# Gender and Career Progression: Evidence from the Banco de España

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June 6, 2025

**Abstract**

In this paper we examine gender differences in career progression using personnel records from the Banco de España. This institution features a complex professional development system, in which competitive calls, direct appointments, and vertical promotions coexist. We document that the presence of women has increased markedly since the late 1990s, although not always in a monotonic manner. On average, for the pool of potential candidates within each selection process, we find no significant gender gaps in the probability of promotion in competitive calls, direct appointments, or vertical promotions. Among managers, on the contrary, our findings uncover significant gender gaps depending on the type of promotion process. In the promotions for department director and division head positions, we find a significantly lower probability of promotion for women relative to men through competitive calls. We also document a lower probability of applying for women relative to men for those managerial positions. When we focus on the business areas where most economists work, we again find a lower probability of promotion for women relative to men in competitive calls in the promotions for department director and division head positions. For this group of business areas, however, gender differences in the probability of application are not significant. Instead, we document a higher probability for women relative to men of getting vertical promotions in unit head positions, which are immediately below in the hierarchy.

*Keywords*: gender gaps, working histories, central banking.

*JEL codes*: J16, J31, J41, J63.

# 1 Introduction

The economics profession includes disproportionately few women, relative to the general population and other disciplines (Bayer and Rouse, 2016). This under representation starts at the undergraduate level and increases moving up the academic career ladder. In 2022, the share of women in the US undergraduate population was 55%, being 37% among economics majors. Similarly, women account for 34.3% of new PhDs, 33.2% of assistant professors, 26.5% of associate professors and 17.8% of full professors (CSWEP, 2023). In Europe, the corresponding female shares are higher, but the attrition rate along the career is similar (Auriol et al., 2019).

Evidence of a leaky pipeline for women in economics is not a new phenomenon. Studies in the early 2000s have already documented that women were significantly less likely to be promoted to tenured positions than men (McDowell et al., 2001; Ginther and Kahn, 2004). Even so, economics became less male-dominated over time. In the last decade, however, this growth has stalled (Lundberg and Stearns, 2019), raising concerns about the reasons behind the lack of women in high-level positions in the economics profession.

Central Banks also suffer from this female scarcity among their staff, in particular in managerial positions (OMFIF, 2024). Still, several of them have shown a strong commitment to increasing gender diversity. For instance, in late 2010 the European Central Bank (ECB) made a public statement supporting diversity: "we believe diversity creates excellence: more diverse teams mean a wider range of opinions, leading to better and more robust results [...] We're moving towards being a more diverse institution, which also means an institution that's more flexible in its thinking and more effective in its decision-making". Indeed, it is not only a matter of fairness or a moral issue why gender equity, and – more broadly – diversity, should be a concern among economists and institutions employing economists. It is also an efficiency argument. As stated by Janet Yellen in her remarks at the Federal Reserve National Summit on Diversity in the Economics Profession in October 2014: "[W]hen economics is tested by future challenges, I hope that our profession will be able to say that we have done all we could to attract the best people and the best ideas".

The evidence shows that diversity matters because it shapes group dynamics and decision-making outcomes. For instance, in a business-oriented scenario, Hoogendoorn et al. (2013) show that mixed-gender groups display more intense mutual monitoring and produce better outcomes. Also, male and female economists have different views about several policy issues even after controlling for cohort of PhD and employment, hence the prevailing views may be

biased by the relative lack of some groups (May et al., 2014).

The economic literature offers several explanations for gender differences in professional career outcomes. Two prominent supply-side explanations are the presence of children (Bertrand, 2013; Keloharju et al., 2022), and gender differences in risk aversion (Niederle and Vesterlund, 2007; Buser et al., 2014; Snowberg and Yariv, 2021). In the context of the ECB, in which every promotion requires winning a selection process, Hospido et al. (2022) show that female workers are less likely relative to males to apply for promotions. Competition from other candidates partly explains this application gender gap.[1]

In this paper we further explore gender differences in career outcomes by focusing on the case of the Banco de España (BdE). An interesting institutional feature of the BdE, relative to the ECB, is that the BdE has a mixed system of promotions through competitive calls but also through vertical promotions and direct appointments.

We start by comparing men and women in terms of wages in years 2009-2023. We find that, while a substantial part of the average gender pay gap is explained by individual characteristics, the two usual suspects - children and promotions - also play a role.

When comparing male and female potential candidates for the same selection process in years 2013-2022, we did not find significant gender gaps in the probability of promotion either in competitive calls, direct appointments or vertical promotions. Among managers, on the contrary, our findings uncover some differences by type of promotion process. In the promotions for department director and division head positions, we find a significantly lower probability of promotion for women relative to men through competitive calls. We also document a lower probability of applying for women relative to men for those managerial positions. When we focus on the business areas where most of the staff are economists, we again find a lower probability of promotion for women relative to men in competitive calls in the promotions for department director and division head positions. For this group of business areas, however, gender differences in the probability of application are not significant. Instead, we document a higher probability for women relative to men of getting vertical promotions in unit head positions, which are immediately below in the hierarchy. Finally, for promotions within non-managerial positions, we do not find any significant difference by gender.

[1]The focus of this study was on those departments that mainly employ economists –Economics, Monetary Policy, Market Operations, Market Infrastructure, International, Financial Stability, Risk Management, Research, and Statistics – to enhance comparability across individuals. Banking supervision, Corporate Services, Communication and Legal were excluded.

The paper proceeds as follows. Section 2 describes the institutional setting and section 3 the dataset. Sections 4 and 5 present our empirical analysis on wages and promotions, respectively. Finally, section 6 concludes.

## 2 Institutional background

The Banco de España (BdE) is the Spanish national central bank and, within the Single Supervisory Mechanism, the supervisor of the Spanish banking system along with the ECB. According to the BdE Law of Autonomy, its governing bodies are the Governor, the Deputy Governor, the Governing Council and the Executive Commission. As of June 1, 2024, the gender profile of those governing bodies was relatively high compared to other central banks (IMF, 2020). In the Governing Council, 5 out of the 9 voting members were women, while among non voting members the proportion was 1 women out of 8 members. In the Executive Commission, 2 of the 4 voting members and 1 of the 7 non voting members were women.

For the overall staff of the institution, in recent years, there has been continuous catching up in the presence of women until reaching gender parity today. As of December 31, 2023, the total workforce was composed of 3,473 people, including branches and other entities, with 51% of women and 49% of men. The share of women increased by six percentage points since 2014. This convergence story, however, masks remarkable heterogeneity across professional groups. The different professional groups that comprise the BdE include (moving up in the hierarchy ladder): a) support administrative positions and various activities (25.3%), b) senior experts and experts or technical personnel (63.2%), c) people who occupy middle management positions such unit managers or division heads (10.2%), and d) those at the top management positions such as department managers and similar (1.4% of the staff). The share of women in each of these groups ranges from 59% among support administrative positions, to 50% among senior experts, experts and technicians, 43% among middle managers, and 35% among top managers.

The BdE uses several procedures to promote personnel. First, *direct appointments* are used for categories considered to be managerial positions of trust. Second, salary increases are directly assigned to some individuals once per year through *vertical promotions*, both at managerial and non-managerial positions. Finally, *competitive calls* are increasingly used to fill all kinds of positions.

A *direct appointment* responds to the manager's belief that the chosen person will perform

well in a position of responsibility, or comes as a recognition for the work already done as a manager in a lower-ranked position. According to the literature, there are several factors that may trigger decisions on direct appointments and are not that favorable to women, such as networking, visibility, their under-representation in the pipeline to be promoted, and even unconscious biases that women will perform worse than men in high positions (Cullen and Perez-Truglia, 2023). Unconscious biases might also be a reason why women are often held to higher standards than men. As documented in recent work for academics, women needed to produce higher quality work than men for referees to recommend publication (Hengel, 2022; Card et al., 2020) or to be accepted for presentation in conferences (Hospido and Sanz, 2021).

A *vertical promotion* grants the employee a permanent salary increase without implying any change in job responsibilities. In this case, the manager's recognition does not mean that the employee assumes greater responsibility but it can be seen as compensation for the work performed.

Finally, *competitive calls* assess merits, particularly the professional ones, of those candidates that have previously applied to the vacancy. Some of these calls can be open to competition from external candidates. The selection process consists of three stages: job application, exam and/or interview, and offer. The selection committee agrees on a short-listed ranking of candidates among those who pass the exam and get interviewed and offers the position to the highest-ranked candidate. In principle, there could be gender gaps in all stages. In addition to the reasons listed above for the possible existence of gender gaps in the assessment of merits and the selection stage, recent evidence shows a substantial gender gap in applications (Fluchtmann et al., 2021; Hospido et al., 2022).

## 3 Data

To conduct the analysis in this paper, we have built a panel dataset that combines personnel files with information on recruitment and selection processes at the worker level. All data have been anonymized by the departments of Human Resources and Information Systems so that we cannot identify any individual information as authors. In particular, we constructed a longitudinal dataset at the individual level that allows us to examine gender differences in work trajectories over time, excluding the top management above department directors.[2]

[2]Those we leave out, for reasons of confidentiality, are the Governor, the Deputy Governor, the General Directors, and the General Secretary. In June 2024, the structure of the BdE was based on six General Directorates (GD) and one General Secretariat: (i) GD Financial Conduct and Banknotes, (ii) GD Economics, Statistics, and Research, (iii) GD Financial Stability, Regulation, and Resolution, (iv) GD Operations, Markets,

Although the raw data contain information from 1959, computerized records for the early years are incomplete. In addition, in the late 1980s, the BdE performed a complete change of definition of the hierarchical levels from a system of categories to the current system of professional groups. This change makes it impossible to build comparable time series for the period before 1987. We also exclude branches and other entities because job changes in those entities are difficult to classify as promotions.

In practice, the dataset we managed to build contains anonymized comparable employee information at the monthly level, from 1987 to 2023. For this period, the panel dataset contains 889,065 monthly observations for 5,757 workers aged 20-70. Annual salaries are available since 2000, contractual hours of work since 2009, and selection processes since 2013. Given the information available, most of our multivariate analysis referred to the period from 2013 to 2023.[3] Descriptive statistics for each subperiod can be found in Table 1.

Over the period 1987-2023, women accounted for 43% of the observations. Figure 1 shows that their presence has increased markedly since 1987, although not always in a monotonic way. The share increased from 31% in 1987 to 53% in 2023. The most intense impulse occurred between 2008 and 2014, which coincides with a larger proportion of women among new entrants (see right hand side graph of Figure 2).[4] At that time the BdE was not implementing any specific policy that aimed to increase the presence of women, hence this entry might be associated to supply effects coinciding with the period of the Great Recession and subsequent recovery of the Spanish economy.[5]

Initially, the upwards evolution in the presence of women was slightly faster among managers than for the rest of the groups, but more recently it has slowed down (see Figure 3). In general, the increase in the share of women occurred in every professional group, although with important differences in the levels and the growth rates. The female share among managers increased from 10% in 1987 to 43% in 2023, for senior experts and specialists from 8% in 1987 to 47% in 2023, for technicians from 34% in 1987 to 56% in 2023, for administrative

and Payments Systems, (v) GD Services, (vi) GD Banking Supervision, and (vii) General Secretariat. See BdE (2024) for the description of functions and responsibilities of each area.

[3]The wage analysis in section 4 refers to the period 2009-2023. For the analysis on promotions in section 5 we consider the period 2013-2023.

[4]Descriptive statistics for the subsample of entrants during that episode can be found in Table A1.

[5]The first Equality Plan of the Banco de España was approved in October 2022. The Plan is publicly available (only available in Spanish) here. This plan strengthens the institution's commitment to gender equality and the diversity of the people and teams it is made up of. It contains a total of 23 measures that cover aspects such as such as communication, training, selection, work-life balance, and career progression. Likewise, it includes a protocol against sexual harassment. Given the time window covered by our sample, we can not assess its effectiveness yet.

staff from 54% in 1987 to 82% in 2023, and for support services from 8% in 1987 to 14% in 2023.

In short, the BdE currently employs a similar number of men as women. However, this converging story masks notable differences between professional groups. This heterogeneity points to the importance of deepening the study of gender differences in remuneration and movements between hierarchical levels. Another implication worth highlighting is that detailed analysis by professional strata can guide transparency policies or gender requirements at the institutional level to suit the specificities of each group.

# 4 The gender wage gap at the BdE

## 4.1 Average gender wage gap

The average wage gap between men and women is commonly used as a summary measure of gender differences in the labour market. Table 1 displays both the average log annual wages and log hourly wages for all employees, as well as for male and for female employees, in 2009-2023, and in 2013-2023.

The average annual wage for women is 18-19% lower than that for men, while the average hourly wage for women is 16-17% lower than that for men. These comparisons are known as raw wage gaps. Part of these differences, however, might be driven by differences in characteristics and other sources of heterogeneity among individuals. To account for those factors, we estimate a linear regression model for log wages (or for log hourly wages), $w_{it}$, of worker $i$ at time $t$:

$$w_{it} = \alpha^w + \beta^w Female_i + X'_{it}\gamma^w + \delta^w_t + \epsilon^w_{it} \tag{1}$$

where the $Female$ dummy is equal to 1 for women, the vector $X_{it}$ includes individual characteristics, such as age, age squared, country of birth, cohort of entry to the BdE, birth cohort, educational level, marital status, a dummy of having children and its interaction with the $Female$ dummy, years of experience since entry to the BdE, experience squared, and dummies for each professional group and area of activity, $\delta^w_t$ are time dummies, and $\epsilon^w_{it}$ is a random error term with unrestricted correlation at the individual level. Model (1) is estimated by OLS.[6] We include individual characteristics sequentially as some control variables, such as having children or the position in the hierarchy of the institution, may themselves be correlated with the error term inducing bias in our estimates.

[6] We do not include individual fixed effects in these regressions because we are interested in estimating the effect of *Female*, but we provide robust standard errors clustered at the individual level.

Regression results for annual wages are shown in Table 2. Once demographic characteristics such as age, age squared, birth country, birth cohort, entry cohort, education, and time dummies are included, the gender wage gap diminishes from 19.5% (column 1) to 14.5% (column 2). If we also account for experience, and business area, the gender wage gap drops to 12.5% (column 3), while adding indicators of being married and having dependent children only reduces it to 12.2% (column 4). When we introduce the interaction of having children with the *Female* dummy (column 5) we see that the gap is significantly bigger for women with dependent children (the *Female* x *Children* coefficient is -11.1% and significant), while it halves to -5.8% for women without dependent children. That is, the gap between mothers and women without children is 11.1%, between mothers and men without children is 16.8%, and between mothers and fathers is 27.4%. Finally, the inclusion of the professional group further reduced the difference between men and women to 3.4% (column 6). In column 7, the interaction term *Female* x *Children* remains significant and equal to -4.9% while the term *Female* is no longer significant, meaning that – when accounting for job position characteristics – there is no wage gap for women without dependent children relative to childless men.

Regression results for hourly wages are shown in Table 3. In this case, accounting for the same set of individual characteristics as in Table 2, closes the raw gender wage gap from 17.2% (column 1) to 1.65% (column 6).[7] In column 7, both the coefficient on *Female* and on the interaction *Female* x *Children* are no longer statistically significant. Thus the gender wage gap associated to having children seems to be fully accounted by differences in hours of work.

To summarize, in the case of BdE, having children and the professional group are key factors contributing to the gender wage gap. However, it is likely that both aspects are not independent of the employees' own careers. Next we provide additional evidence on the importance of motherhood, and in section 5 we focus on gender differences in promotions.

### 4.2 Gender wage gap over the career

Although the average wage gap between men and women is useful as a summary measure, calculating wage differentials by age provides us with additional information on gender differences in career progression. The upper part of Figure 4 shows how the wage profiles of men and women diverge with increasing age (being the gap lower for hourly wages than for

[7] The fact that the salary differences between men and women are almost completely closed is most likely due to the fact that the comparison refers to a single institution and its public nature.

annual wages). In the bottom right panel of the figure, we can see that up to the age of 32, the average number of working hours is the same for men and women. A wide gap in working hours then opens up that lasts at least 10 years, when it gradually begins to close.[8] On the other hand, the gender gap in wages did not narrow.[9]

Finally, figure A3 shows – for a balanced sample of employees that we observe for 10 consecutive years, and giving birth to their first child – how the profile for fathers and mothers change at the moment of the arrival of their first child. The upper graphs display the raw comparison, while in the bottom graphs we perform a child penalty event study. This exercise further corroborate that the gender wage gaps due to having children are in part due to the decrease in hours worked by mothers. The middle bottom graph, however, indicates that while mothers manage to recover their hourly wage two years after motherhood, the difference relative to fathers is close to 20 p.p.

# 5 Gender differences in career progression under a mixed system of promotions

Professional progression at the BdE consists of either ascending hierarchical levels (as illustrated in Figure A4), or – within the same professional group – improving wage levels by being granted a permanent salary increase without changing duties. These salary increases within a given position are called *vertical promotions*. Climbing levels in the hierarchy is possible through *direct appointments* or as a result of *competitive calls*. In the case of a competitive call, candidates go through a selection procedure for which they have to apply first.

The analysis in this section is two-fold. First, in subsection 5.1, we explore gender gaps in the probability of promotion among employees. Figure 5 and the bottom part of Table 1 shows that overall the average probability of promotion at the monthly level is 1.26%, being 1.28% for men and 1.24% for women. The raw gender gap in the promotion probability is negative although not significant. Taking into account gender differences in demographic characteristics, the conditional gender gap turns out negative, while it becomes not significant when we include job characteristics. This analysis, however, does not take into account that

[8] Figure A2 indicates that the gender gap in hours worked is due to workers who eventually become parents.

[9] Figure A1 compares the career paths of employees who entered to the BdE during the 2008-2014 period (coinciding with the Great Recession) to those who joined during other years around that date, which we refer to as normal times. We see that gender gaps in both annual and hourly wages are particularly pronounced for the cohort composed predominantly of women. Noticeably, however, the gender gap in working hours is significantly smaller for the cohort with relatively more women compared to the cohorts who entered in normal times.

men and women could be participating in different types of promotion processes.[10]

Given that we have additional information on who applies (and who could have applied or been selected) in each promotion process, in subsection 5.2, we move the unit of analysis from individuals to potential candidates. We define the pool of potential candidates as those employees working at the BdE when the selection process took place and at the same professional group and business area of the selected worker for appointments and vertical promotions, and that of most of the actual candidates for competitive calls.[11] For the pool of potential candidates, we estimate – within each promotion process observed in the sample – gender differences in the probability of promotion. For the case of the competitive calls, we also estimate gender gaps in the probability of applying.

### 5.1 Gender differences in the probability of promotion among employees

To account for composition differences between men and women, we estimate a linear regression model for the probability of promotion $p_{it}$ of worker $i$ at time $t$:

$$p_{it} = \alpha^p + \beta^p Female_i + Z'_{it}\gamma^p + \delta^p_t + \epsilon^p_{it} \tag{2}$$

where the $Female$ dummy is equal to 1 for women, the vector $Z_{it}$ includes a set of individual characteristics such as age, age squared, country of birth, cohort of entry to the BdE, birth cohort, educational level, marital status, a dummy of having children, years of experience since entry, experience squared, and business area dummies. In model (2), differently to model (1), it is not possible to include a dummy for each professional group because some of the movements we are considering involve changes among those categories. Instead, we include an indicator for administrative and support services staff, as employees on those levels do not switch to higher professional groups. As previously, $\delta^p_t$ are time dummies, $\epsilon^p_{it}$ is a random error term with unrestricted correlation at the individual level, and $\beta^P$ is our coefficient of interest. Model (2) is estimated by OLS.

Table 4 shows estimates for the probability of promotion for the whole sample of employees over the time period 2013-2023. The raw gender gap of 0.04 percentage points, shown in column 1, is negative but not significant. Once we consider men and women with similar demographic characteristics, we find that the probability of promotion is significantly lower for women (column 2). The gap of 0.09 p.p. (or 7% relative to the mean promotion rate) remains

[10] If we distinguish by promotion type, the bottom part of Table 1 shows that, unconditionally, women have a significantly lower probability of promotion than men only in direct appointments (0.06% versus 0.09%).

[11] We exclude external applications because we miss information on key individual traits for these candidates.

negative once we account for family composition (column 3), while it becomes not significant when we include job characteristics (column 4). Finally, column 5 show that the probability of promotion is significantly lower for mothers even accounting for job characteristics.[12]

As men and women could be taking part in different promotion processes, next we take a step forward and move the unit of analysis from employees over time to potential candidates within promotion processes. In this way, we can compare the difference between men and women in the probability of promotion within each promotion process.

### 5.2 Gender differences in the probability of promotion within promotion processes

In the sample, we observe a total of 3,021 promotions for all types of workers (see Table 5, panel A). Of them, 81.1% are vertical promotions, 6.4% are direct appointments for positions of responsibility, and 12.5% were decided as the result of competitive calls.

For promotions outside managerial positions, 91.7% are vertical promotions and 8.3% competitive calls.[13] For promotions from non-managerial levels to unit head positions (the lowest level of the managerial hierarchy), 42.6% are direct appointments and 57.4% the result of competitive calls. For promotions within managerial positions (640), 75.9% are vertical promotions (486), 14.5% are direct appointments (93), and 9.5% are the result of competitive calls (61 processes).

For each of these promotion processes, we define a corresponding set of potential candidates. In the case of direct appointments and vertical promotions, potential candidates are those employees working at the BdE at the time of the selection process and in the same professional group and business area as the selected worker. In the case of competitive calls, potential candidates are those employees working at the BdE at the time of the selection process, and in the same professional group and business area as the majority of the actual candidates for the selection process.[14]

Taking all promotion processes together, the unconditional probability of promotion across potential candidates is, on average, 0.79%, being 0.72% for men and 0.88% for women. This positive gap in favour of women is due to the processes outside managerial positions, for which the probability of promotion is 0.61% for men and 0.81% for women, while for managerial positions the unconditional probability of promotion is 1.4% both for men and women.

[12] This result is robust to the estimation of non linear models such as logit or probit.

[13] It is important to emphasize that direct appointments are only possible for promotions to or within managerial positions.

[14] Sample sizes are shown in Table 5, panel B.

Once again, to account for composition differences by gender, we consider a linear model for the probability of promotion of a given worker $i$ in a selection process $s$:

$$p_{is} = \alpha^s + \beta^s Female_i + W'_{is}\gamma^s + \delta^s_s + \epsilon^s_{is} \tag{3}$$

where $Female_i$ is equal to one for women, $W_{is}$ is a vector of individual characteristics (such as age, age squared, country of birth, cohort of entry to the BdE, birth cohort, educational level, marital status, a dummy of having children, years of experience since entry to the BdE, experience squared, and dummies for each area of activity), $\delta^s_s$ are selection process fixed effects, and $\epsilon^s_{is}$ is a random error term with unrestricted correlation at the individual level. We estimate model (3) among *potential candidates* and $\beta^s$ is our coefficient of interest.

We also estimate an alternative specification considering the different types of promotions. That is, for a given worker $i$ in a selection process $s$:

$$\begin{aligned} p_{is} = \alpha^s + \beta^s_c Female_i + \gamma^s_d Appointment_i + \beta^s_d Appointment_i \times Female_i \\ + \gamma^s_v Vertical_i + \beta^s_v Vertical_i \times Female_i + \beta^s_c Female_i W'_{is}\gamma^s + \delta^s_s + \epsilon^s_{is} \end{aligned} \tag{4}$$

where relative to model (3), we also add the indicators of direct appointment ($Appointment_i$) and vertical promotion ($Vertical_i$), together with their interactions with the dummy $Female$. We estimate model (4) among *potential candidates* and, now, the coefficients of interest are $\beta^s_c$ for competitive calls, $\beta^s_d$ for direct appointments, and $\beta^s_v$ for vertical promotions.

**Competitive calls** In the case of competitive calls, the promotion process has two stages: first, the application stage, and second, the selection contest among applicants.

Formally, for a given employee $i$ and selection process $s$, the probability of promotion is the product of the probability of applying for promotion following a competitive call $\times$ the probability of winning the call conditional on having applied, that is, $\Pr(a) \times \Pr(p|a = 1)$. Even if there is no gender gap in the promotion probability, there could still be gender gaps in the underlying probabilities $\Pr(a)$ and $\Pr(p|a = 1)$. Hence, we proceed sequentially. First, we estimate the gender gap in the probability of promotion; and, second, we estimate the probability of applying for a promotion, thus also exploring a potential gender application gap.

In practice, in addition to the estimation of model (3), we consider another linear model for the probability that the potential candidate $i$ applies for a promotion in the selection

process $s$:

$$a_{is} = \alpha^a + \beta^a Female_i + Y'_{is}\gamma^a + \delta^a_s + \epsilon^a_{is} \tag{5}$$

where, as before, $Female_i$ is equal to one for women, the vector $Y_{is}$ of individual characteristics includes age, age squared, country of birth, cohort of entry to the BdE, birth cohort, educational level, marital status, a dummy of having children, years of experience since entry to the BdE, experience squared, and dummies for each area of activity, $\delta^a_s$ are promotion process fixed effects, and $\epsilon^a_{is}$ is a random error term with unrestricted correlation at the individual level. Model (5) is estimated among the set of potential candidates and $\beta^a$ is our coefficient of interest.[15]

**Estimation results** Table 6 reports OLS estimates of the probability of promotion among potential candidates. Standard errors are clustered at the individual level. Panel A shows estimates pooling all promotions. Panel B reports estimates by professional group, and panel C further differentiates by type of promotion: competitive call, direct appointment, and vertical promotion.

Starting with panel A, column 1 shows the raw gender gap which is positive for females relative to males. Controlling for age, country of birth, birth cohort, entry cohort, educational level, and year, the magnitude of the gap decreases minimally (column 2). If we also account for marital status, children, experience, experience squared, and business area, the higher probability of selection for women gets reduced substantially (column 3). Finally, if we compare male and female potential candidates within the same process, the gender gap in

[15] Alternatively, we could model the probability of winning a competitive call accounting for the fact that only people who applied for a vacancy have a positive probability of winning the selection process. The latent probability of winning a call, $p^*$, would be:

$$p^*_{is} = \alpha^{s^*} + \beta^{s^*} Female_i + W'_{is}\gamma^{s^*} + \delta^{s^*}_s + \epsilon^{s^*}_{is} \tag{6}$$

that is only observed ($p_{is} = p^*_{is}$) if the probability of applying is strictly positive:

$$a_{is} = \alpha^a + \beta^a Female_i + Y'_{is}\gamma^a + \delta^a_s + \epsilon^a_{is} > 0 \tag{7}$$

where $Female_i$ is equal to one for women, $W_{is}$ is the same vector of individual characteristics as in model (3), $\delta^w_s$ are selection process fixed effects, and variables and parameters definitions in equation (7) are as in model (5). Model assumptions for the error terms in equations (6) and (7) are that:

$$\epsilon^{s^*}_{is} \sim N(0, \sigma) \tag{8}$$

$$\epsilon^a_{is} \sim N(0, 1) \tag{9}$$

$$corr(\epsilon^{s^*}_{is}, \epsilon^a_{is}) = \rho \tag{10}$$

In this setup, equation (6) is known as the outcome equation and equation (7) as the selection equation. Identification would require some exclusion restriction, namely some variable that drives the selection into the applicants' pool which is not a determinant of the probability of winning the promotion (the outcome equation), not readily available in our dataset.

the probability of promotion is not statistically significant (column 4), in line with what we get in Table 4.

Panel B shows that most of the unconditional positive gap we observe in favour of women comes from promotions within non-managerial positions (panel B.2), whereas for promotions to/within managerial positions, the probabilities are almost equal for men and women (panel B.1). If we compare male and female potential candidates within the same process (column 4), even for promotions within non-managerial positions, the gender gap in the probability of promotion is not statistically significant.

In panel C we consider the different types of promotions. We document that the unconditional positive gap within non-managerial positions occurs in competitive calls (panel C.2), but accounting for all the characteristics of the employee and the process, the conditional gender gap is no longer significant.

Table 7 focuses on promotions for managerial positions. For promotions to/within department directors and division heads, the findings show that women are less likely to be promoted than men, although this is imprecise in the pooled results (panel A.1). However, it is worth noting that when we distinguish by type of promotion (panel B.1), the probability of promotion to/within department directors and division heads is consistently lower for women than for men in competitive calls, and statistically significant even in the most complete specification (column 4). In contrast, for unit heads, the gender difference in the probability of promotion is not significant either in the pooled data (panel A.2) or for each type of process (panel B.2).

In an attempt to contextualize our results and draw parallels with the existing literature, Table 8 considers, as in Hospido et al. (2022), the business areas where most economists work.[16]

Starting with promotions to/within department directors and division heads in these business areas, results reveal the same pattern that for the whole institution, there is a lower probability of promotion for women relative to men (panel A.1), coming from a significantly negative gender gap in the probability of being selected in competitive calls (panel B.1). These results, however, are not directly comparable with those obtained for the ECB, which does not analyse promotions to/within department directors and division heads. The most comparable promotion at the BdE to that considered in the ECB study (namely ECB promotions through competitive processes to Band H, a position with some responsibility and involving

[16] Descriptive statistics for this subsample can be found in Table A2.

the management of a small team) is the movement from a non-managerial level to a position as unit head through a competitive call (panel B.2). For that type of promotion, and in line with the result for the full sample, we find no significant gender gap in promotion, which was also the finding for the ECB in Hospido et al. (2022). Similarly, for promotions to unit head through a direct appointment, the probability is not significantly different between men and women. Remarkable for this subsample, we uncover a higher chance of getting vertical promotions for women relative to men within positions of unit heads. These vertical promotions, however, do not yield any change in duties. In this way, the performance of female unit heads seems to be rewarded more often than that of male unit heads, but without this recognition implying an advancement in the hierarchy.

Finally, Table 9 reports OLS estimates of the probability of applying to competitive calls. Standard errors are clustered at the individual level. In panel A, controlling for the same sets of observable characteristics as before, the gender gap in applications in favor of women gets reduced from 1.6 p.p. (column 1) to 1.2 (column 2) or 1.0 (column 3), but it remains significant. If we, in addition, compare male and female potential candidates for the same process (column 4), the difference is no longer significant.

Panel B.1 shows the results for promotions to/within managerial positions. In this case, women are less likely to apply than men, even in the most complete specification (column 4).

Panels C.1 and C.2 show the same qualitative pattern both for promotions to head of department and head of division positions and for promotions to head of unit positions. Thus, the absence of a gender gap in promotions in the case of unit heads masks a negative gap in applications, while in the case of department directors and division heads it is associated with a lower probability of applying.

In contrast, panels D.1 and D.2 report the results for promotions to/within managerial positions in the areas where most economists work, showing no significant gender gaps for this subsample in the probability of applying. Thus, the lower probability of selection for women relative to men in competitive calls for division heads or department directors in this subsample is not coupled with a lower probability of applying as it was the case for all the business areas together. Similarly, in the case of promotions to unit head positions, the above-discussed absence of a promotion gap for this subsample, is also not associated with a lower probability of applying. This contrasts with the ECB's findings in Hospido et al. (2022), where the absence of a gender gap in promotions masks a negative gap in applications

(compensated by a higher probability of being selected conditional on having applied). This discrepancy between the ECB and BdE results in the application gap could be indicative of a higher opportunity cost for applicants at the ECB, where promotion processes were often open to external candidates in the period analysed in Hospido et al. (2022), namely 2012-2018, and included both technical and behavioural interviews as well as written exercises.

# 6 Conclusions

The under representation of women in senior and managerial positions is an ongoing cause of concern in most International Financial Institutions (Comunale et al., 2023). This under representation is perhaps nowhere as visible as in central banks (OMFIF, 2024).

In this paper, we examine gender differences in career progression using anonymized personnel records from the BdE, an institution with a mixed system of promotions that combines competitive calls with vertical promotions and direct appointments.

We first document that the presence of women at the BdE has increased markedly since the late 1990s, although not always in a monotonic manner. The strongest impulse corresponds with periods when females dominate the pool of new entrants.

Second, by comparing wages of men and women of similar characteristics, we show that a substantial part of the gender gap in hourly wages is explained by individual characteristics, such as age or experience, but also due to gender differences in hours of work - mostly due to reduction in hours after the arrival of children - and the placement in the institution's hierarchy.

When it comes to promotions, if we compare potential candidates for the same process, we find no significant gender gaps in the probability of promotion. This lack of gender differences remains within non-managerial positions. Among managers, on the contrary, our results reveal significant gender gaps depending on the type of promotion process. In promotions for department director and division head positions, we find a significantly lower probability of promotion for women relative to men through competitive calls. We also document a lower probability of applying for women relative to men for those managerial positions. When we focus on the business areas where most of the staff are economists, again we find a lower probability of promotion for women relative to men in competitive calls in the promotions for department director and division head positions. However, for this group of business areas, the gender differences in the probability of application are not significant. Instead, we

document a higher probability for women relative to men of getting vertical promotions in unit head positions, which are immediately below in the hierarchy.

## Acknowledgements

We thank Andrés Atienza, Marc Castellano, Alicia de Quinto, Sara Izquierdo and Camila Pineda for excellent research assistance. Special thanks go to the former Governor of the Banco de España, Pablo Hernández de Cos, and to the Departments of Human Resources and Information Systems for granting us access to the anonymized data. We are also grateful to three anonymous referees who refereed this paper, the editor, and to Manuel Arellano, Manuel Bagues, Nagore Iriberri, Andrea Weber, and seminar participants at the Banco de España, Bank of Lithuania, COSME Workshop on Gender Economics, EALE Annual Meetings, Gender Gaps Conference, Pathways to Gender Equality in Central Banks workshop, Simposio de la Asociación Española de Economía, and SOLE Annual Meetings for useful comments. The views expressed are those of the authors and do not necessarily reflect those of the Banco de España, the European Central Bank or the Eurosystem.

## Data and codes availability

The datasets generated and/or analysed in the current study are not publicly available due to privacy reasons. It will be possible to apply for access to a shareable version of the data of the study at the BELab of Banco de España. Codes will be made available.

## Competing interests

The authors have no competing interests to declare that are relevant to the content of this article.

## Funding

No funding was received for conducting this study.

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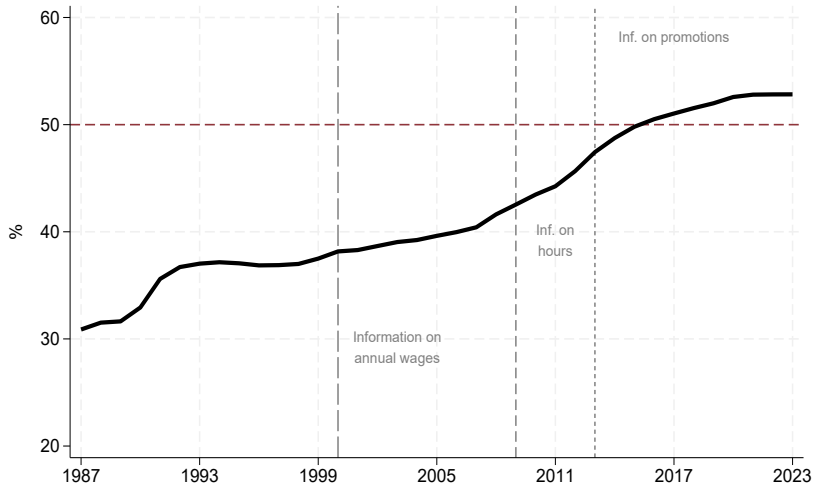
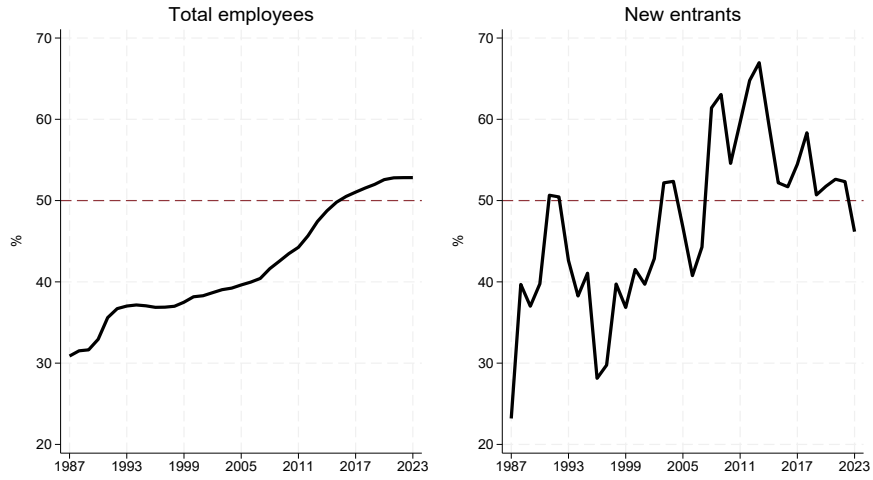
# Figures and Tables

Figure 1: Share of women and data availability



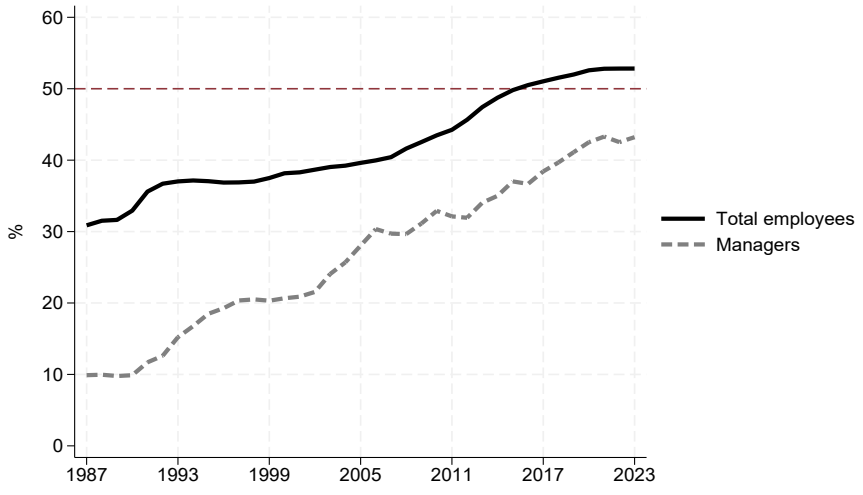

*Notes: Employees aged 20-70, excluding branches and other entities. Time period: 1987-2023.*

Figure 2: Share of women among total employees, and among new entrants



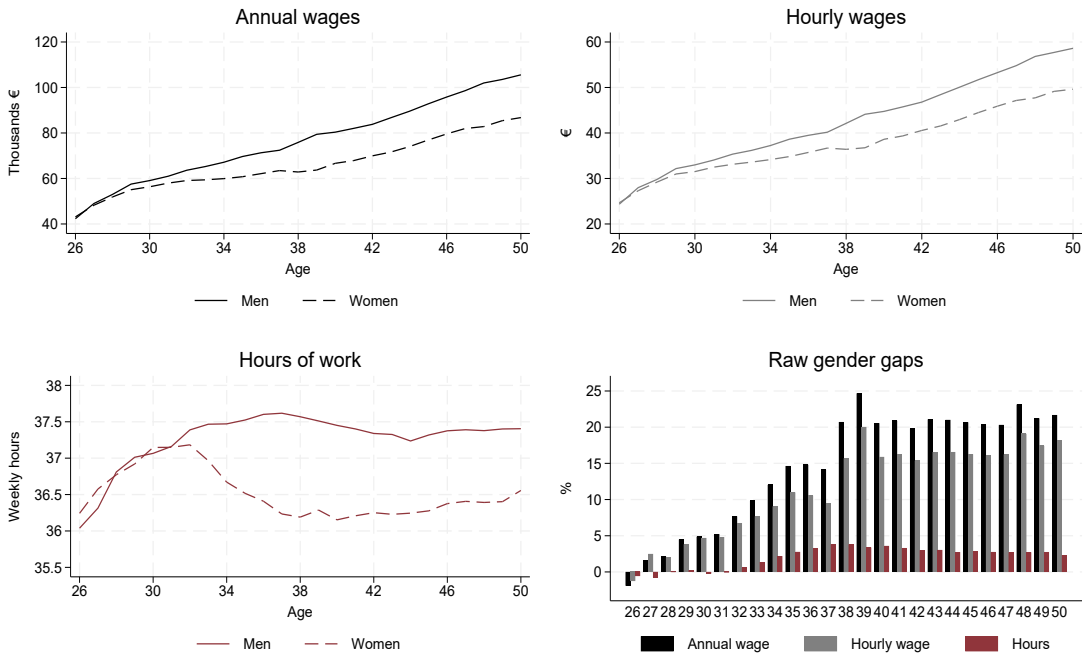

*Notes: Employees aged 20-70, excluding branches and other entities. Time period: 1987-2023.*

Figure 3: Share of women among total employees, and among managers



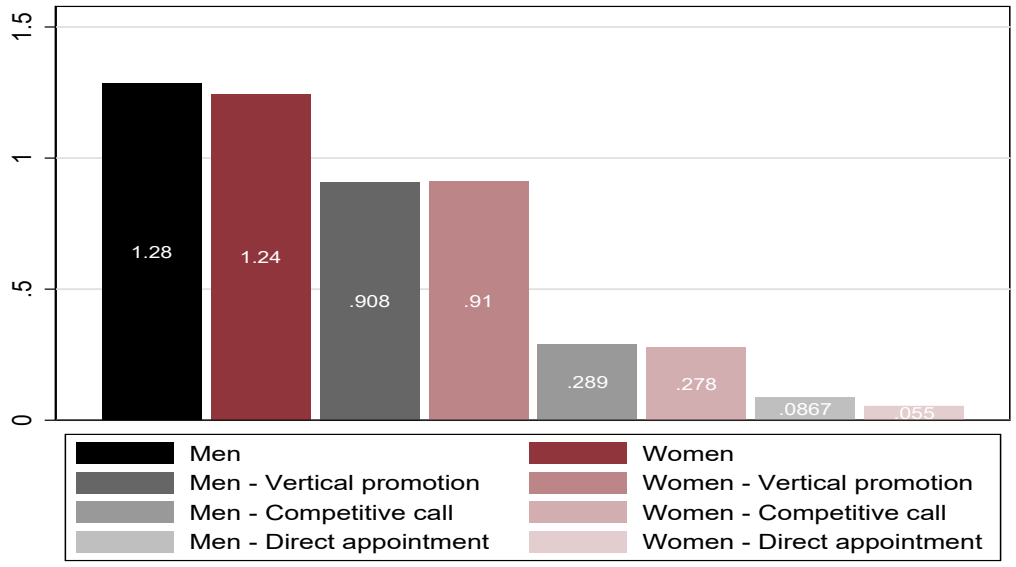

*Notes: Employees aged 20-70, excluding branches and other entities. Time period: 1987-2023.*

Figure 4: Gender differentials by age




*Notes: Employees aged 20-70, excluding branches and other entities. Time period: 2009-2023.*

Figure 5: Probability of promotion among employees




*Notes: Employees aged 20-70, excluding branches and other entities. Time period: 2013-2023.*

Table 1: Descriptive statistics (sample of employees)

| | | Total | Men | Women | p-value |
|---|---|---|---|---|---|
| Time period: 1987-2023 | | | | | |
| Observations (year-month) | n, % | 889,065 | 57.28 | 42.72 | |
| Workers | n, % | 5,757 | 54.46 | 45.54 | |
| Entry age (years) | mean | 30.64 | 30.23 | 31.13 | 0.00 |
| Age (years) | mean | 44.11 | 44.93 | 43.02 | 0.00 |
| Experience (years) | mean | 15.96 | 16.89 | 14.73 | 0.00 |
| Married | mean | 0.68 | 0.73 | 0.61 | 0.00 |
| Children | mean | 0.63 | 0.67 | 0.58 | 0.00 |
| Time period: 2009-2023 | | | | | |
| Observations (year-month) | n, % | 399,389 | 50.34 | 49.66 | |
| Workers | n, % | 4,466 | 50.34 | 49.66 | |
| Entry age (years) | mean | 31.38 | 30.81 | 31.95 | 0.00 |
| Age (years) | mean | 44.52 | 45.54 | 43.51 | 0.00 |
| Experience (years) | mean | 14.24 | 15.64 | 12.83 | 0.00 |
| Married | mean | 0.65 | 0.68 | 0.62 | 0.00 |
| Children | mean | 0.59 | 0.61 | 0.58 | 0.00 |
| Log annual wages | mean | 11.18 | 11.28 | 11.09 | 0.00 |
| Log hourly wages | mean | 3.71 | 3.79 | 3.62 | 0.00 |
| Hours of work | mean | 36.94 | 37.30 | 36.75 | 0.00 |
| Managers | mean | 11.63 | 14.34 | 8.89 | 0.00 |
| - Department director (DD) | mean | 1.15 | 1.70 | 0.58 | 0.00 |
| - Division head (DH) | mean | 4.17 | 5.52 | 2.79 | 0.00 |
| - Unit head (UH) | mean | 6.32 | 7.11 | 5.51 | 0.00 |
| Senior Experts | mean | 37.82 | 43.43 | 32.14 | 0.00 |
| Experts | mean | 27.71 | 25.00 | 30.46 | 0.00 |
| Administrative | mean | 17.63 | 8.82 | 26.55 | 0.00 |
| Support services | mean | 5.01 | 8.17 | 1.81 | 0.00 |
| Time period: 2013-2023 | | | | | |
| Observations (year-month) | n, % | 309,631 | 48.69 | 51.31 | |
| Workers | n, % | 3,987 | 49.49 | 50.51 | |
| Entry age (years) | mean | 32.02 | 31.56 | 32.47 | 0.00 |
| Age (years) | mean | 44.38 | 45.37 | 43.45 | 0.00 |
| Experience (years) | mean | 14.68 | 14.63 | 12.13 | 0.00 |
| Married | mean | 0.64 | 0.67 | 0.62 | 0.00 |
| Children | mean | 0.58 | 0.59 | 0.57 | 0.00 |
| Log annual wages | mean | 11.16 | 11.25 | 11.06 | 0.00 |
| Log hourly wages | mean | 3.68 | 3.76 | 3.60 | 0.00 |
| Hours of work | mean | 37.10 | 37.48 | 36.76 | 0.00 |
| Managers | mean | 11.57 | 14.32 | 8.95 | 0.00 |
| - Department director (DD) | mean | 1.21 | 1.85 | 0.60 | 0.00 |
| - Division head (DH) | mean | 4.08 | 5.32 | 2.90 | 0.00 |
| - Unit head (UH) | mean | 6.28 | 7.15 | 5.45 | 0.00 |
| Senior Experts | mean | 38.89 | 44.43 | 33.64 | 0.00 |
| Experts | mean | 28.88 | 26.55 | 31.08 | 0.00 |
| Administrative | mean | 16.13 | 7.05 | 24.75 | 0.00 |
| Support services | mean | 4.38 | 7.46 | 1.47 | 0.00 |
| General Secretariat | mean | 7.76 | 5.33 | 10.07 | 0.00 |
| Services | mean | 28.50 | 30.80 | 26.32 | 0.00 |
| Banking supervision | mean | 20.02 | 22.44 | 17.73 | 0.00 |
| Financial stability | mean | 7.80 | 6.93 | 8.63 | 0.00 |
| Financial conduct | mean | 7.61 | 6.81 | 8.37 | 0.00 |
| Operations | mean | 12.75 | 12.41 | 13.08 | 0.00 |
| Economics | mean | 15.04 | 14.70 | 15.37 | 0.00 |
| Probability of promotion | mean, % | 1.26 | 1.28 | 1.24 | 0.31 |
| - Vertical promotion | mean, % | 0.91 | 0.91 | 0.91 | 0.97 |
| - Direct appointment | mean, % | 0.07 | 0.09 | 0.06 | 0.00 |
| - Competitive call | mean, % | 0.28 | 0.29 | 0.28 | 0.57 |

*Notes: p-value for the difference between the mean for Men and the mean for Women.*

Table 2: Linear regression of log annual wages

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Female | -0.1947** | -0.1451** | -0.1247** | -0.1223** | -0.0576** | -0.0341** | -0.0057 |
| | (0.0164) | (0.0137) | (0.0131) | (0.0130) | (0.0173) | (0.0088) | (0.0124) |
| Experience (years) | | | 0.0564** | 0.0549** | 0.0552** | 0.0402** | 0.0404** |
| | | | (0.0027) | (0.0027) | (0.0027) | (0.0016) | (0.0016) |
| Squared experience | | | -0.0009** | -0.0009** | -0.0009** | -0.0006** | -0.0006** |
| | | | (0.0001) | (0.0001) | (0.0001) | (0.0000) | (0.0000) |
| Services | | | -0.0146 | -0.0167 | -0.0192 | 0.0038 | 0.0027 |
| | | | (0.0248) | (0.0244) | (0.0244) | (0.0127) | (0.0127) |
| Banking supervision | | | 0.1910** | 0.1882** | 0.1839** | 0.0417** | 0.0400** |
| | | | (0.0256) | (0.0253) | (0.0253) | (0.0146) | (0.0145) |
| Financial stability | | | 0.0762* | 0.0782** | 0.0773** | -0.0023 | -0.0027 |
| | | | (0.0297) | (0.0293) | (0.0292) | (0.0166) | (0.0166) |
| Financial conduct | | | -0.0886** | -0.0900** | -0.0922** | -0.0415** | -0.0428** |
| | | | (0.0296) | (0.0290) | (0.0288) | (0.0156) | (0.0156) |
| Operations | | | -0.0443 | -0.0380 | -0.0398 | -0.0208 | -0.0220 |
| | | | (0.0294) | (0.0292) | (0.0292) | (0.0202) | (0.0202) |
| Economics | | | -0.0165 | -0.0152 | -0.0178 | -0.0346 | -0.0360* |
| | | | (0.0294) | (0.0291) | (0.0290) | (0.0179) | (0.0179) |
| Married | | | | 0.0791** | 0.0766** | 0.0270* | 0.0260* |
| | | | | (0.0158) | (0.0157) | (0.0114) | (0.0113) |
| Children | | | | 0.0487** | 0.1063** | 0.0213 | 0.0472** |
| | | | | (0.0177) | (0.0205) | (0.0125) | (0.0139) |
| Female x Children | | | | | -0.1107** | | -0.0494** |
| | | | | | (0.0239) | | (0.0159) |
| Senior Experts | | | | | | -0.2269** | -0.2252** |
| | | | | | | (0.0122) | (0.0122) |
| Experts | | | | | | -0.6011** | -0.5979** |
| | | | | | | (0.0144) | (0.0145) |
| Administrative | | | | | | -0.8439** | -0.8404** |
| | | | | | | (0.0116) | (0.0117) |
| Support services | | | | | | -0.9756** | -0.9758** |
| | | | | | | (0.0149) | (0.0148) |
| Observations | 390436 | 390436 | 390436 | 390436 | 390436 | 390436 | 390436 |
| $R^2$ | 0.026 | 0.263 | 0.326 | 0.332 | 0.334 | 0.531 | 0.532 |

*Notes: Sample: employees aged 20-70, excluding branches and other entities. Time period: 2009-2023. Linear regression. Robust standard errors in parentheses, clustered by individual.* $*\ p < 0.1$, $**\ p < 0.05$, $***\ p < 0.01$. *Age, age squared, birth country, birth cohort, entry cohort, education, and time dummies included except in column 1.*

Table 3: Linear regression of log hourly wages

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Female | -0.1724** | -0.1207** | -0.1007** | -0.0985** | -0.0600** | -0.0165 | -0.0105 |
| | (0.0161) | (0.0132) | (0.0126) | (0.0125) | (0.0168) | (0.0086) | (0.0121) |
| Experience (years) | | | 0.0587** | 0.0570** | 0.0571** | 0.0432** | 0.0432** |
| | | | (0.0027) | (0.0026) | (0.0026) | (0.0016) | (0.0016) |
| Squared experience | | | -0.0009** | -0.0009** | -0.0009** | -0.0006** | -0.0006** |
| | | | (0.0001) | (0.0001) | (0.0001) | (0.0000) | (0.0000) |
| Services | | | -0.0074 | -0.0105 | -0.0120 | 0.0071 | 0.0069 |
| | | | (0.0239) | (0.0236) | (0.0235) | (0.0120) | (0.0120) |
| Banking supervision | | | 0.1887** | 0.1848** | 0.1823** | 0.0484** | 0.0481** |
| | | | (0.0249) | (0.0245) | (0.0245) | (0.0140) | (0.0140) |
| Financial stability | | | 0.0885** | 0.0901** | 0.0896** | 0.0118 | 0.0118 |
| | | | (0.0285) | (0.0281) | (0.0281) | (0.0163) | (0.0163) |
| Financial conduct | | | -0.0745** | -0.0763** | -0.0776** | -0.0333* | -0.0335* |
| | | | (0.0283) | (0.0276) | (0.0276) | (0.0151) | (0.0151) |
| Operations | | | -0.0138 | -0.0073 | -0.0084 | 0.0012 | 0.0009 |
| | | | (0.0286) | (0.0282) | (0.0282) | (0.0199) | (0.0198) |
| Economics | | | 0.0082 | 0.0093 | 0.0078 | -0.0132 | -0.0134 |
| | | | (0.0285) | (0.0282) | (0.0281) | (0.0176) | (0.0176) |
| Married | | | | 0.0773** | 0.0758** | 0.0291* | 0.0288* |
| | | | | (0.0154) | (0.0154) | (0.0113) | (0.0112) |
| Children | | | | 0.0701** | 0.1043** | 0.0454** | 0.0509** |
| | | | | (0.0172) | (0.0198) | (0.0124) | (0.0138) |
| Female x Children | | | | | -0.0658** | | -0.0106 |
| | | | | | (0.0229) | | (0.0157) |
| Senior Experts | | | | | | -0.2090** | -0.2087** |
| | | | | | | (0.0121) | (0.0122) |
| Experts | | | | | | -0.5359** | -0.5352** |
| | | | | | | (0.0143) | (0.0144) |
| Administrative | | | | | | -0.7952** | -0.7944** |
| | | | | | | (0.0113) | (0.0114) |
| Support services | | | | | | -0.9398** | -0.9399** |
| | | | | | | (0.0135) | (0.0135) |
| Observations | 390510 | 390510 | 390510 | 390510 | 390510 | 390510 | 390510 |
| $R^2$ | 0.021 | 0.270 | 0.334 | 0.342 | 0.343 | 0.523 | 0.523 |

*Notes: Sample: employees aged 20-70, excluding branches and other entities. Time period: 2009-2023. Linear regression. Robust standard errors in parentheses, clustered by individual.* $*\ p < 0.1$, $**\ p < 0.05$, $***\ p < 0.01$. *Age, age squared, birth country, birth cohort, entry cohort, education, and time dummies included except in column 1.*

Table 4: Linear regression of the monthly probability of promotion among employees

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Female | -0.0388 | -0.0894* | -0.0837* | -0.0181 | 0.0642 |
| | (0.0397) | (0.0384) | (0.0382) | (0.0380) | (0.0527) |
| Married | | | 0.2058** | 0.1717** | 0.1673** |
| | | | (0.0466) | (0.0462) | (0.0464) |
| Children | | | 0.0039 | -0.0176 | 0.0598 |
| | | | (0.0497) | (0.0492) | (0.0645) |
| Experience (years) | | | | 0.0896** | 0.0900** |
| | | | | (0.0076) | (0.0076) |
| Squared experience | | | | -0.0019** | -0.0019** |
| | | | | (0.0002) | (0.0002) |
| Administrative | | | | -0.5982** | -0.5965** |
| | | | | (0.0443) | (0.0442) |
| Female x Children | | | | | -0.1443* |
| | | | | | (0.0730) |
| Observations | 309631 | 309631 | 309631 | 308040 | 308040 |
| $R^2$ | 0.000 | 0.001 | 0.001 | 0.002 | 0.002 |

*Notes: Sample: employees aged 20-70, excluding branches and other entities. Time period: 2013-2023. Linear regression. Robust standard errors in parentheses, clustered by individual. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Age, birth country, birth cohort, entry cohort, education, business areas, and time dummies are included except in (1). Mean monthly promotion rate for men is 1.28%.*

Table 5: Descriptive statistics (sample of promotion processes and of potential candidates)

| | Total | Competitive calls | Direct appointments | Vertical promotions |
|---|---|---|---|---|
| A) Promotion processes (number) | | | | |
| All promotion processes | 3,021 | 376 | 194 | 2,451 |
| For managerial positions | 877 | 197 | 194 | 486 |
| For department directors and division heads | 371 | 61 | 93 | 217 |
| For unit heads | 506 | 136 | 101 | 269 |
| For non-managerial positions | 2,144 | 179 | - | 1,965 |
| B) Potential candidates (monthly observations) | | | | |
| All promotion processes | 483,421 | 101,350 | 10,448 | 371,623 |
| For managerial positions | 64,999 | 31,650 | 10,448 | 22,901 |
| For department directors and division heads | 23,103 | 8,808 | 4,742 | 9,553 |
| For unit heads | 41,896 | 22,842 | 5,706 | 13,348 |
| For non-managerial positions | 418,422 | 69,700 | - | 348,722 |

*Notes: Time period: 2013-2023.*

Table 6: Linear regression of the probability of promotion among potential candidates

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| A) Pooled results | | | | |
| Female | 0.1654** | 0.1599** | 0.0543* | 0.0091 |
| | (0.0321) | (0.0319) | (0.0265) | (0.0226) |
| Observations | 482265 | 482265 | 482265 | 482265 |
| $R^2$ | 0.000 | 0.001 | 0.004 | 0.018 |
| B) Results by professional group: | | | | |
| B.1) Promotions to/within managerial positions | | | | |
| Female | 0.0259 | -0.0280 | -0.0828 | -0.0122 |
| | (0.1052) | (0.1020) | (0.0924) | (0.0866) |
| Observations | 64579 | 64579 | 64579 | 64579 |
| $R^2$ | 0.000 | 0.003 | 0.006 | 0.011 |
| B.2) Promotions within non-managerial positions | | | | |
| Female | 0.2045** | 0.2003** | 0.0957** | 0.0131 |
| | (0.0289) | (0.0286) | (0.0237) | (0.0212) |
| Observations | 417686 | 417686 | 417686 | 417686 |
| $R^2$ | 0.000 | 0.001 | 0.004 | 0.019 |
| C) Results by professional group and promotion type: | | | | |
| C.1) Promotions to/within managerial positions | | | | |
| Female | -0.0711 | -0.0996 | -0.1882* | -0.1292 |
| | (0.0906) | (0.0890) | (0.0884) | (0.0863) |
| Direct appointment | 1.2176** | 1.2027** | 1.1577** | 1.6344 |
| | (0.1890) | (0.1932) | (0.1933) | (4.0681) |
| Female x Direct appointment | -0.0051 | -0.0529 | -0.0218 | -0.0217 |
| | (0.2983) | (0.2986) | (0.2945) | (0.3077) |
| Vertical promotion | 1.2890** | 1.3387** | 1.2505** | 1.6567 |
| | (0.1264) | (0.1355) | (0.1287) | (6.2750) |
| Female x Vertical promotion | 0.4663* | 0.3988 | 0.4297* | 0.3527 |
| | (0.2075) | (0.2063) | (0.1944) | (0.1931) |
| Observations | 64579 | 64579 | 64579 | 64579 |
| $R^2$ | 0.004 | 0.006 | 0.009 | 0.011 |
| C.2) Promotions within non-managerial positions | | | | |
| Female | 0.5285** | 0.5198** | 0.4217** | 0.0719 |
| | (0.0968) | (0.0949) | (0.0923) | (0.0857) |
| Vertical promotion | -0.6061** | -0.5090** | -0.2970** | 3.7279 |
| | (0.0641) | (0.0640) | (0.0638) | (8.3113) |
| Female x Vertical promotion | -0.4406** | -0.4350** | -0.4161** | -0.0708 |
| | (0.1005) | (0.0992) | (0.0974) | (0.0908) |
| Observations | 417686 | 417686 | 417686 | 417686 |
| $R^2$ | 0.002 | 0.002 | 0.005 | 0.019 |

*Notes: Sample: potential candidates. Time period: 2013-2023. Linear regression, sample 2013-2023. Robust standard errors in parentheses, clustered by individual. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Age, birth country, birth cohort, entry cohort, education, and time dummies are included except in (1). (3) as (2) plus family situation, experience, experience squared, and business areas. (4) as (3) plus selection process fixed effects.*

Table 7: Linear regression of the probability of promotion among potential candidates for managerial positions

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| A) Results by professional group: | | | | |
| A.1) Promotions to/within managerial positions as department director or division head | | | | |
| Female | -0.0626 | -0.1121 | -0.2100 | -0.1851 |
| | (0.2151) | (0.2129) | (0.2016) | (0.2014) |
| Observations | 22896 | 22896 | 22896 | 22896 |
| $R^2$ | 0.000 | 0.005 | 0.008 | 0.012 |
| A.2) Promotions to/within managerial positions as unit head | | | | |
| Female | 0.0956 | 0.0452 | 0.0074 | 0.0967 |
| | (0.1262) | (0.1215) | (0.1177) | (0.1144) |
| Observations | 41683 | 41683 | 41683 | 41683 |
| $R^2$ | 0.000 | 0.003 | 0.006 | 0.012 |
| B) Results by professional group and promotion type: | | | | |
| B.1) Promotions to/within managerial positions as department director or division head | | | | |
| Female | -0.3410* | -0.3695* | -0.4417** | -0.4491** |
| | (0.1715) | (0.1733) | (0.1712) | (0.1697) |
| Direct appointment | 1.1784** | 1.1488** | 1.0364** | 1.0170 |
| | (0.2790) | (0.2899) | (0.2967) | (3.7568) |
| Female x Direct appointment | 0.2144 | 0.2498 | 0.1966 | 0.2708 |
| | (0.4804) | (0.4777) | (0.4717) | (0.4859) |
| Vertical promotion | 1.2933** | 1.1236** | 1.0357** | 0.2274 |
| | (0.2067) | (0.2329) | (0.2323) | (3.5168) |
| Female x Vertical promotion | 0.6741* | 0.5793 | 0.5202 | 0.5212 |
| | (0.3355) | (0.3335) | (0.3294) | (0.3364) |
| Observations | 22896 | 22896 | 22896 | 22896 |
| $R^2$ | 0.003 | 0.007 | 0.010 | 0.012 |
| B.2) Promotions to/within managerial positions as unit head | | | | |
| Female | 0.0338 | 0.0190 | -0.0581 | 0.0235 |
| | (0.1042) | (0.1039) | (0.1039) | (0.1035) |
| Direct appointment | 1.1746** | 1.2296** | 1.2297** | 2.0026 |
| | (0.2514) | (0.2680) | (0.2655) | (6.2881) |
| Female x Direct appointment | -0.0619 | -0.1182 | -0.0594 | -0.1148 |
| | (0.3911) | (0.3935) | (0.3906) | (0.4084) |
| Vertical promotion | 1.2268** | 1.4255** | 1.3442** | 1.2193 |
| | (0.1613) | (0.1763) | (0.1717) | (4.4123) |
| Female x Vertical promotion | 0.4179 | 0.3400 | 0.3977 | 0.2862 |
| | (0.2758) | (0.2762) | (0.2665) | (0.2711) |
| Observations | 41683 | 41683 | 41683 | 41683 |
| $R^2$ | 0.004 | 0.007 | 0.009 | 0.012 |

*Notes: Linear regression, sample 2013-2023. Robust standard errors in parentheses, clustered by individual. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Age, birth country, birth cohort, entry cohort, education, and time dummies are included except in (1). (3) as (2) plus family situation, experience, experience squared, and business areas. (4) as (3) plus selection process fixed effects.*

Table 8: Linear regression of the probability of promotion among potential candidates for managerial positions (subsample of business areas where most economists work)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| A) Results by professional group: | | | | |
| A.1) Promotions to/within managerial positions as department director or division head | | | | |
| Female | -0.7875* | -0.8094* | -0.8767* | -0.8085* |
| | (0.3944) | (0.3883) | (0.3788) | (0.3809) |
| Observations | 7934 | 7934 | 7934 | 7934 |
| $R^2$ | 0.001 | 0.006 | 0.009 | 0.012 |
| A.2) Promotions to/within managerial positions as unit head | | | | |
| Female | 0.3117 | 0.3230 | 0.3266 | 0.5148* |
| | (0.2207) | (0.2161) | (0.2136) | (0.2053) |
| Observations | 15908 | 15908 | 15908 | 15908 |
| $R^2$ | 0.000 | 0.004 | 0.007 | 0.025 |
| B) Results by professional group and promotion type: | | | | |
| B.1) Promotions to/within managerial positions as department director or division head | | | | |
| Female | -0.9659** | -0.9363** | -0.9777** | -0.9468** |
| | (0.2883) | (0.3059) | (0.2933) | (0.2813) |
| Direct appointment | 1.6116* | 1.5845* | 1.2545 | 3.8144 |
| | (0.7103) | (0.7542) | (0.7435) | (5.8768) |
| Female x Direct appointment | 0.1320 | 0.0469 | 0.0239 | 0.0466 |
| | (1.1302) | (1.1414) | (1.1508) | (1.1827) |
| Vertical promotion | 1.3295** | 1.2951** | 1.1341* | 3.1721 |
| | (0.3892) | (0.4751) | (0.4645) | (3.4031) |
| Female x Vertical promotion | 0.5570 | 0.4225 | 0.3624 | 0.3150 |
| | (0.6309) | (0.6481) | (0.6514) | (0.6565) |
| Observations | 7934 | 7934 | 7934 | 7934 |
| $R^2$ | 0.004 | 0.008 | 0.010 | 0.012 |
| B.2) Promotions to/within managerial positions as unit head | | | | |
| Female | -0.0340 | -0.0633 | -0.1233 | -0.0126 |
| | (0.1737) | (0.1742) | (0.1735) | (0.1699) |
| Direct appointment | 1.6646** | 1.7114** | 1.6581** | 37.5531 |
| | (0.5446) | (0.5636) | (0.5494) | (51595.4795) |
| Female x Direct appointment | 1.1483 | 1.1466 | 1.2798 | 0.9357 |
| | (0.9584) | (0.9563) | (0.9336) | (0.9241) |
| Vertical promotion | 1.2441** | 1.4418** | 1.4966** | 3.8909 |
| | (0.2497) | (0.2719) | (0.2760) | (66852.2405) |
| Female x Vertical promotion | 1.2996** | 1.3232** | 1.4581** | 1.3350** |
| | (0.4892) | (0.4920) | (0.4852) | (0.4900) |
| Observations | 15908 | 15908 | 15908 | 15908 |
| $R^2$ | 0.006 | 0.009 | 0.013 | 0.025 |

*Notes: Linear regression, sample 2013-2023. Robust standard errors in parentheses, clustered by individual. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Age, birth country, birth cohort, entry cohort, education, and time dummies are included except in (1). (3) as (2) plus family situation, experience, experience squared, and business areas. (4) as (3) plus selection process fixed effects.*

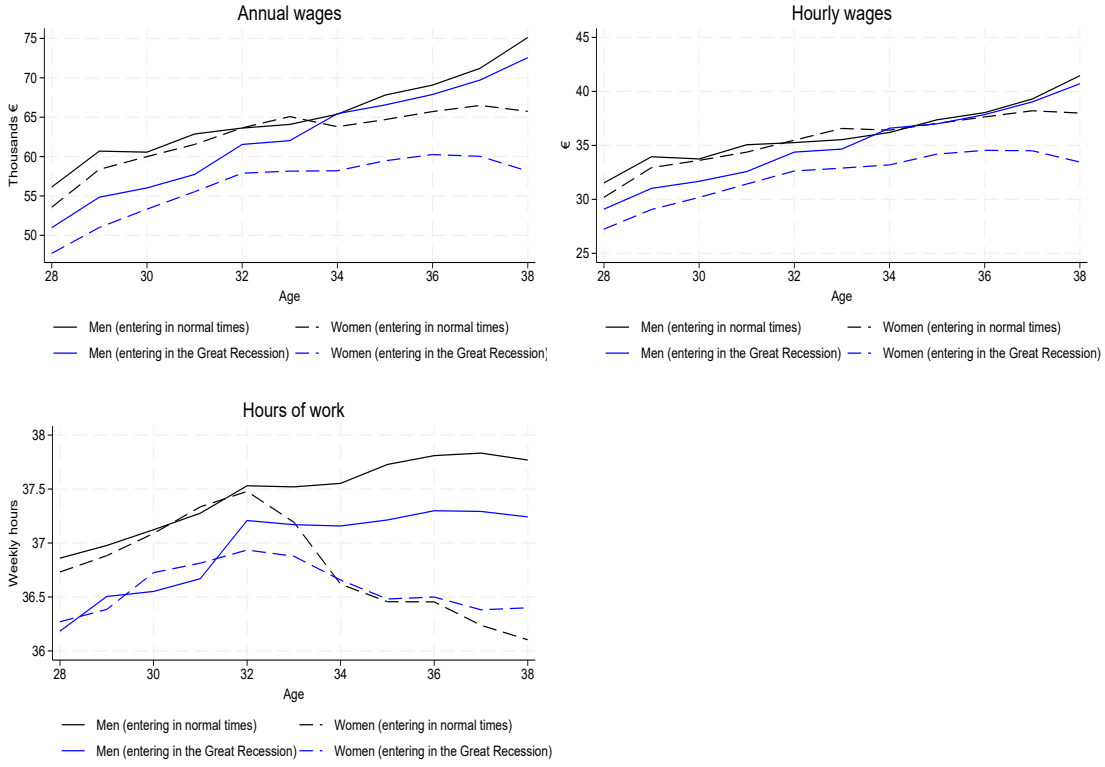
Table 9: Linear regression of the probability of applying among potential candidates

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| A) Pooled results | | | | |
| Female | 1.6482** | 1.2442** | 1.0629** | -0.1491 |
| | (0.3261) | (0.2922) | (0.2834) | (0.2442) |
| Observations | 100250 | 100250 | 100250 | 100250 |
| $R^2$ | 0.001 | 0.089 | 0.097 | 0.239 |
| B) Results by professional group: | | | | |
| B.1) Promotions to/within managerial positions | | | | |
| Female | -1.0532** | -1.1077** | -1.3755** | -1.2255** |
| | (0.3872) | (0.3761) | (0.3796) | (0.3697) |
| Observations | 31286 | 31286 | 31286 | 31286 |
| $R^2$ | 0.001 | 0.046 | 0.055 | 0.074 |
| B.2) Promotions within non-managerial positions | | | | |
| Female | 2.2897** | 1.9539** | 1.7538** | 0.2590 |
| | (0.4181) | (0.3760) | (0.3615) | (0.3103) |
| Observations | 68964 | 68964 | 68964 | 68964 |
| $R^2$ | 0.002 | 0.109 | 0.120 | 0.278 |
| C) Results by professional group for managerial positions: | | | | |
| C.1) Promotions to department director or division head positions | | | | |
| Female | -1.0027* | -1.0579** | -1.3332** | -1.1807** |
| | (0.3954) | (0.3843) | (0.3884) | (0.3782) |
| Observations | 30145 | 30145 | 30145 | 30145 |
| $R^2$ | 0.001 | 0.046 | 0.055 | 0.075 |
| C.2) Promotions to unit head positions | | | | |
| Female | -0.7789 | -0.8195* | -1.0870** | -0.9763* |
| | (0.4263) | (0.4151) | (0.4116) | (0.4077) |
| Observations | 22632 | 22632 | 22632 | 22632 |
| $R^2$ | 0.000 | 0.041 | 0.049 | 0.064 |
| D) Results by professional group for managerial positions (subsample): | | | | |
| D.1) Promotions to department director or division head positions | | | | |
| Female | -0.3136 | -0.2954 | -0.2720 | -0.2508 |
| | (0.4697) | (0.4613) | (0.3858) | (0.3808) |
| Observations | 11481 | 11481 | 11481 | 11481 |
| $R^2$ | 0.000 | 0.042 | 0.169 | 0.181 |
| D.2) Promotions to unit head positions | | | | |
| Female | -0.2208 | -0.1881 | -0.1817 | -0.2123 |
| | (0.5275) | (0.5232) | (0.4165) | (0.4137) |
| Observations | 8790 | 8790 | 8790 | 8790 |
| $R^2$ | 0.000 | 0.041 | 0.179 | 0.190 |

*Notes: Linear regression, sample 2013-2023. Robust standard errors in parentheses, clustered by individual. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Age, birth country, birth cohort, entry cohort, education, and time dummies are included except in (1). (3) as (2) plus family situation, experience, experience squared, and business areas. (4) as (3) plus selection process fixed effects.*

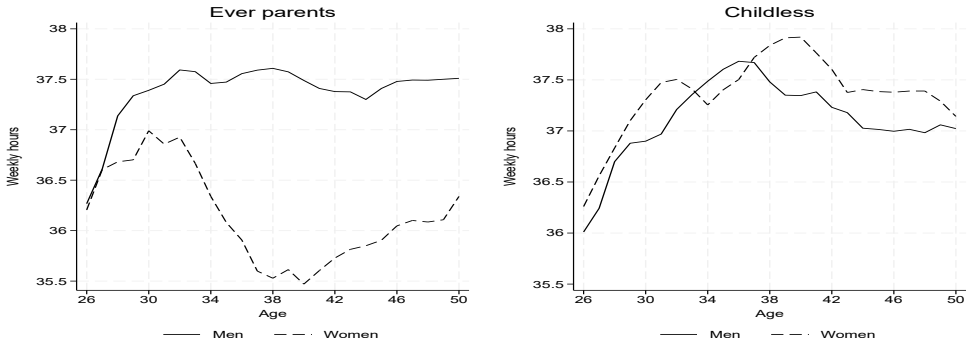
# A Additional Figures and Tables

Figure A1: Gender differentials by age



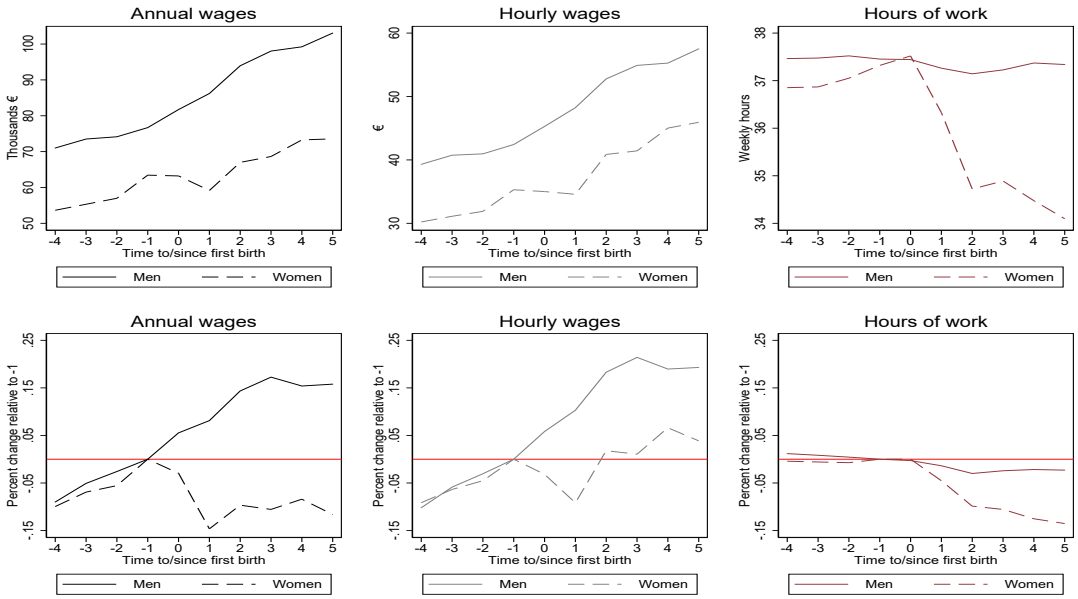

*Notes: Employees aged 20-70, excluding branches and other entities. Entering in normal times refers to those who enter to the BdE in years 2006, 2007, 2015, and 2016, while entering in the Great Recessions refers to those who enter in years from 2008 to 2014.*

Figure A2: Hours of work by age



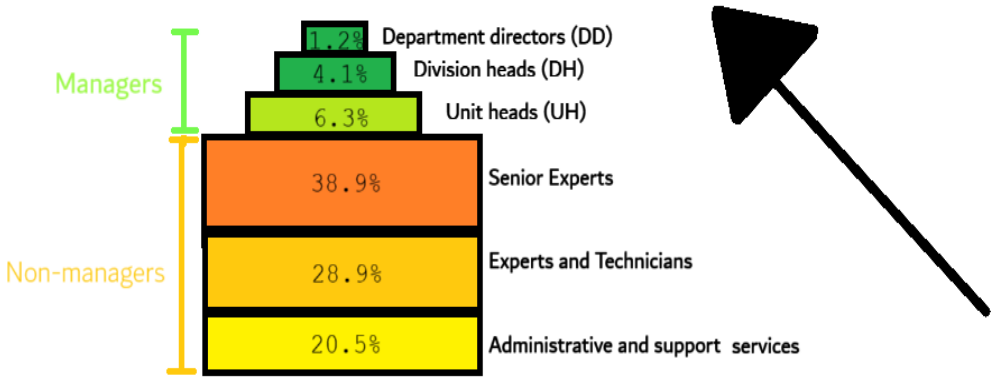

*Notes: Employees aged 20-70, excluding branches and other entities. Time period: 2009-2023.*

Figure A3: Child penalties




*Notes: Employees aged 20-70, excluding branches and other entities. Time period: 2009-2023. Balanced sample of employees that we observe for 10 consecutive years, and giving birth to their first child.*

Figure A4: Hierarchical levels




*Notes: Employees aged 20-70, excluding branches and other entities. Time period: 2013-2023.*

Table A1: Descriptive statistics (New entrants between 2008 and 2014)

| | | Total | Men | Women | p-value |
|---|---|---|---|---|---|
| Time period: 2008-2023 | | | | | |
| Observations (year-month) | n, % | 91,937 | 39.15 | 60.85 | |
| Workers | n, % | 1,021 | 39.96 | 60.04 | |
| Entry age (years) | mean | 32.30 | 31.98 | 32.51 | 0.23 |
| Age (years) | mean | 38.05 | 37.92 | 38.14 | 0.00 |
| Experience (years) | mean | 5.75 | 5.66 | 5.81 | 0.00 |
| Married | mean | 0.55 | 0.54 | 0.55 | 0.00 |
| Children | mean | 0.45 | 0.41 | 0.47 | 0.00 |
| Log(wages) | mean | 10.91 | 11.01 | 10.84 | 0.00 |
| Log(hourly wages) | mean | 3.43 | 3.53 | 3.37 | 0.00 |
| Hours of work | mean | 36.91 | 37.12 | 36.78 | 0.00 |
| Managers | mean | 6.45 | 9.51 | 4.48 | 0.00 |
| - Department director (DD) | mean | 0.56 | 1.02 | 0.26 | 0.00 |
| - Division head (DH) | mean | 1.37 | 1.91 | 1.02 | 0.00 |
| - Unit head (UH) | mean | 4.52 | 6.58 | 3.19 | 0.00 |
| Senior Experts | mean | 32.79 | 42.38 | 26.61 | 0.00 |
| Experts | mean | 32.87 | 33.54 | 32.44 | 0.00 |
| Administrative | mean | 25.97 | 10.75 | 35.76 | 0.00 |
| Support services | mean | 1.58 | 3.30 | 0.48 | 0.00 |
| General Secretariat | mean | 8.51 | 4.86 | 10.86 | 0.00 |
| Services | mean | 23.91 | 27.06 | 21.88 | 0.00 |
| Banking supervision | mean | 18.47 | 19.97 | 17.50 | 0.00 |
| Financial stability | mean | 6.13 | 6.86 | 5.65 | 0.00 |
| Financial conduct | mean | 9.39 | 8.14 | 10.19 | 0.00 |
| Operations | mean | 15.97 | 16.12 | 15.87 | 0.34 |
| Economics | mean | 17.15 | 16.57 | 17.53 | 0.00 |

*Notes: p-value for the difference between the mean for Men and the mean for Women.*

Table A2: Descriptive statistics (Subsample)

| | | Total | Men | Women | p-value |
|---|---|---|---|---|---|
| Time period: 2013-2023 | | | | | |
| Observations (year-month) | n, % | 92,033 | 51.17 | 48.83 | |
| Workers | n, % | 1,529 | 51.60 | 48.40 | |
| Entry age (years) | mean | 30.39 | 30.67 | 30.08 | 0.07 |
| Age (years) | mean | 42.28 | 42.68 | 41.87 | 0.00 |
| Experience (years) | mean | 12.77 | 13.08 | 12.44 | 0.00 |
| Married | mean | 0.59 | 0.59 | 0.58 | 0.07 |
| Children | mean | 0.51 | 0.51 | 0.52 | 0.01 |
| Log(wages) | mean | 11.20 | 11.27 | 11.14 | 0.00 |
| Log(hourly wages) | mean | 3.73 | 3.79 | 3.68 | 0.00 |
| Hours of work | mean | 36.66 | 37.08 | 36.23 | 0.00 |
| Managers | mean | 15.83 | 19.76 | 11.72 | 0.00 |
| - Department director (DD) | mean | 1.37 | 1.98 | 0.73 | 0.00 |
| - Division head (DH) | mean | 4.80 | 7.23 | 2.25 | 0.00 |
| - Unit head (UH) | mean | 9.67 | 10.55 | 8.75 | 0.00 |
| Senior Experts | mean | 37.13 | 37.68 | 36.55 | 0.00 |
| Experts | mean | 46.86 | 42.25 | 51.68 | 0.00 |
| Probability of promotion | mean, % | 1.38 | 1.42 | 1.34 | |
| - Vertical promotion | mean, % | 0.90 | 0.92 | 0.87 | |
| - Direct appointment | mean, % | 0.09 | 0.09 | 0.08 | |
| - Competitive call | mean, % | 0.40 | 0.40 | 0.39 | |

*Notes: p-value for the difference between the mean for Men and the mean for Women.*