes=1)	mean	0.05	0.02	0.10	-0.08***
Dataset 2: Promotion campaigns 2012-2017					
Observations (potential candidates)	n, %	23,259	64.12%	35.88%	
Observations (applicants)	n, %	810	70.37%	29.63%	
Observations (winners)	n, %	62	53.23%	46.77%	
Probability of winning (applicants)	mean (%)	7.65%	5.79%	12.08%	-6.30***
Probability of winning (potential candidates)	mean (%)	0.27%	0.22%	0.35%	-0.13%*
Applicants:					
Tenure within band	mean	7.46	7.16	8.16	-1.00***
Top performer (yes=1)	mean	0.64	0.60	0.72	-0.12***
Bonus (yes=1)	mean	0.52	0.49	0.57	-0.08**
Mentee (yes=1)	mean	0.11	0.05	0.25	-0.20***
Part-time (yes=1)	mean	0.09	0.04	0.23	-0.20***
Head of household (yes=1)	mean	0.38	0.42	0.30	0.12***
Children (yes=1)	mean	0.50	0.44	0.63	-0.19***
Maternity leave (yes=1)	mean	0.06	0.00	0.21	-0.21***
Potential candidates:					
Tenure within band	mean	6.29	6.03	6.75	-0.73***
Top performer (yes=1)	mean	0.50	0.45	0.57	-0.12***
Bonus (yes=1)	mean	0.39	0.37	0.42	-0.04***
Mentee (yes=1)	mean	0.06	0.03	0.12	-0.09***
Part-time (yes=1)	mean	0.15	0.07	0.29	-0.22***
Head of household (yes=1)	mean	0.32	0.38	0.21	0.17***
Children (yes=1)	mean	0.48	0.45	0.54	-0.09***
Maternity leave (yes=1)	mean	0.06	0.00	0.16	-0.16***

*Notes: * p<0.1, ** p<0.05, *** p<0.01. Salary band F/G: economist/senior economist; H: principal economist; I: adviser. Salary steps: salary level in steps. Tenure within band: years in the current salary band. Children (dummy): 1 if the employee has dependent children. Permanent [temporary] promotion (d): 1 if employee [temporarily] moves to a higher salary band. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Part-time (d): 1 if employee worked part-time in the last 2 years. Head of household (d): 1 if the spouse earns less than a certain level (currently €57,211) or if single parent.*

Table 3: Descriptive statistics at entry into the ECB (2003-2017)

		Total	[1] Male	[2] Female	Diff. [1]-[2]
Workers who enter in salary band F/G	n, %	598	68.73%	31.27%	
Age	mean	33.24	33.59	32.49	1.10**
Salary steps	mean	308.42	309.73	305.56	4.17
Children (yes=1)	mean	0.21	0.25	0.14	0.11***
Number of children	mean	1.66	1.70	1.50	0.20
At entry to the ECB (2003-2007):					
Workers who enter in salary band F/G	n, %	176	67.61%	32.39%	
Age	mean	31.73	32.06	31.05	1.01
Salary steps	mean	327.83	329.74	323.84	5.90
Children (yes=1)	mean	0.17	0.21	0.09	0.12**
Number of children	mean	1.50	1.52	1.40	0.12
At entry to the ECB (2008-2012):					
Workers who enter in salary band F/G	n, %	168	61.31%	38.69%	
Age	mean	33.36	33.50	33.15	0.34
Salary steps	mean	299.58	300.37	298.32	2.05
Children (yes=1)	mean	0.18	0.22	0.12	0.10
Number of children	mean	1.58	1.65	1.38	0.28
At entry to the ECB (2013-2017):					
Workers who enter in salary band F/G	n, %	254	74.41%	25.59%	
Age	mean	34.21	34.60	33.08	1.53*
Salary steps	mean	300.83	302.23	296.77	-5.46
Children (yes=1)	mean	0.26	0.29	0.20	0.09
Number of children	mean	1.76	1.80	1.62	0.18

*Notes: * p<0.1, ** p<0.05, *** p<0.01. Salary band F/G: economist/senior economist. Salary steps: salary level in steps. Children (dummy): 1 if the employee has dependent children.*

Table 4: Linear regression of logwages: Baseline

					Within band F/G	
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.013**	-0.011**	-0.064***	-0.036***	-0.022***	-0.015**
	(0.006)	(0.005)	(0.013)	(0.010)	(0.007)	(0.006)
Tenure within band	0.019***	0.012***	0.014***	-0.003***	0.022***	0.013***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Salary band H	0.314***	0.266***				
	(0.005)	(0.006)				
Salary band I	0.415***	0.353***				
	(0.007)	(0.008)				
Age dummies	No	Yes	No	Yes	No	Yes
Observations	85516	85516	85516	85516	58544	58544
R^2	0.822	0.866	0.122	0.511	0.504	0.643

*Notes: Linear regression, monthly data 2003-2017. Robust standard errors in parentheses, clustered by individual. Directorate and time dummies included. * p<0.1, ** p<0.05, *** p<0.01. Sample includes salary band F/G: economist/senior economist, H: principal economist, and I: adviser. Dependent variable: log of wages (measured as salary steps). Female (dummy): 1 if the employee is a woman. Tenure within band: years in the current salary band. Salary band H [I] (d): 1 if the employee is in salary band H [I]. Age dummies: 1 if the age of the employee is within a interval, namely (. , 35), [35 , 40), [40, 45), [45 , 50), [50 ,55), [55,.).*

Table 5: Linear regression of logwages: Subsamples

			Within band F/G	
	(1) No child	(2) Children	(3) No child	(4) Children
Female	-0.007	-0.016**	-0.010	-0.021**
	(0.007)	(0.007)	(0.008)	(0.009)
Tenure within band	0.013***	0.011***	0.012***	0.014***
	(0.001)	(0.001)	(0.001)	(0.001)
Salary band H	0.285***	0.253***		
	(0.010)	(0.007)		
Salary band I	0.370***	0.342***		
	(0.014)	(0.009)		
Age dummies	Yes	Yes	Yes	Yes
Observations	38024	47492	31279	27265
R^2	0.838	0.859	0.635	0.614

*Notes: Linear regression, monthly data 2003-2017. Robust standard errors in parentheses, clustered by individual. Directorate and time dummies included. * p<0.1, ** p<0.05, *** p<0.01. Sample includes salary band F/G: economist/senior economist, H: principal economist, and I: adviser. Dependent variable: log of wages (measured as salary steps). Female (dummy): 1 if the employee is a woman. Tenure within band: years in the current salary band. Salary band H [I] (d): 1 if the employee is in salary band H [I]. Age dummies: 1 if the age of the employee is within a interval, namely (. , 35), [35 , 40), [40, 45), [45 , 50), [50 ,55), [55,.).*

Table 6: Linear regression of the probability of promotion: Baseline

	(1)	(2)	(3) No child	(4) Children
Female	-0.0014***	-0.0018***	-0.0009	-0.0029***
	(0.0005)	(0.0005)	(0.0006)	(0.0009)
Tenure within band	0.0006***	0.0004***	0.0003***	0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Temporary promotion	0.0012	0.0002	0.0016	-0.0012
	(0.0008)	(0.0008)	(0.0011)	(0.0012)
Top performer		0.0041***	0.0024***	0.0061***
		(0.0005)	(0.0006)	(0.0009)
Bonus		0.0032***	0.0029***	0.0032***
		(0.0008)	(0.0011)	(0.0012)
Mentee		0.0036	0.0039	0.0035
		(0.0027)	(0.0042)	(0.0034)
Observations	59356	59356	31590	27766
R^2	0.003	0.004	0.005	0.006

*Notes: Linear regression, monthly data 2003-2017. Robust standard errors in parentheses, clustered by individual. Directorate, time and age dummies included. * p<0.1, ** p<0.05, *** p<0.01. Dependent variable: Permanent promotion (dummy), takes value 1 if employee moves to a higher salary band. Female (d): 1 if the employee is a woman. Tenure within band: years in the current salary band. Temporary promotion (d), takes value 1 if employee has ever moved to a higher salary band for a limited time. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Children (d): if the employee has dependent children.*

Table 7: Linear regression of the probability of promotion: Policy change

	(1)	(2)	(3) No child	(4) Children
Female	-0.0028***	-0.0028***	-0.0016**	-0.0042***
	(0.0007)	(0.0007)	(0.0008)	(0.0012)
Tenure within band	0.0006***	0.0004***	0.0003***	0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Temporary promotion	0.0012	0.0003	0.0017	-0.0011
	(0.0008)	(0.0008)	(0.0011)	(0.0012)
Post-2010	-0.0064***	-0.0066***	0.0008	-0.0097***
	(0.0016)	(0.0016)	(0.0019)	(0.0035)
Female x Post-2010	0.0025**	0.0019*	0.0013	0.0023
	(0.0010)	(0.0010)	(0.0012)	(0.0017)
Top performer		0.0041***	0.0024***	0.0060***
		(0.0005)	(0.0006)	(0.0009)
Bonus		0.0031***	0.0029***	0.0032***
		(0.0008)	(0.0011)	(0.0012)
Mentee		0.0033	0.0037	0.0031
		(0.0027)	(0.0042)	(0.0035)
Observations	59356	59356	31590	27766
R^2	0.003	0.004	0.005	0.006

*Notes: Linear regression, monthly data 2003-2017. Robust standard errors in parentheses, clustered by individual. Directorate, time and age dummies included. * p<0.1, ** p<0.05, *** p<0.01. Dependent variable: Permanent promotion (dummy), takes value 1 if employee moves to a higher salary band. Female (d): 1 if the employee is a woman. Tenure within band: years in the current salary band. Temporary promotion (d), takes value 1 if employee has ever moved to a higher salary band for a limited time. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Children (d): if the employee has dependent children. Post-2010 (d): takes value 1 for years 2011 to 2017.*

Table 8: Linear regression of the probability of promotion: Differential effects

	(1)	(2) Before 2011	(3) From 2011
Tenure within band	0.0011***	0.0012***	0.0011***
	(0.0001)	(0.0002)	(0.0003)
Top performer	0.0043***	0.0041***	0.0021
	(0.0009)	(0.0013)	(0.0015)
Female x Top performer	-0.0020	-0.0020	0.0003
	(0.0014)	(0.0019)	(0.0024)
Bonus	0.0043***	0.0055*	0.0026
	(0.0013)	(0.0031)	(0.0016)
Female x Bonus	-0.0006	-0.0089***	-0.0005
	(0.0019)	(0.0034)	(0.0025)
Mentee	-0.0014		0.0009
	(0.0041)		(0.0049)
Female x Mentee	0.0079		0.0039
	(0.0059)		(0.0070)
Children	0.0037*	0.0044	0.0024
	(0.0021)	(0.0032)	(0.0035)
Female x Children	-0.0053**	-0.0067*	-0.0056
	(0.0025)	(0.0039)	(0.0045)
Observations	59356	27500	31856
R^2	0.007	0.008	0.007

*Notes: Linear regression, monthly data 2003-2017. All regressions include individual fixed effects. Robust standard errors in parentheses, clustered by individual. Directorate, time and age dummies included. * p<0.1, ** p<0.05, *** p<0.01. Dependent variable: Permanent promotion (dummy), takes value 1 if employee moves to a higher salary band. Tenure within band: years in the current salary band. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Children (d): if the employee has dependent children.*

Table 9: Linear regression of the probability of promotion: Campaigns

	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.0011	0.0004	0.0005	0.0005	0.0006	0.0006
	(0.0009)	(0.0008)	(0.0008)	(0.0009)	(0.0008)	(0.0007)
Tenure within band	0.0003**	0.0001	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Top performer		0.0019***	0.0019***	0.0019***	0.0019***	0.0019***
		(0.0007)	(0.0007)	(0.0007)	(0.0006)	(0.0007)
Bonus		0.0022***	0.0022***	0.0022***	0.0022***	0.0022***
		(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Mentee		0.0057**	0.0057**	0.0057**	0.0057**	0.0057**
		(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0025)
Part-time			-0.0004		-0.0004	-0.0004
			(0.0010)		(0.0010)	(0.0010)
Head of household				0.0006	0.0007	0.0007
				(0.0009)	(0.0009)	(0.0008)
Children				0.0003		
				(0.0009)		
Share of external candidates					-0.0107*	-0.0109
					(0.0054)	(0.0080)
Size of selection panel						-0.0001
						(0.0003)
Share of female panelists						-0.0001
						(0.0023)
Observations	23259	23259	23259	23259	23259	23259
R^2	0.004	0.006	0.006	0.006	0.003	0.003

*Notes: Linear regression, campaigns data 2012-2017. The sample includes potential candidates to recruitment campaigns. Robust standard errors in parentheses, clustered by campaign. Directorate and age dummies included. Campaign dummies also included except in (5) and (6). * p<0.1, ** p<0.05, *** p<0.01. Dependent variable: dummy variable that takes value 1 if the employee is offered the promotion after a recruitment campaign. Female (d): 1 if the employee is a woman. Tenure within band: years in the current salary band. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Part-time (d): 1 if employee worked part-time in the last 2 years. Head of household (d): 1 if the spouse earns less than a certain level (currently €57,211) or if single parent. Children (d): 1 if the employee has dependent children. Share of external candidates: the ratio of external over total number of candidates to a particular selection campaign. Size selection panel: number of members of the campaign's selection panel. Share of female panelists: number of female panel members over total number of panel members.*

Table 10: Linear regression of the probability of applying for promotion: Campaigns

	(1)	(2)	(3)
Female	-0.0159***	-0.0126***	-0.0142***
	(0.0026)	(0.0029)	(0.0027)
Tenure within band	0.0014***	0.0015***	0.0014***
	(0.0004)	(0.0004)	(0.0004)
Top performer	0.0120***	0.0117***	0.0119***
	(0.0029)	(0.0029)	(0.0029)
Bonus	0.0099***	0.0094***	0.0096***
	(0.0032)	(0.0032)	(0.0031)
Mentee	0.0259***	0.0259***	0.0255***
	(0.0077)	(0.0077)	(0.0077)
Part-time		-0.0153***	
		(0.0040)	
Head of household			0.0063*
			(0.0031)
Children			-0.0059**
			(0.0029)
Observations	23259	23259	23259
R^2	0.023	0.024	0.023

*Notes: Linear regression, campaigns data 2012-2017. The sample includes potential candidates to recruitment campaigns. Robust standard errors in parentheses, clustered by campaign. Campaign, directorate and age dummies included. * p<0.1, ** p<0.05, *** p<0.01. Dependent variable: dummy variable that takes value 1 if the employee applies for a promotion (thus participates in a recruitment campaign). Female (d): 1 if the employee is a woman. Tenure within band: years in the current salary band. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Part-time (d): 1 if employee worked part-time in the last 2 years. Head of household (d): 1 if the spouse earns less than a certain level (currently €57,211) or if single parent. Children (d): 1 if the employee has dependent children.*

Table 11: Linear regression of the probability of promotion: Heckman

Received the offer:	(1)	(2)	(3)
Female	0.0220	0.0427	0.0284
	(0.0424)	(0.0585)	(0.0394)
Tenure within band	0.0045	0.0024	0.0039
	(0.0047)	(0.0061)	(0.0044)
Top performer	0.0671*	0.0510	0.0619*
	(0.0348)	(0.0451)	(0.0323)
Bonus	0.0565**	0.0456	0.0530**
	(0.0277)	(0.0354)	(0.0261)
Mentee	0.0896*	0.0664	0.0827*
	(0.0525)	(0.0717)	(0.0497)
Applying (Probit):			
Female	-0.1841***	-0.2086***	-0.1700***
	(0.0391)	(0.0388)	(0.0399)
Tenure within band	0.0237***	0.0221***	0.0232***
	(0.0049)	(0.0049)	(0.0049)
Top performer	0.1677***	0.1748***	0.1675***
	(0.0360)	(0.0359)	(0.0360)
Bonus	0.1233***	0.1247***	0.1196***
	(0.0355)	(0.0355)	(0.0356)
Mentee	0.2756***	0.2668***	0.2712***
	(0.0615)	(0.0615)	(0.0616)
Part-time	-0.2249***		-0.2106***
	(0.0569)		(0.0584)
Head of household		0.0790**	0.0648*
		(0.0378)	(0.0380)
Children		-0.0705*	-0.0382
		(0.0368)	(0.0378)
λ	0.1359	0.0301	0.1041
	(0.1836)	(0.2736)	(0.1670)
Observations	23259	23259	23259

*Notes: Linear regression (Received the offer) and Probit regression (Applying), campaigns data 2012-2017. The sample includes potential candidates to recruitment campaigns. Standard errors in parentheses. Campaign, directorate and age dummies included. * p<0.1, ** p<0.05, *** p<0.01. Dependent variable (Received the offer): dummy that takes value 1 if the employee is offered the promotion. Dependent variable (Applying): dummy that takes value 1 if the employee applies for a promotion. Female (d): 1 if the employee is a woman. Tenure within band: years in the current salary band. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Part-time (d): 1 if employee worked part-time in the last 2 years. Head of household (d): 1 if the spouse earns less than a certain level (currently €57,211) or if single parent. Children (d): 1 if the employee has dependent children.*

Table 12: Linear regression of the probability of promotion, conditional on having applied for promotion: Campaigns

	(1)	(2)	(3)
Female	0.0686**	0.0487	0.0761**
	(0.0294)	(0.0292)	(0.0300)
Tenure within band	0.0027	0.0018	0.0016
	(0.0027)	(0.0028)	(0.0027)
Top performer		0.0466**	0.0469**
		(0.0175)	(0.0179)
Bonus		0.0423*	0.0388*
		(0.0216)	(0.0219)
Mentee		0.0594	0.0538
		(0.0413)	(0.0408)
Maternity leave			-0.1162***
			(0.0407)
Observations	810	810	810
R^2	0.081	0.099	0.108

*Notes: Linear regression, campaigns data 2012-2017. The sample includes actual candidates who applied to recruitment campaigns. Robust standard errors in parentheses, clustered by campaign. Campaign, directorate and age dummies included. * p<0.1, ** p<0.05, *** p<0.01. Dependent variable: dummy that takes value 1 if the candidate is offered the promotion. Female (d): 1 if the employee is a woman. Tenure within band: years in the current salary band. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Maternity leave (d): 1 if candidate is on maternity leave in the last 2 years.*

Table 13: Linear regression of logwages: Wage gap following promotion

	(1)	(2) Before 2011	(3) From 2011
Female	-0.017**	-0.016*	-0.016**
	(0.007)	(0.008)	(0.006)
Tenure within band	0.012***	0.018***	0.010***
	(0.001)	(0.001)	(0.001)
Salary band H	0.259***	0.255***	0.268***
	(0.006)	(0.008)	(0.007)
Salary band I	0.350***	0.358***	0.352***
	(0.009)	(0.012)	(0.008)
Female x Salary band H	0.028***	0.030***	0.018*
	(0.009)	(0.011)	(0.010)
Female x Salary band I	0.017	0.005	0.014
	(0.013)	(0.014)	(0.013)
Observations	85516	37118	48398
R^2	0.867	0.820	0.899

*Notes: Linear regression, monthly data 2003-2017. Robust standard errors in parentheses, clustered by individual. Age, directorate and time dummies included. * p<0.1, ** p<0.05, *** p<0.01. Sample includes salary band F/G: economist/senior economist, H: principal economist, and I: adviser. Dependent variable: log of wages (measured as salary steps). Female (dummy): 1 if the employee is a woman. Tenure within band: years in the current salary band. Salary band H [I] (d): 1 if the employee is in salary band H [I]. Age dummies: 1 if the age of the employee is within a interval, namely (. , 35), [35 , 40), [40, 45), [45 , 50), [50 ,55), [55,.).*

A Appendix tables

Table A.1: Linear regression of logwages: OLS vs FE

					Within band F/G	
	(1) OLS	(2) FE	(3) OLS	(4) FE	(5) OLS	(6) FE
Female	-0.011**		-0.036***		-0.015**	
	(0.005)		(0.010)		(0.006)	
Tenure within band	0.012***	0.011***	-0.003***	-0.013***	0.013***	0.014***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)
Salary band H	0.266***	0.243***				
	(0.006)	(0.010)				
Salary band I	0.353***	0.331***				
	(0.008)	(0.014)				
Observations	85516	85516	85516	85516	58544	58544
Individuals	1084	1084	1084	1084	1024	1024
Adjusted R^2	0.866	0.871	0.510	0.748	0.642	0.779

*Notes: Linear regression, monthly data 2003-2017. OLS: Ordinary Least Squares; FE: Panel Fixed Effects Estimates with individual fixed effects. Robust standard errors in parentheses, clustered by individual. Directorate, age and time dummies included. * p<0.1, ** p<0.05, *** p<0.01. Sample includes salary band F/G: economist/senior economist, H: principal economist, and I: adviser. Dependent variable: log of wages (measured as salary steps). Female (dummy): 1 if the employee is a woman. Tenure within band: years in the current salary band. Salary band H [I] (d): 1 if the employee is in salary band H [I].*

Table A.2: Linear regression of logwages: Number and ages of children

			Within band F/G	
	(1)	(2)	(3)	(4)
Female	-0.013**	-0.011**	-0.021***	-0.015**
	(0.006)	(0.005)	(0.007)	(0.006)
Tenure within band	0.018***	0.012***	0.020***	0.013***
	(0.001)	(0.001)	(0.001)	(0.001)
One child	0.019**	0.002	0.036***	0.010
	(0.008)	(0.007)	(0.011)	(0.010)
Two children	0.032***	0.014	0.064***	0.034*
	(0.012)	(0.011)	(0.019)	(0.018)
Three or more children	0.033**	0.015	0.076***	0.046**
	(0.016)	(0.013)	(0.023)	(0.019)
Children younger than 1	-0.015***	0.001	-0.031***	-0.008
	(0.006)	(0.005)	(0.009)	(0.008)
Children between 1 and 3	-0.010*	-0.001	-0.027***	-0.010
	(0.005)	(0.005)	(0.009)	(0.008)
Children between 3 and 6	-0.003	0.001	-0.019**	-0.008
	(0.005)	(0.005)	(0.009)	(0.008)
Children older than 6	0.013*	0.003	0.013	-0.002
	(0.007)	(0.007)	(0.012)	(0.011)
Salary band H	0.301***	0.261***		
	(0.005)	(0.006)		
Salary band I	0.400***	0.348***		
	(0.007)	(0.008)		
Age dummies	No	Yes	No	Yes
Observations	85516	85516	58544	58544
R^2	0.829	0.867	0.537	0.650

*Notes: Linear regression, monthly data 2003-2017. Robust standard errors in parentheses, clustered by individual. Directorate and time dummies included. * p<0.1, ** p<0.05, *** p<0.01. Sample includes salary band F/G: economist/senior economist, H: principal economist, and I: adviser. Dependent variable: log of wages (measured as salary steps). Female (dummy): 1 if the employee is a woman. Tenure within band: years in the current salary band. Salary band H [I] (d): 1 if the employee is in salary band H [I]. Age dummies: 1 if the age of the employee is within a interval, namely (. , 35), [35 , 40), [40, 45), [45 , 50), [50 ,55), [55,.). Number and ages of children are dummy variables.*

Table A.3: Linear regression of the probability of promotion: Before and after 2011

	(1) Before 2011	(2) From 2011	(3) Before 2011	(4) From 2011
Female	-0.0025***	-0.0004	-0.0025***	-0.0011
	(0.0007)	(0.0008)	(0.0007)	(0.0008)
Tenure within band	0.0008***	0.0005***	0.0005***	0.0004***
	(0.0002)	(0.0001)	(0.0001)	(0.0001)
Temporary promotion	-0.0011	0.0043***	-0.0016*	0.0026*
	(0.0009)	(0.0015)	(0.0009)	(0.0015)
Top performer			0.0047***	0.0035***
			(0.0007)	(0.0008)
Bonus			0.0012	0.0036***
			(0.0018)	(0.0009)
Mentee				0.0034
				(0.0027)
Observations	27500	31856	27500	31856
R^2	0.004	0.003	0.005	0.005

*Notes: Linear regression, monthly data 2003-2017. Robust standard errors in parentheses, clustered by individual. Directorate, time and age dummies included. * p<0.1, ** p<0.05, *** p<0.01. Dependent variable: Permanent promotion (dummy), takes value 1 if employee moves to a higher salary band. Female (d): 1 if the employee is a woman. Tenure within band: years in the current salary band. Temporary promotion (d), takes value 1 if employee has ever moved to a higher salary band for a limited time. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Children (d): if the employee has dependent children.*

Table A.4: Linear regression of the probability of promotion: Before and after 2011 & Presence of children

	No child		Children	
	(1) Before 2011	(2) From 2011	(3) Before 2011	(4) From 2011
Female	-0.0012	-0.0002	-0.0046**	-0.0054***
	(0.0008)	(0.0010)	(0.0022)	(0.0020)
Tenure within band	0.0005**	0.0003**	0.0003	0.0009***
	(0.0002)	(0.0002)	(0.0004)	(0.0003)
Temporary promotion	-0.0008	0.0065**	-0.0053***	0.0048*
	(0.0012)	(0.0029)	(0.0020)	(0.0029)
Top performer	0.0029***	0.0018*	0.0046*	0.0046**
	(0.0008)	(0.0009)	(0.0024)	(0.0021)
Bonus	0.0013	0.0032***	0.0041	0.0009
	(0.0024)	(0.0012)	(0.0041)	(0.0019)
Mentee		0.0034		0.0084
		(0.0041)		(0.0052)
Observations	15174	16416	4925	5823
R^2	0.004	0.006	0.014	0.010

*Notes: Linear regression, monthly data 2003-2017. Robust standard errors in parentheses, clustered by individual. Directorate, time and age dummies included. * p<0.1, ** p<0.05, *** p<0.01. Dependent variable: Permanent promotion (dummy), takes value 1 if employee moves to a higher salary band. Female (d): 1 if the employee is a woman. Tenure within band: years in the current salary band. Temporary promotion (d), takes value 1 if employee has ever moved to a higher salary band for a limited time. Top performer (d): 1 if employee's salary award is among the top 25% in her business area at least once in the last 2 years. Bonus (d): 1 if employee received cash bonuses in the last 2 years. Mentee (d): 1 if employee participated in the mentorship program in the last 2 years. Children (d): if the employee has dependent children.*

Table A.5: Gender promotion gap over time: Three-year rolling estimates

Period	Coeff. Female	Obs.
2003-05	-0.0040***	9,181
2004-06	-0.0033***	9,807
2006-08	-0.0021**	10,569
2007-09	-0.0023**	10,962
2008-10	-0.0019*	11,440
2009-11	-0.0007	11,758
2010-12	-0.0011	12,157
2011-13	-0.0008	12,734
2012-14	-0.0015	13,492
2013-15	-0.0019	13,907
2014-16	-0.0014	14,392
2015-17	-0.0015	14,356

*Notes: estimated coefficients of the dummy Female for same specification as Table 6, column (2), for three-year rolling samples. * p<0.1, ** p<0.05, *** p<0.01.*