Gender Pay Gap, Labor Unions and Firm Performance[1]

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Abstract

Using detailed employee-employer administrative data, we analyze the impact of the gender pay gap on the performance of firms and find that it depends on the presence of labor unions. When the firm is not unionized, the gender pay gap reduces profitability. In contrast, when unions are present, the gender gap has no effect on profitability in male-dominated firms and increases profitability in female-dominated firms. Our evidence suggests that when there is no union, giving priority to cohesion and pay equality is value-enhancing. In highly feminized firms, unions provide employees with the option of nonpecuniary benefits, with females opting for better work-life balance and males opting for higher salaries. Our findings indicate that in these firms, the gender pay gap may reflect the divergent interests of female and male employees and can positively affect firm value.

JEL Classification: G32, G34, G38, J16, J21, J24, J31, J71

Keywords: labor unions, gender pay gap, feminization, performance, profitability, productivity, wages

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1. Introduction

Despite numerous reports and analyses, the gender pay gap remains large in most developed countries: it was 13.8% on average for OECD countries in 2016 (OECD, 2017) and 16% at the European level (21% in Germany and 15.4% in France) using hourly pay (Eurostat, 2017). Women are also less represented in top executive positions (Matsa and Miller, 2011). An increasing number of countries have introduced provisions related to transparency regarding the gender pay gap (Denmark from 2006, UK from 2017, France from 2019) and encouraging pay equality. The European Union (EU) has made strategic engagement on gender equality part of all EU policies. Furthermore, the gender gap is an item increasingly scrutinized by socially responsible investors. Some shareholders are concerned about gender pay inequality and use shareholder resolutions to request disclosures of gender pay gaps. For example, in 2019, Arjuna, an investment firm specializing in sustainable and ethical investing, asked nearly a dozen tech, retail and banking companies to disclose median pay at their annual meetings with shareholders.[1] In January 2019, CitiGroup responded to a similar shareholder proposal by raising pay for women in the United States, the United Kingdom and Germany.[2] However, despite the growing interest of stakeholders, evidence on the real effects of gender pay inequality on firms' outcomes is limited.

In this paper, we use detailed French employee-employer administrative data to examine the consequences of the gender pay gap on the performance of union and nonunion firms. We find that the gender pay gap decreases profitability in nonunion firms, whereas in the presence of unions, the gender gap increases profitability in female-dominated firms and has no effect on profitability in male-dominated firms.

[1] Gender is the focus of nearly a third of approximately 400 shareholder resolutions dealing with social, environmental and governance issues proposed for 2019 annual meetings, according to Michael Passoff, head of Proxy Impact. https://www.reuters.com/article/us-usa-women-pay/be-honest-about-u-s-gender-pay-gap-investors-tell-firms-idUSKCN1QN231

[2] https://www.reuters.com/article/us-citigroup-pay/citi-to-raise-pay-for-women-and-minorities-in-u-s-uk-germany-idUSKBN1F428H

The gender pay gap is the result of multiple factors. It is affected by job classifications, female occupations and skills, qualifications, individually negotiated pay, access to training, and family responsibilities that lead to shorter hours, part-time work and fewer women in top positions.[3] We use French administrative data covering the nonfinancial private sector from 2009 to 2015 to compute the gender pay gap. We first compute a measure of the gender pay gap at the employee level, using one-to-one matching on observable factors such as firm, location, age, job occupation, type of job contract, year and industry. We only keep firms for which at least ten yearly pairs are successfully matched. The resulting sample is composed of 19,784 firm-year observations spanning the period 2009-2015. From these man-woman pairs, we find a median (average) gender pay gap of 9.35% (10.38%), varying from 15.42% (18.28%) for high-skilled white-collars to 4.61% (5.85%) for low- and unskilled white-collars. We then compute a measure of the gender pay gap at the firm level by averaging the gender gaps for all man-woman pairs in each firm. The gender pay gap in our firm-level sample is on average 10.7%, from 20% for high-skilled white-collars to 5.17% for low and unskilled white-collars. The gender pay gap decreases over the sample period, from 12% in 2009 to 9% in 2015. The gender pay gap is higher in female-dominated firms and lower in unionized firms and in firms with a female CEO. The gender pay gap increases with R&D expenses and workforce age and decreases with the size of the firm.

We examine the impact of the gender pay gap on firm operating performance using two different perspectives. On the one hand, if employees have a preference for noncompetitive environments and greater cohesion and cooperation in the firm, a policy emphasizing pay equality – and no gender gap – may lead to enhanced performance due to higher employee satisfaction.[4] On

[3] Other factors, which may be less measurable, are also at work. Women may be more risk averse (Croson and Gneezy, 2009), less inclined to competition (Niederle and Vesterlund, 2007a), less overconfident (Huang and Kisgen, 2013) and have a lower propensity to negotiate over salaries and promotions (Babcock and Laschever, 2003). For a review of the importance of these factors in explaining the gender pay gap, see (Blau and Kahn, 2017).

[4] Several papers focus on the importance of human capital, employees as a key asset, and on employee satisfaction as ways to improve the performance of firms (Edmans, 2011; Zingales, 2000).

the other hand, if males are more productive than females and want to be rewarded with higher salaries, the gender pay gap may have a positive effect on performance.

First, controlling for year and industry fixed effects as well as firms' characteristics, we find that the gender pay gap decreases the performance of nonunion firms. The gender pay gap is costly for these firms because it increases men's wages, leaving women's wages unchanged, and therefore resulting in a higher total payroll. The gender pay gap decreases profitability in nonunion firms because labor productivity does not increase enough to compensate for higher labor costs. It may be that in these firms, due to lower protection and reduced wage transparency, pay equality would be the employees' preferred option and would be the more efficient option for the company.

Second, we explore the impact of labor unions on the relationship between the gender gap and firm performance. Even if unions advocate in favor of gender pay equality[5], during negotiations, they often focus on measures to address overall pay inequality, rather than gender pay inequality only.[6] One reason for this behavior may be the lack of women in union leadership and at the negotiating tables. Unions also argue that campaigns to raise the minimum wage for all workers help to increase women's pay. However, such campaigns do not reduce the gender pay gap. When considering labor unions, our previous results change. On average, we are not able to highlight any significant effect of the gender gap on the performance of unionized firms, which is also the result we obtain for male-dominated firms. In contrast, we find that in female-dominated firms, the gender gap decreases operating performance in nonunion firms but increases it in union firms. Feminized firms are characterized by lower average salaries, and any potential lower labor productivity does not compensate for the lower salaries, leading to higher average performance. In feminized firms, high gender gaps involve a strong increase in wages, while the positive effect on labor productivity is limited to unionized firms, explaining the positive impact on profitability in union firms and the

[5] See for example the survey by the European Trade Union Confederation, "Bargaining for equality", 2014.
[6] Several studies find that overall wage compression in a country helps explain smaller gender pay gaps, see for example (Blau and Kahn, 1992). For a recent overview of the relationship between unionization and wage inequality, see (Card et al., 2018).

negative impact in nonunion firms. We find evidence that in female-dominated firms, labor unions' bargaining does not focus on wages but may rather focus on flexible working arrangements and policies on work-life balance, improving paid parental leave, and enhancing access to child care, all measures that females may particularly appreciate.[7] Therefore, females may favor flexibility at the expense of a higher gender pay gap that benefits males. What could be the mechanism explaining the positive impact on profitability? (Clark, 1997) finds that women report higher levels of job satisfaction than men do, although they are, on average, worse off in the labor market in terms of pay. This gender satisfaction differential mainly exists in female-dominated workplaces. Several studies find that flexibility and better work-life balance policies improve the well-being of employees and are associated with significantly higher productivity (Bender et al., 2005; Bloom and Van Reenen, 2006). Our results suggest that the gender pay gap should be considered together with work-life balance policies that improve employee satisfaction and can lead to an overall value-enhancing equilibrium.

Our results are both statistically and economically significant. The patterns that we observe in our main results remain after various robustness checks involving changes in empirical specifications, sampling restrictions, variable construction methods, instrumental variables methods, and covariates balancing preprocessing. First, we use two alternative computation methods for the gender gap, and our results remain the same. Second, we may have a reverse causality issue, as firms with better performance may be more inclined to reduce the gender gap, which could explain our results for firms without unions (but not those with unions). Likewise, unionization could be affected by reverse causality because poorly, or high, performing firms may be more likely to become unionized. We use a 2SLS approach to instrument gender gap and a Woolridge 3-step procedure to instrument unionization, and our results are confirmed. Third, as nonunion firms may have different characteristics compared to unionized firms, we use the entropy-balancing preprocessing method to

[7] On average, women spend 26 hours a week on care activities, compared to 9 hours spent by men (Eurofound, 2013).

construct a reweighted sample in which nonunion and unionized firms share similar characteristics, and our findings are confirmed.

Our paper contributes to several strands of research. First, our study is related to the literature on the gender pay gap. An extensive review of the main results on factors explaining the gender pay gap can be found in Blau and Kahn (2017). Our findings confirm the decrease in the gender pay gap over time and the main conventional variables identified to explain it: occupation, size of the firm, high-tech activities, workforce age and education.[8] The literature in this field mainly describes and explains the gender pay gap without providing evidence of its impact on performance. Examining the effect of new legislation on gender pay gap transparency in Denmark, Bennedsen et al., (2019) find that the law reduces the gender pay gap, primarily by slowing wage growth for male employees. In addition, the wage transparency mandate causes a reduction in the productivity of the firm and in the overall wage bill, leaving the profitability of the firm unchanged. We find that the impact of the gender pay gap on operational performance can be positive or negative depending on whether the company is female- or male dominated and whether there is a union.

Second, our paper is related to the literature examining the impact of employee satisfaction (Edmans, 2011; Guiso et al., 2015; Huang et al., 2015) and corporate social responsibility practices (Deng et al., 2013; Ferrell et al., 2016) on the value and performance of firms. Our results that the gender gap improves productivity and performance in female-dominated firms when a union is present suggest that women may place higher value and satisfaction on work-life balance policies rather than higher wages, which leads to enhanced performance. These preferences may also be related to studies underlining that parenthood is one of the main drivers of the lack of women in top executive positions (Keloharju et al., 2019) and of the large gender pay gap in leadership positions (Angelov et al., 2016; Bertrand et al., 2010; Geiler and Renneboog, 2015).

[8] There is also a large strand of literature on the gender pay gap in leadership positions, see for example (Geiler and Renneboog, 2015).

Third, we contribute to the literature examining the impact of pay inequality on the performance of firms, as overall wage compression and the gender gap are often related (Blau and Kahn, 1992). Using a matched employer-employee data set for Sweden, Heyman (2005) finds a positive and significant effect of wage dispersion on profitability. Using a proprietary data set of UK firms, Mueller et al., (2017) show that firms with higher pay inequality have higher valuations, better operating performance and higher equity returns. Their results are consistent with pay inequality reflecting managerial talent or incentive provisions. In contrast, Rouen, (2019) finds a negative relation between unexplained pay disparity, a proxy for pay unfairness, and the future performance of firms. These papers do not examine the impact of the presence of unions. Our evidence on the gender pay gap highlights that unions have an impact on the relation between pay inequality and performance, one possible explanation being that unions provide a kind of fairness certification that makes inequality more acceptable to employees. Furthermore, more specifically focusing on gender pay inequalities, Kulich et al. (2011) argue that the gender gap in leadership positions is driven by the fact that men have much stronger upward remuneration potential, whereas women are offered contracts that are less performance-sensitive. Grund (2015) finds that gender pay gaps are much more pronounced for bonus payments than they are for fixed salaries, which is also in line with the results of Flory et al. (2015) showing that women are reluctant to pursue performance-based compensation. Our findings that gender pay gap increases performance in female-dominated firms with at least one union can also be interpreted as females accepting incentive wages for males, as long as they are granted work-life balance benefits for themselves.

The rest of the paper is structured as follows. In Section 2, we present the institutional context of unions and the gender pay gap in France. In Section 3, we detail our hypotheses. In Section 4, we present our gender gap measures and dataset. We analyze our empirical results in Section 5, and Section 6 concludes.

2. The French institutional setting

2.1. Unions in France

The institutions shaping labor relations in France differ from those in the US or the UK.[9] In France, every two to four years, elections take place at each of a firm's workplaces to determine which labor unions will be certified for the next two to four years. The employer's failure to initiate these elections is treated as a matter of criminal law. The bargaining unit is the whole workplace workforce, and multiple labor unions can be certified for the same bargaining unit. To be certified, a labor union needs to win 10% of the votes cast in the election. In addition to this workplace-level certification process, firm-level certification also occurs. For firm-level certification, votes from all the firm's workplaces are aggregated, and labor unions that have gathered 10% of the aggregated votes are certified at the firm level. Labor unions certified at the firm level represent all the firm's employees regardless of the votes cast at a specific workplace. All employees, from either a workplace or a firm, are represented by the certified labor unions and benefit from collective bargaining without the need to pay a fee to the labor unions, which are financed by public subsidies and mandatory financial support from employers. The firm's union coverage depends on both workplace and firm-level certifications.[10]

2.2. Gender gap in France

In France, the gender pay gap attracted the attention of the legislature as early as 1972 with the Act of December 22 that established the principle of equal pay between men and women for equal work. In 1976, the EU Directive 76/207/EEC, on the implementation of the principle of equal

[9] In the US and the UK, one union, and only one, negotiates for a bargaining unit, which is a group of employees with a community interest (similar occupations, geographic location, duties, payment structure, review/rating system). To be certified, the labor union must receive a majority vote from the employees of the bargaining unit. The firm's union coverage depends on the size of all bargaining units compared to the size of the firm.

[10] For an overview of trade unions in France, see: https://www.worker-participation.eu/National-Industrial-Relations/Countries/France/Trade-Unions

treatment for men and women as regards access to employment, vocational training and promotion, and working conditions (transposed into French law in 1983 "loi Roudy, July 13, 1983"), aimed to remove all discriminatory provisions against women throughout all professional fields. In 2001, the Génisson Act (May 9, 2001) extended collective bargaining to gender equality negotiations. More recently, the Ameline Act (March 23, 2006) aimed to eliminate pay gaps in the private sector by December 31, 2010 and to facilitate the link between professional and personal life, as well as access to vocational training and apprenticeships. Facing the difficulty of eliminating pay gaps in the private sector, the Act on pension reform (November 9, 2010) removed the 31 December 2010 deadline for the elimination of pay gaps between women and men. However, it added to the existing negotiating obligations the requirement to establish, by January 2012, a collective agreement or an action plan to ensure professional equality between women and men. Furthermore, for companies with more than 50 employees, it introduced a financial penalty for those that failed to publish an action plan. Since 2011, the Copé-Zimmerman Act (January 27 2011), which targets professional equality and the balanced representation of women and men on boards of directors and supervisors, has required all public firms and all large private firms (those with at least 500 employees and total sales or total assets of 50 million €) to include at least 40% of each gender on their boards as of January 1, 2017. The Act of August 4, 2014, targeting real equality between women and men, extended the field of gender equality in collective bargaining and extended the Copé-Zimmerman Act to smaller private firms (250 employees). Finally, a 2018 Act (September, 5, 2018, pour la liberté de choisir son avenir professionnel) imposed that all firms with more than 50 employees have to disclose a measure of the gender pay gap within the firm. The decree "Décret 2019-15, January 8, 2019" indicated the method of computing this measure and the threshold under which the firm shall be liable to financial penalties of 1% of total payroll. Thus, over the period we are studying, several laws have been adopted to strengthen equality between women and men in companies.

Because their deadlines partially overlap, these successive laws do not allow an analysis to be carried out in terms of differences in differences. However, this succession of laws also allows us to

be confident that the problems of endogeneity, and in particular reverse causality, remain limited. Indeed, it is unlikely that firms, under the spotlight of these legislative developments, have deliberately chosen to widen their wage gaps between men and women for reasons stemming from firm characteristics.

3. Hypotheses development

3.1. Why might the gender pay gap have an impact on the performance of firms?

H1. Incentive effects: The performance of firms increases with the gender pay gap.

According to (Lazear and Rosen, 1981) tournament theory, if wages are based on relative productivity, highly productive employees should be rewarded with higher wages. As a consequence, the equilibrium effort will increase, leading to a positive relation between pay dispersion and productivity. Tournament models also predict that the pay gap increases as one moves up the hierarchy (Rosen, 1986). If males are systematically more productive than females, these models would predict that males are granted higher salaries than females and that the gender gap would result in higher profitability.[11]

H2. Cohesiveness: The performance of firms decreases with the gender pay gap.

According to Akerlof and Yellen (1990), individual effort may be reduced if employees regard their wages as unfair. A similar argument can be found in Levine (1991). Lazear (1989) argues that

[11] However, the drawback of these predictions is that they rely on average characteristics of male and female as a group, and they may lead to statistical discrimination, firms paying women less because of their lower average expected productivity, rather than upon their own merits. Such a wage policy is illegal under anti-discrimination laws and regulation, even if a rich literature has provided convincing evidence that discrimination exists (see for example Bertrand and Duflo, 2016).

homogeneous wage treatment may allow firms to preserve worker unity, maintain good morale and create a cooperative work environment. On the other hand, high-quality workers may decide to leave the firm. Pay equality may improve the performance of firms if the morale of the average work force is sufficiently improved to offset the worsening of morale among high-quality workers. Furthermore, wage compression may reduce uncooperative behavior, especially if there is a large fraction of competitive individuals in a firm. There are also papers showing that employee satisfaction improves the performance of firms (Edmans, 2011; Hansen and Wernerfelt, 1989). If pay equality and its corollary, the absence of a gender pay gap, increase average employee satisfaction, this should lead to enhanced performance.

H3. Competition: The relationship between performance and the gender pay gap depends on the intensity of competition within the firm.

A large number of papers provide evidence that women shy away from competitive environments and that men compete excessively given their abilities (Niederle and Vesterlund, 2007b; Reuben et al., 2015). In this context, Lazear's (1989) results would predict that pay equality, which implies a reduced gender pay gap, could be efficient, especially in firms with a large proportion of male employees, whereas in female dominated firms, more pay inequality, potentially leading to a higher gender pay gap, could be useful. Conducting a large-scale field experiment, (Flory et al., 2015) find that when individuals are responding to a job opening, the applicant pool becomes increasingly male-dominated when the proposed compensation relies heavily on individual performance. This result is especially salient for jobs typically held by males. Male-dominated firms that want to attract female employees should therefore reduce pay inequality, and female-dominated firms should increase pay inequality to attract men. As a consequence, in male-dominated firms, performance may decrease with the gender gap, whereas in female-dominated firms, performance may increase with the gender gap.

3.2. The impact of unions on the relation between gender pay gap and performance

There is ample evidence that unions lower wage inequality, even controlling for individual worker effects (Card et al., 2004; Freeman, 1991, 1984; Lewis, 1983). However, unions have a much smaller equalizing effect on female pay inequality than male pay inequality (Card, 2001; Gosling and Lemieux, 2001).

H4. Transparency: The presence of unions increases transparency regarding wages/outputs, offsetting the negative impact of the gender pay gap on performance.

Unions may provide greater transparency regarding wages and salary scales. Using an experiment with Indian manufacturing workers, Breza et al. (2018) find that workers appear to accept homogeneous wages as fair even when there are productivity differences but similarly have no issue with clearly justified heterogeneous wages. In contrast, they may resent what they perceive as arbitrary behavior from an employer. Therefore, disparate wages are acceptable only in the presence of transparency in outputs. In our context, unions may provide a type of certification of fairness relative to employee wages/outputs, allowing the gender pay gap to reflect distinct female/male productivity without a negative effect on performance.

H5. Family friendly benefits versus wages: By bringing women's requests for non-pecuniary benefits to the bargaining table, unions may increase employees' satisfaction and the performance of the firm (especially in highly feminized firms).

One reason for unions having a much smaller equalizing effect on female pay inequality could be linked to the fact that unions bargain on policies focused on work-life balance rather than exclusively on wages. Unions act as agents of collective voice and convey employees' collective preference to employers. They may reallocate the total compensation package toward greater employee benefits and lower wages. If family-friendly benefits are more valued by females than males, unions may favor these benefits in highly feminized firms. For example, using British data, Budd and Mumford (2004) find that unionized workplaces are more likely to have parental leave, child care and job sharing policies than similar workplaces with no union. Such a policy could imply lower wages for females, who favor family-friendly benefits, and higher wages for males, leading to a larger gender gap in unionized highly feminized firms. The gender gap could reflect different flexibility/salary trade-offs made by females and males, leading to higher employee satisfaction and increased profitability.

4. Data and summary statistics

4.1. Data

We draw a sample of firm-year observations from the ACEMO-DSE[12] labor relations surveys of 2009 to 2015. The ACEMO-DSE survey covers all French firms with more than 500 employees and a representative sample of smaller firms, those with 10 to 500 employees. Any lack of response or intentional error from firms triggers an administrative fine. The survey contains information at the firm level on labor representation, such as the presence of unions. To investigate our research hypotheses, we create two different datasets, a firm-level one to analyze the impact of the gender pay gap on total payroll, labor productivity and operating performance, and an employee-level one

[12] Labor force activity and employment conditions: social dialogue in firms, DARES, Ministry of Labor.

to analyze the impact of the gender pay gap on male and female wages at the employee level. We will refer to these datasets as the *Firm-level dataset* and the *Employee-level dataset, respectively*.

Firm-level dataset: First, we discard any observations from the ACEMO-DSE data that are related to banks, insurance companies, the agricultural sector, economic interest groups, associations and foundations to focus our analyses on the nonfinancial business economy. We then match the remaining firm-year observations to data from the French tax administration (DGFiP).[13] Every year, French firms have to provide accounting data to the tax administration. We then trim the data by removing firms that have ceased or suspended their activity during the current year. Second, we merge the dataset with the GECIR,[14] also produced by the French tax administration (DGFiP), to identify firms engaged in R&D. In France, R&D expenditures entitle firms to a tax credit of 30%, creating strong incentives to report these expenses to the tax authority. Third, we merge the dataset with the LIFI[15] database, which identifies business groups, to determine if a firm belongs to a business group. Fourth, we match this merged dataset to an aggregated dataset at the firm level from the annual declaration of social data (DADS-Postes). The DADS is a social database produced by the INSEE.[16] The DADS is a declaratory formality that all companies with employees must complete. In the DADS, employers supply a variety of information about each employee: age, gender, job occupation, type of job contract, number of hours under job contract with the firm, and total salary and benefits received. Thus, we can determine at the firm level the number of full-time equivalent employees, the feminization rate of the workforce and the workforce mean age and socioprofessional composition. Finally, we merge the dataset with gender pay gap data. Gender gap data are built using a hand-written algorithm presented at the end of this section. The resulting sample contains 19 784 firm-year observations representative of the French nonfinancial private sector.

[13] Direction Générale des Finances Publiques, French Ministry of Budget, Public Accounts and Civil Administration.
[14] Database on the "Crédit Impôt Recherche", DGFiP.
[15] Enquête sur les liaisons financières entre sociétés, INSEE.
[16] Institut national de la statistique et des études économiques, French Ministry for the Economy and Finance.

Employee-level dataset: For the investigation of male and female wages at the employee-level, we merge the employee-level data from the DADS-Postes to the *Firm-level dataset*. We obtain a database containing information on all the employment contracts of each firm-year observation of the *Firm-level dataset*. To avoid large-firm bias, we randomly select 100 employment contracts from 100 unique workers for each firm-year observation. The *Employee-level dataset* contains 1,855,885 employee-level observations. For each observation, in addition to the firm-level data from the *Firm-level dataset*, the following information at the employee level is available: wage, number of hours under job contract, age, gender, origin (French, European or outside the European Union), location where the workplace operates (322 employment zones defined as geographical areas within which most of the workers reside and work, and in which firms' workplaces can find the vast majority of their needed workforce), job position (29 socioprofessional categories, using the 2-digit PCS-ESE job classification of the INSEE), employment conditions (full-time or part-time) and type of job contract (permanent or fixed-term).

Gender gap variables: The main gender gap variable used throughout the paper is computed with a hand-written one-to-one matching algorithm. First, the algorithm collects information on all the employment contracts of each firm-year observation of the *Firm-level dataset*. Second, it splits the data into two samples, one for men and one for women. Third, it randomly sorts both samples. Fourth, it selects the first woman of the female sample and searches the male sample for the best match. The best match is a match that fulfills two conditions: it is a possible match, and there are no better possible matches in the male sample. A possible match is a man who works in the same firm, in the same year, in the same employment zone, in the same industry, in the same job position, with the same employment conditions (full-time or part-time), with the same type of job contract (permanent or fixed-term) and with a maximum age difference of two years. From all possible matches, the best is the one that minimizes age difference. If there are still multiple male

observations that fulfill all these criteria, the algorithm selects the first of these observations to be matched. Fifth, the selected male observation is matched to the female observation and is removed from the male sample so it cannot be matched to any other remaining female observation. If no man is a possible match, the female observation is deleted from the female sample. Sixth, the algorithm repeats the above procedure for all observations in the female sample. Seventh, after all matches are made, the algorithm computes the firm-level gender gap by averaging all gender gaps from all man/woman pairs that belong to the firm. The algorithm also computes a firm-level gender gap for each group of job positions (high skilled white-collars, medium skilled white-collars, low and unskilled white-collars, skilled blue-collars and unskilled blue-collars) by averaging gender gaps from all pairs belonging to a group of job positions. For each gender gap variable, the algorithm imposes at least 10 pairs to compute a gender gap variable. Eighth, the algorithm stores the above gender gap variables and starts again from step three to repeat the procedure 199 times to ensure that sample sorting does not bias computation. Ninth, for each firm-year observation, the gender gap variables are averaged over the 200 replications. We also use two alternate gender gap measures, *gender gap (group)* and *gender gap (law),* as robustness checks. These measures are presented in Appendix A.

4.2. Summary statistics

Table 1 presents the descriptive statistics of variables used in both the *Firm-level dataset* and the *Employee-level dataset*. The average gender pay gap is 10.7%, both with the main gender gap measure and with the alternate *gender gap (group)* measure. The *gender gap (law)* measure has a lower average at 5.17%, which is explained by the methodology imposed by the decree. The gender gap varies across job positions from 20% for highly skilled white-collars to 5.17% for low-skilled and unskilled white-collars. The average return on assets, computed as the EBIT over total assets, is 0.0476, and the average labor productivity, computed as the natural logarithm of the ratio of value-added over full-time equivalent employees, is 11. The average firm size is approximately 410 full-

time equivalent employees, and the average leverage, computed as total debts over total assets, is 15.5%. The average unionization is 76.8%, and the average workforce age is 40 years old. The average feminization rate is 40.1%, and 10.6% of the firms have a female employee earning the firm's highest wage, which will be our proxy for firms with a female CEO. A total of 87.1% of the firms are affiliated with a business group, which highlights the importance of this organizational structure in France. Of these firms, 39.49% are considered dominant because they employ the majority of the workers in the entire business group. Firms involved in R&D represent 34.6% of firm-year observations. The average workforce composition is 19.5% of high skilled white-collars, 20.4% of skilled white-collars, 18.7% of skilled blue-collars, 15.9% of unskilled blue-collars and 25.5% of low skilled and unskilled white-collars, found by difference. The descriptive statistics of the instrumental variables show that the average support for extremist political parties is 34.1% and that 6.06% of the workforce is composed of female high-skilled white-collars, representing 31.24% of the high-skilled white-collar average. The average (gross) hourly wage is 17.3€. Finally, the employee-level average age, job position, employment condition and job contract type are comparable to their firm average.

Figures 1a to 1e show descriptive statistics of the evolution and distribution of the gender pay gap. Figure 1a shows that the average gender pay gap decreases from 12% in 2009 to 9% in 2015. Figure 1b suggests that the gender pay gap is higher in unionized firms. Figure 1c indicates that, splitting the sample in half according to the feminization rate, the gender pay gap is approximately one third lower in highly feminized firms. Figure 1d provides evidence that the reduction in the gender gap from 2009 to 2015 is concentrated on skilled white-collar employees. Finally, figure 1e suggests that the CEO’s gender is a key determinant of the gender pay gap. Firms with a female CEO have half the gender pay gap of firms with a male CEO.

5. Empirical results

5.1. Firm-level gender gap analysis

To our knowledge, we are the first to provide firm-level regressions explaining the gender gap. Table 2 presents coefficient estimates of firm-level regressions of the gender gap on various variables, such as unionization, feminization rate, female CEO, firm size, capital intensity, business group affiliation, R&D expenditures, workforce composition (mean age and percentages of employees in each job position) and industry and year fixed effects. In all specifications, unionization decreases the gender gap significantly, both statistically and economically. Unionization decreases the gender gap by 0.0079, which represents a 7.38%[17] decrease in the gender gap. Although we found that a higher feminization rate was associated with a lower gender gap in the summary statistics, there is evidence that a higher feminization rate actually leads to a higher gender gap after controlling for firms' characteristics. However, columns 4 and 5 indicate that this finding is circumscribed to firms with a female CEO. The coefficient estimate on female CEO is, along with the estimates related to workforce composition, the most important variable that affects the size of the gender gap. Having a female CEO is associated with a 21.68%[18] decrease in the gender gap. Column 4 shows that in the presence of a female CEO, the gender gap decreases by 39.72% when the feminization rate is close to zero but decreases by only 6.26% when the feminization rate is close to 100%. This result suggests that female top managers believe that the gender gap is less unfair in feminized firms where women can more easily enjoy family-friendly benefits. Column 5 confirms all previous findings. Other covariates have the expected sign: estimates on firm size are negative and close to statistical significance; capital intensity and group affiliation have no effect on gender gap; R&D firms have a larger gender gap; and the workforce composition has a strong impact on the

[17] Compared to the average firm, gender gap in unionized firms is $\frac{0.0079}{0.107} = 7.38\%$

[18] Compared to the average firm, gender gap in female CEO firms is $\frac{0.0232}{0.107} = 21.68\%$

gender gap. Higher workforce age and job positions are associated with a larger gender gap, confirming the summary statistics.

5.2. Employee-level wage analysis

Because the gender gap is a wage differential between similar men and women, employee-level wage analyses allow investigation of how the gender gap shapes men's and women's wage levels.

Identification strategy: The employee-level wage model is a Mincer model, controlling for employee and firm characteristics. Compared to firm-level wage models, employee-level wage models better control for workforce composition, workplace location and multi-industry firms by identifying the industry in which each employee operates. The model allows us to separately investigate male and female wages, controlling for firm-level and employee-level covariates suggested by the literature. Firm-level covariates are firm size, capital intensity, R&D activities, leverage, business group affiliation, various covariates to capture workforce composition such as workforce mean age, feminization rate and percentages of employees in specific job positions (high skilled white-collars, medium skilled white-collars, skilled blue-collars and unskilled blue-collars), labor productivity captured for each industry-year as quintiles of natural logarithm of the ratio of value-added over full-time equivalent employees, percentages of part-time and fixed-term job contracts, and two covariates to capture the percentage of non-French employees (from the European Union or not). Employee-level covariates are gender, age, age squared, origin for non-French employees (from the European Union or not), 2 binary variables for the type of job contract (fixed-term and/or part-time), 29 job position fixed effects (2 digit PCS-ESE job classification) and 322 employment zone fixed effects to capture local job market conditions. Finally, industry fixed-effects at the NACE/NAF/CITI division-level industry classification (88 industries) and year fixed-effects are also included. Industry fixed effects are determined at the employee level to take into account multi-industry firms.

The model is as follows:

$$Wage_i = \alpha + \rho.Union_i + \gamma.Gender\ gap_i + \varphi.Feminization_i + \beta.X_i + \varepsilon_i$$

Wage is the natural logarithm of hourly wage, *i* indexes employees, *Union* indicates unionization and *X* is a vector of observable covariates described above.

Table 3 reports the coefficient estimates of the employee-level wage model. In column 1, on the full sample, the average gender gap estimate is 10.04%, which is close to the 10.7% of our firm-level matching algorithm. Log-transformation tends to lower high differentials, which could be a possible explanation for the slightly lower estimate. Unionization increases wages by 0.62% on average, and while the gender gap is associated with higher wages, the feminization rate is associated with lower wages even after controlling for employee gender. These results suggest that, on average, labor unions succeed at increasing wages, the gender gap increases wages, which means that the increase in men's wages is not fully compensated by a decrease in women's wages, and feminized firms experience lower wages. To investigate the gender gap, we also run unconditional quantile regressions (UQR) on the specification in column 1, using the recentered influence function, following Firpo et al., (2009). Figure 2 reports the coefficient estimates of the female variable for each quantile of the unconditional wage distribution, from 5% to 95% with 5% bins. Estimates refer to the gender gap. The slope provides strong evidence that the gender gap increases with wage level, confirming the intuition given by the summary statistics about the gender gap increasing in job positions that offer higher wages. Table 3, Columns 2 and 3 show that the gender gap increases men's wages but has no effect on women's wages. Women in high-gender-gap firms are being paid as much as women in other firms. Union wage premiums are positive only for men but are mitigated by gender gaps. The higher the gender gap, the less labor unions are able to increase wages. The effects of unionization and the gender gap on wages cancel each other out. However, the results in Columns 4 and 5 underline that the union wage premium is actually similar for men and women but decreases with the feminization rate. Because 73% of the women are working in feminized firms,

whereas only 32.81% of the men are working in such firms, not controlling for the interaction between unionization and the feminization rate leads to biased estimates. The results in columns 4 and 5 suggest that labor unions in feminized firms may prefer nonfinancial benefits rather than pay raises. This finding supports the hypothesis of labor unions trying to match employees' preferences. If women favor family-friendly benefits rather than higher wages, then it is rational for labor unions in feminized firms to focus on these nonfinancial benefits. Concerning the gender gap, previous results are confirmed. Finally, columns 6 to 9 show coefficient estimates for men and women in both masculinized and feminized firms, respectively, to take into account the effect of the feminization rate on the union wage premium. Previous findings have been confirmed. Labor unions increase wages for men and women in masculinized firms but not in feminized firms. The gender gap increases men's wages, leaving women's wages unchanged, in both masculinized and feminized firms. Last, the gender gap mitigates union wage premiums in firms where labor unions do increase wages, i.e., in masculinized firms. Overall, the results indicate that the gender gap is not a zero-sum game, and total payroll increases significantly. Men's higher wages are not compensated by lower women's wages. To cover these additional salary costs, firms must believe that the gender gap will increase labor productivity enough to, at least, compensate for these costs. Finally, the gender gap acts as a substitute for the union wage premium, which suggests that the gender gap may be used to lower the bargaining position of labor unions. As a result, gender gap policies are less costly in masculinized unionized firms.

5.3. Gender gap and firm performance

5.3.1. Identification strategy

To investigate the effect of the gender gap on performance, proxied by earnings before interest and taxes (EBIT) over total assets, we will investigate not only performance but also firm-level wages and labor productivity. Because EBIT is roughly equal to value-added less total payroll,

our investigation will identify the channel through which the gender gap could affect performance. The ACEMO-DSE labor relations survey is highly unbalanced because only firms with more than 500 full-time equivalent employees are included in the sample every year. Because nearly all of these large firms are unionized in all years of the panel, firm fixed effects cannot be used to investigate the interaction between the gender pay gap and unionization on performance because there is no intrafirm intertemporal variation in the unionization variable. As a result, only pooled models can be used. We limit omitted variable bias by controlling for variables that have a causal effect on both unionization and the gender gap and that affect performance. Following the literature, we include covariates for firm size, capital intensity, R&D activities, business group affiliation, and various covariates to capture workforce composition. Industry fixed-effects and year fixed-effects are also included. For the firm-level wage analysis, further controls include firm leverage, labor productivity captured for each industry-year as quintiles of the natural logarithm of the ratio of value-added over full-time equivalent employees, percentage of part-time and fixed-term job contracts, and two covariates to capture the percentage of non-French employees (from the European Union or not).

The model is as follows:

$$Wages_i = \alpha + \rho.Union_i + \gamma.Gender\ gap_i + \varphi.Feminization_i + \beta.X_i + \zeta.Y_i + \epsilon_i$$

$$Productivity_i = \alpha + \rho.Union_i + \gamma.Gender\ gap_i + \varphi.Feminization_i + \beta.X_i + \epsilon_i$$

$$ROA_i = \alpha + \rho.Union_i + \gamma.Gender\ gap_i + \varphi.Feminization_i + \beta.X_i + \epsilon_i$$

Wages are the natural logarithm of the ratio of total salaries and benefits over full-time equivalent employees, *Productivity* is the natural logarithm of the ratio of value-added over full-time equivalent employees, and *ROA* is EBIT scaled by total assets. *i* indexes the firms, *Union* indicates unionization and *X* and *Y* are vectors of observable covariates described above. The wage model is derived from Mincer wage models but computed at the firm level instead of the employee level, and the productivity model is derived from a Cobb-Douglas function augmented with human capital variables.

5.3.2. Gender gap and firm performance

Table 4, Columns 1 and 2 report the wage analysis, columns 3 and 4 report the labor productivity analysis, and columns 5 to 6 report the performance analysis. First, the wage analysis indicates that the gender gap significantly increases wages and that the union wage premium is positive but mitigated by the gender gap. These results at the firm level confirm our previous findings at the employee level. Second, the labor productivity analysis suggests that the gender gap increases labor productivity significantly, promoting the incentives hypothesis (H1). Finally, in the performance analysis, the coefficient estimate of the gender gap in column 5 is close to zero and non-significant, suggesting that the gender gap has no effect on performance. We can deduce from the wages and labor productivity analyses in columns 1 and 3 that the gender gap increases both wages and labor productivity in the same magnitude, leaving performance unchanged. Although the average gender gap has no effect on performance, the results are sharply different when considering unionization status. In column 6, the estimate of the gender gap is significantly negative, whereas the estimate of the interaction between unionization and the gender gap is significantly positive. In nonunion firms, the gender gap increases wages too much compared to the increase in labor productivity. In contrast, in unionized firms, the gender gap mitigation effect on the union wage premium allows the rise in wages to be on par with the increase in labor productivity.

5.3.3. Gender gap and performance in feminized firms

Table 5 reports additional results considering feminization rate interactions. Columns 1 to 3 report the wage analysis, columns 4 to 6 report the labor productivity analysis, and columns 7 to 9 report the performance analysis. First, column 1 results confirm our previous findings that if the feminization rate reduces wages, it does so to an even greater extent when the firm is unionized. Females are paid less; thus, more women means lower total payroll, and feminized unionized firms

pay their employees, both men and women, less than do their masculinized firm counterparts because of the disappearance of the union wage premium. Columns 2 and 3 further show that the union wage premium is concentrated in masculinized firms, that the gender gap increases wages in both masculinized and feminized firms and that the gender gap mitigates the union wage premium. Second, column 4 suggests that the feminization rate has no effect on labor productivity in nonunion firms, whereas the feminization rate in unionized firms has a strong negative effect on labor productivity. This finding is consistent with the family-benefits hypothesis (H5). In feminized firms, labor unions may prefer to focus on private-life issues rather than wages, which would explain why they are associated with lower productivity and lower wages compared to their counterparts in masculinized firms. The average effect of the gender gap on labor productivity is positive. The gender gap increases labor productivity in all types of firms except feminized nonunion firms. Possible explanations are that in feminized nonunion firms, women see the gender gap as unfair and work less intensively in return, neutralizing the increase in effort of men, who benefit from the gender gap, consistent with the cohesiveness hypothesis (H2). Conversely, in feminized unionized firms, the gender gap increases labor productivity because women do not perceive it as unfair, and labor unions grant trust in the fairness of the wage policies and compensate women with generous family benefits, as suggested in the transparency hypothesis (H4) and the family-benefits hypothesis (H5). Last, regarding performance, the feminization rate, in nonunion firms, increases performance because it decreases wages without decreasing labor productivity. In unionized firms, the positive effect of the feminization rate is highly mitigated, which is explained by the drop in labor productivity that is higher than the decrease in wages. The gender gap still has no impact on performance, but the negative effect of the gender gap in nonunion firms, shown in Table 4, is mostly concentrated in feminized firms. In nonunion firms, the gender gap increases wages too much compared to the rise in labor productivity, and this issue is stronger in feminized firms. Moreover, in column 9, a T-test on the sum of the gender gap and unionization interaction term estimates shows that gender gap increases performance in feminized unionized firms, with a 5% significance level, suggesting that

feminized unionized firms could benefit from high-gender-gap policies to mitigate the adverse effect of unionization in these firms, promoting the competition hypothesis (H3).

5.4. Robustness checks

5.4.1. Endogeneity issues

Reverse causality issues may affect the association between performance, the gender gap and unionization. If employees in lower (higher) performing firms are more willing to unionize, to protect their jobs (increase their wages), then the estimates for unionization may suffer from a negative (positive) bias. Likewise, if top managers in higher performing firms are more willing to reduce the gender gap, then the estimates for the gender gap may suffer from negative bias.

Unions and reverse causality

In France, establishing a union in a firm is far less costly than in the US and the UK. From a standard cost-benefit analysis, if the cost of unionizing is far lower in France, then unionization should not take place only where benefits are high. With French data, the reverse causality issue should be less problematic than with US or UK data. Nevertheless, we address this potential issue by instrumenting unionization. The usual instruments for unionization found in the economic and finance literature, such as feminization rate, percentage of blue-collar workers and workforce mean age, all seem associated with the performance of firms. In this paper, we use support for extremist political parties (i.e., far-left and far-right parties) in the employment zone where the workplaces operate as an instrument for unionization. For firms with multiple workplaces, we compute a weighted average of this support, weights being the number of full-time equivalent employees in each employment zone. Support for extremist political parties is proxied by the percentage of votes cast for extremist political parties (NPA, LO, FG, EELV, DLF and FN) in the first round of the major French political election, the Presidential election, which took place in 2012. The results are

available[19] at the district level (i.e., cantonal-level), and we are able to link every district to an employment zone to compute our instrumental variable at the employment-zone level, which better suits the job market conditions.

The gender gap and reverse causality

Several laws on gender pay equality have been adopted over the period we examine. There were overlapping periods, and entry into force was also postponed in some cases. Overall, firms have all tried to reduce gender gap over the period, and our data confirm the reduction over time. Therefore, it is unlikely that some firms have deliberately chosen to widen their wage gap between men and women during the period, and reverse causality issues may be of limited importance. Nevertheless, we instrument the gender gap using two different variables, the female CEO binary variable and the percentage of women holding a high-skilled white-collar position in the firm. Female CEO is equal to one if the employee earning the highest wage is a woman and zero otherwise. The percentage of women holding a high skilled white-collar position is computed, just as the percentage of high skilled white-collars, from an aggregation of the employee-level comprehensive data of firms' job contracts found in the DADS.

First-stage

To pass the first-stage (relevance condition), instrumental variables must be (strongly) correlated with the variable they instrument. Because unionization is a binary variable, we use the Woolridge 3-step procedure to limit bias. The rationale underlying the use of support for extremist political parties to instrument unionization is that employees favoring extremist political parties should be more willing to complain and unionize to improve their conditions. The rationale underlying the use of female CEO and the percentage of women holding a high skilled white-collar

[19] The results are available at https://www.data.gouv.fr/fr/datasets/election-presidentielle-2012-resultats-572126/

position to instrument the gender gap is that female top managers may be more concerned about unfairness toward women and that, for a given percentage of high skilled white-collars in a firm, the more women holding a high skilled white-collar position there are, the larger the gender gap because the gender gap is concentrated in higher job positions. Table 6 reports the results from the first and second stages. Columns 1 and 3 confirm that all instrumental variables pass the relevance condition. In column 1, support for extremist political parties is positively associated with unionization. The more residents of an employment zone support extremist political parties, the more likely that the firms in that employment zone will be unionized. In column 3, female CEO is negatively associated with the gender gap, while the female high skilled white-collar rate is positively correlated with the gender gap. These estimates confirm previous findings: female top managers reduce the gender gap, as documented in the gap analysis, while the percentage of females holding a high job position increases the firm-level gender gap because the gender gap is concentrated in these positions.

Second-stage

To pass the exclusion restriction, instrumental variables must be uncorrelated with the error term of the performance model. This condition is not testable, but we argue that controlling for observables, employees' support for specific political parties should not be correlated with the performance of firms, that there is no reason to believe that women do better or worse than men at running a firm and that women in high skilled white-collar positions may be more profitable to firms than similar men (through channels other than the gender gap). Including these instrumental variables directly in the performance model leads to non-significant estimates. The overidentification test (Hansen J statistic) on the instrumentation of the gender gap reports a p-value of 0.3518, suggesting that both instrumental variables for the gender gap are coherent with one another. Columns 2, 4 and 5 of Table 6 show coefficient estimates of the second stage. Column 2 instruments unionization and confirms that unionization decreases performance significantly. Column 4 instruments the gender gap and confirms that the average effect of the gender gap on performance

is not significantly different from zero. Finally, column 5 instruments both unionization and the gender gap to investigate their interaction term. The results confirm the findings from the main results: the gender gap reduces performance in nonunion firms but not in unionized firms.

5.4.2. Balancing covariates

Parametric regressions impose a functional form that leads to potential misspecification errors. Unionization can be seen as a treatment effect. When covariates between the treated and untreated groups are not balanced, misspecification error can lead to biased estimates. There is an extensive literature about covariate balancing and the techniques to achieve balance, such as exact matching, coarsened exact matching, propensity score matching with or without replacement, or entropy balancing. In this paper, we use entropy balancing from (Hainmueller, 2012) because this recent method, which is attracting more and more attention, allows excellent balance without the need to repeatedly look for the best parameterization, as is required with propensity-score matching. Entropy balancing weights the observations so that the reweighted treatment and control groups satisfy the same moments of the covariate distributions. In this paper, we balance covariate distributions between nonunion and unionized firms for the first three moments. Balance tests show that the reweighted sample is well balanced. The pseudo-R^2 is close to zero, which means that the covariates no longer determine unionization. The mean and median biases are 0.7 and 0, respectively, with a bias on the gender gap variable of 0. To further allow comparisons with propensity-score matching techniques, we compute Rubin's B[20] and Rubin's R[21], which are 5.7 and 1.82, respectively. Table 7 reports the results on the reweighted sample. Both columns confirm previous results. Although the gender gap does not reduce performance on average, it does significantly reduce performance in nonunion firms.

[20] Rubin's B is the absolute standardized difference in the means of the propensity score index in the treated and non-treated group.
[21] Rubin's R is the ratio of treated to non-treated variances of the propensity score index.

5.4.3. Alternate gender gap measures

To alleviate concerns that our results may be driven by a specific way of computing firm-level gender gaps, we confirm our main results using two alternative gender gap measures presented in Appendix A. Table 8 reports the estimates of the main specifications using all available gender gap measures. Columns 1 and 4 are the main results, using our main gender gap measure, while columns 2 and 5 report results using the *gender gap (group)* measure and columns 3 and 6 report results using the *gender gap (law)* measure. All gender gap measures give similar results. The detrimental effect of the gender gap on performance is circumscribed to nonunion firms.

6. Conclusion

In this paper, we analyze the impact of the gender pay gap on the performance of firms in France. We find that the gender pay gap effect depends on the presence of unions in the firm. When the firm is not unionized, the gender pay gap reduces profitability due to higher labor costs that are not compensated by higher productivity. In contrast, when unions are present, the gender gap has no effect on profitability in male-dominated firms and increases profitability in female-dominated firms. We interpret our results in the following manner: the presence of a union can be a guarantee of transparent and fair pay policy. If there is no union, employees may prefer an equal pay policy, which would also be an efficient option for the firm, as its performance would increase. This result is in line with our second hypothesis that pay equality favors cohesiveness and employee satisfaction and improves firm value.

When unions are present in the firm, on average, the negative effect of the gender pay gap on performance disappears, in line with our fourth hypothesis that disparate wages are acceptable in the presence of transparency in outputs. Disparate wages are acceptable as long as they appear to

be fair, i.e., consistent with employees' productivity. We find different results in male-dominated and female-dominated firms. These differences are in line with our third hypothesis that competition shifts the relation between the gender gap and performance, with women shying away from competition and avoiding performance-based compensation. In male-dominated firms, the gender pay gap is small and has no effect on profitability, which means that increased productivity compensates for higher salaries. In contrast, in female-dominated firms, we find a positive impact of gender pay gap on performance. Our findings, in line with our fifth hypothesis, suggest that in these firms, union bargaining focuses on work-life balance, which is one of the main claims of female workers, leading to higher employee satisfaction and higher performance of the firms, despite lower salaries and higher gender gaps.

Our results suggest that in female-dominated firms, women collectively focus on quality of life at the expense of wages. These priorities more broadly reflect the burden of family responsibilities, which mainly fall on women. The pay gap can only be eliminated in the long term by changing cultural choices in the distribution of domestic tasks between men and women. This subject goes far beyond the compensation policies of companies and the scope of this article.

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Appendix A. Alternate gender gap measures

In addition to our main variable measuring the gender pay gap, we also use two alternate gender gap measures as robustness checks. Both measures involve grouping, for each firm and each year, employees by job positions and age categories. Group gender gaps are computed for each group. For both measures, group gender gaps are computed using all the employment contracts of each firm-year observation of the *Firm-level dataset*. For a given year, the firm gender gap is the weighted average of these group gender gaps. The weights are the number of full-time equivalent employees in each group.

The first measure, the *gender gap (group)* variable, is computed with the following rules: groups are combinations of 22 job positions (2-digit PCS-ESE) and 11 "5-year" age categories (16-20 / 21-25 / ... / 61-65 / 66-70). Group gender gaps are computed only if at least one man and one woman are in the group, and firm gender gap is computed only if there are at least 10 full-time equivalent male employees and 10 full-time equivalent female employees in the groups from which group gender gaps are computed.

The second measure, the *gender gap (law)* variable, is computed following the rules fixed by the decree: employees who were not under a job contract with the firm for at least 6 months for a given year are discarded and groups are a combination of 4 job positions (high skilled white-collars, medium skilled white-collars, low and unskilled white-collars and blue-collars) and 4 age categories (less than 30 / 30-39 / 40-49 / 50 and more). Group gender gaps are computed only if at least 3 men and 3 women are in the group, and group gender gaps are set to zero if the absolute value of the group gender gap is below 5%. Finally, the *gender gap (law)* is computed only if there are at least 40% of the firm's employees in the groups from which group gender gaps are computed. As a consequence, the *gender gap (law)* suffers from downward bias because groups with small gender gaps are considered to have no gap, which ultimately decreases the firm-level average gender gap.

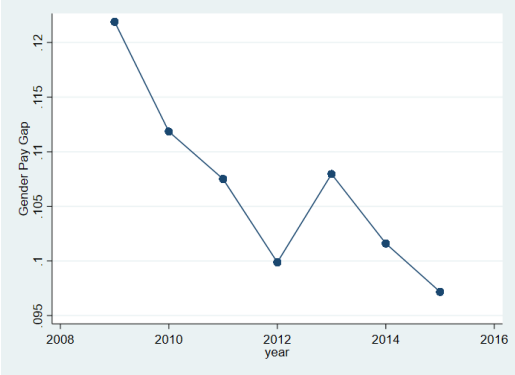
Appendix B. Variable definitions

Variable name		Source
	Gender gap variables	
Gender gap	Firm-level average wage differential between men and women - computation method is discussed in Section 4.1.	DADS
Gender gap (group)	Firm-level average wage differential between men and women - computation method is discussed in Appendix A.	DADS
Gender gap (law)	Firm-level average wage differential between men and women - computation method is discussed in Appendix A.	DADS
	Union variable	
Union	Dummy variable that equals one if there is at least one union in the firm, zero otherwise	ACEMO-DSE
	Dependent variables (firm-level)	
ROA	Return on assets computed as earnings before interests and taxes (EBIT) over total assets	FARE
Productivity	Labor Productivity computed as the natural logarithm of the ratio of value-added over full-time equivalent employees	FARE
Wages	Natural logarithm of the ratio of total salaries and benefits over the number of full-time equivalent employees	DADS
	Dependent variable (employee-level)	
HWAGE	Natural logarithm of the ratio of wage over the number of hours under job contract	DADS
	Instrumental variables	
Support for extremist political parties	Percentage of votes cast by employees for far-left and far-right political parties proxied by the votes cast in the employment zones where the firm operates Computation description in section 5.4.1.	http://data.gouv.fr
Female CEO	Dummy variable that equals one if the highest wage in the firm is earned by a woman, zero otherwise	DADS
Female high skilled white-collar	Percentage of employees that are women in a high-skilled white-collar position	DADS
	Firm-level Controls	
Industry FE	Industry Fixed effects, using Eurostat NACE Rev.2 industry classification at the division-level (88 industries)	FARE
Firm size	Natural logarithm of full-time equivalent employees	DADS
Capital intensity	Natural logarithm of the ratio of noncurrent tangible assets over full-time equivalent employees	FARE and DADS
R&D	Dummy variable that equals one if the firm is declaring R&D expenditures for research tax credit, zero otherwise	DGFiP
Group : dominant firm	Dummy variable that equals one if the firm is part of a business group and employs the majority of the group workforce, zero otherwise	LIFI
Group : non dominant firm	Dummy variable that equals one if the firm is part of a business group and does not employ the majority of the group workforce, zero otherwise	LIFI
Workforce age	Workers mean age	DADS
Feminization	Percentage of full-time equivalent female	DADS
High skilled white-collars	Percentage of firm total work time (hours) worked by managers and intellectual professions	DADS
Skilled white-collars	Percentage of firm total work time (hours) worked by intermediary professions	DADS
Skilled blue-collars	Percentage of firm total work time (hours) worked by blue-collars with technical qualifications	DADS
Unskilled blue-collars	Percentage of firm total work time (hours) worked by blue-collars without technical qualification	DADS
Productivity Q#	Industry-year quintiles of the natural logarithm of the ratio of value-added over full-time equivalent employees	FARE
Leverage	Total debts over total assets	FARE
Employment conditions	Percentage of full-time equivalent employees on full-time job contract	DADS
Contracts types	Percentage of full-time equivalent employees on fixed-term job contract	DADS
Foreigners (European)	Percentage of non-French European full-time equivalent employees	DADS
Foreigners (non-European)	Percentage of non-French non-European full-time equivalent employees	DADS
	Employee-level Controls	
Employee Industry FE	Industry of the workplace where the employee operates, using Eurostat NACE Rev.2 industry classification at the division-level (88 industries)	FARE
Employment zone FE	Location of the workplace where the employee operates: 322 employment zones (geographical areas within which most of the workers reside and work, and in which firms' establishments can find the vast majority of their needed workforce)	DADS
Job position FE	Employee job position: 29 job positions (Socioprofessional job classification from the PCS-ESE of the INSEE)	DADS
Age	Age of the employee	DADS
Age (squared)	Squared age of the employee	DADS
Female	Dummy variable that equals one if the employee is female, zero otherwise	DADS
Employment conditions	Dummy variable that equals one if the employee holds a part-time job contract, zero otherwise	DADS
Contract type	Dummy variable that equals one if the employee holds a fixed-term job contract, zero otherwise	DADS
Foreigner	Categorical variable indicating that the employee is either French, non-French European or non-French non-European (3 positions)	DADS
	Sub-samples	
MF (Masculinized Firms)	Firms with the lowest feminization rate when the full sample is splitted in half depending on the feminization rate	DADS
FF (Feminized Firms)	Firms with the highest feminization rate when the full sample is splitted in half depending on the feminization rate	DADS

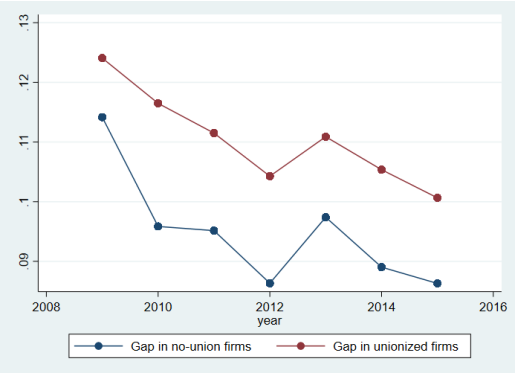
Figures

Figure 1: Evolution and distribution of the gender gap (descriptive statistics)

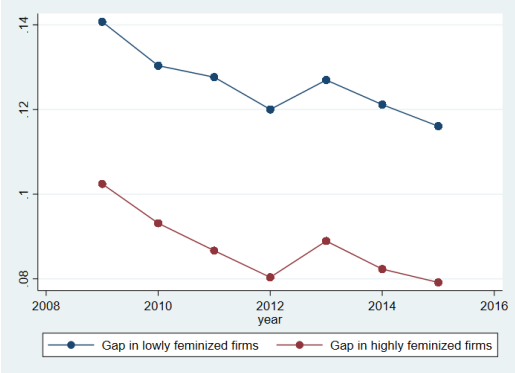
Figure 1a reports the evolution and distribution of the gender gap, from 2009 to 2015, in French nonfinancial private firms. Figure 1b compares the evolution of the gender gap in union and nonunion firms. In Figure 1c, we split the sample firms in half depending on the feminization rate. In Figure 1d, WC refers to white-collars and BC to blue-collars. Appendix B provides definitions for all variables. Figure 1e compares the evolution of the gender gap by CEO gender.



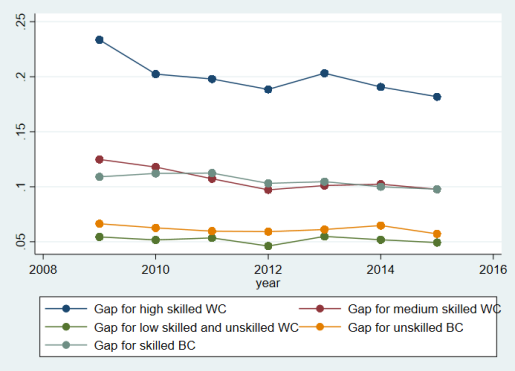
(a) Average gap



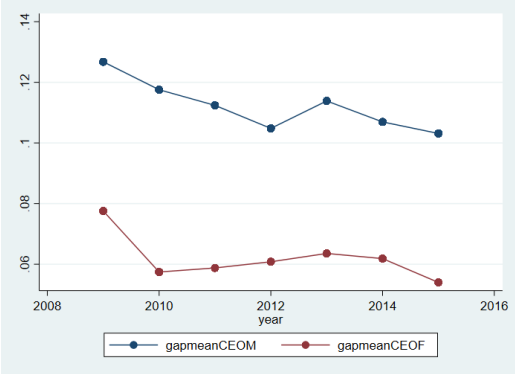
(b) Gap in non-union and unionized firms



(c) Gap in masculinized and feminized firms



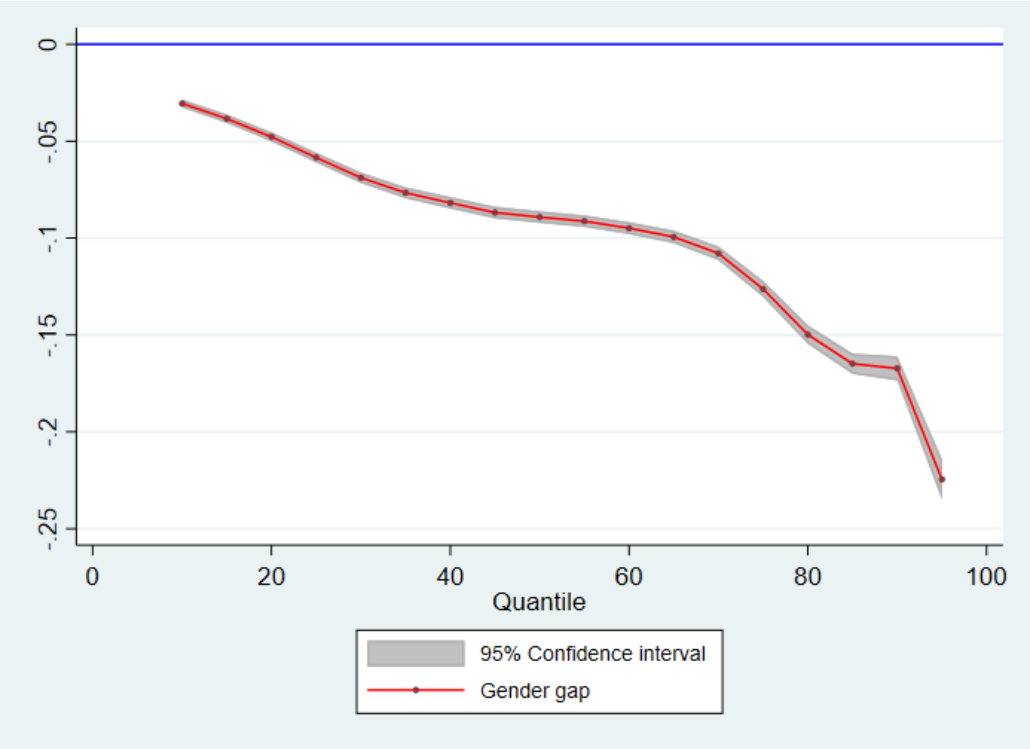
(d) Gap by job positions



(e) Gap by CEO gender

Figure 2: Distribution of the gender gap through the wage distribution

Figure 2 reports unconditional quantile regression (UQR) results on the relation between wage and gender. The dependent variable is the natural logarithm of wage over the number of hours under job contract. Control variables include firm-level variables such as firm size, capital intensity, R&D expenditures, business group affiliation, workforce composition (feminization, average age, job positions, part-time, fixed-term and nationality), firm leverage, labor productivity, and employee-level variables such as age and its squared term, nationality, job contract (part-time, fixed-term), job position, employment zone, and industry and year fixed effects. The gray area around the curve is 95% confidence interval, adjusted for heteroscedasticity and clustered by firm. Appendix B provides definitions for all variables.



(a) Gap along the wage distribution

Tables

Table 1: Summary statistics

This table presents descriptive statistics for all variables at the firm level, including instrumental variables and additional variables at the employee level. Appendix B provides detailed definitions for all variables.

	Level	mean	sd	skewness	p50	min	max	count
PANEL A : Variables from the firm-level data set								
ROA	Firm	.0476	.13	-1.16	.0499	-.642	.471	19784
Productivity	Firm	11	.613	.252	11	4.17	17.7	19645
Gender gap	Firm	.107	.1	1.07	.0923	-.0878	.473	19784
Gender gap (group)	Firm	.107	.093	1.06	.0944	-.0825	.458	19050
Gender gap (law)	Firm	.0517	.0516	.824	.0437	-.079	.236	18234
Gender gap for High skilled White-collars	Firm	.2	.16	1.05	.173	-.134	.792	8505
Gender gap (group) for High skilled White-collars	Firm	.188	.142	1.17	.162	-.107	.725	9334
Gender gap (law) for High skilled White-collars	Firm	.0947	.0949	.298	.0852	-.223	.399	12561
Gender gap for medium skilled White-collars	Firm	.108	.11	.816	.0964	-.149	.502	8596
Gender gap (group) for medium skilled White-collars	Firm	.101	.103	.781	.0909	-.158	.475	9643
Gender gap (law) for medium skilled White-collars	Firm	.0485	.072	.522	.038	-.183	.307	14148
Gender gap for low skilled and unskilled White-collars	Firm	.0517	.0974	1.24	.0339	-.175	.434	8233
Gender gap (group) for low skilled and unskilled White-collars	Firm	.053	.0981	1.12	.0355	-.188	.428	8486
Gender gap (law) for low skilled and unskilled White-collars	Firm	.0361	.0828	.957	.0133	-.214	.341	11883
Gender gap for skilled Blue-collars	Firm	.106	.096	.617	.0966	-.143	.441	5422
Gender gap (group) for skilled Blue-collars	Firm	.106	.0987	.691	.0963	-.149	.459	5663
Gender gap for unskilled Blue-collars	Firm	.0617	.0728	.926	.0509	-.128	.337	4865
Gender gap (group) for unskilled Blue-collars	Firm	.0698	.0805	1.14	.0595	-.144	.41	4945
Gender gap (law) for Blue-collars	Firm	.0533	.065	.52	.0437	-.164	.292	10514
Union	Firm	.768	.422	-1.27	1	0	1	19784
Feminization	Firm	.401	.224	.41	.371	.0149	.992	19784
female CEO	Firm	.106	.308	2.55	0	0	1	19784
Workforce age	Firm	40	4.41	-.703	40.7	22.4	59.1	19784
Firm size	Firm	6.01	1.18	.342	6.05	.916	12.4	19784
Capital intensity	Firm	9.46	1.86	-.53	9.73	-1.57	17.1	19784
Group	Firm	.871	.335	-2.21	1	0	1	19784
Group : dominant firm	Firm	.344	.475	.657	0	0	1	19784
Group : non dominant firm	Firm	.527	.499	-.108	1	0	1	19784
R&D	Firm	.346	.476	.646	0	0	1	19784
High skilled White-collars	Firm	.194	.217	1.77	.115	0	1	19784
Skilled White-collars	Firm	.204	.155	1.21	.174	0	1	19784
Skilled Blue-collars	Firm	.187	.207	1.07	.101	0	.988	19784
Unskilled Blue-collars	Firm	.159	.251	1.95	.0403	0	1	19784
PANEL B : Instrumental variables								
Support for extremist political parties	Firm	.341	.0442	.116	.345	.263	.514	19326
female CEO	Firm	.106	.308	2.55	0	0	1	19326
Female High skilled White-collar	Firm	.0606	.0841	2.63	.0279	0	.711	19326
PANEL C : Additional variables from the employee-level data set								
Hourly wage	Employee	2.85	.465	1.14	2.75	-2.48	9.05	1855885
Leverage	Firm	.155	.188	1.57	.0781	0	.93	1855885
Female	Employee	.409	.492	.37	0	0	1	1855885
Age	Employee	39.6	11.2	.0828	39	16	80	1855885
High skilled White-collars	Employee	.192	.394	1.57	0	0	1	1855885
Skilled White-collars	Employee	.198	.399	1.51	0	0	1	1855885
Unskilled and low skilled White-collars	Employee	.254	.435	1.13	0	0	1	1855885
Skilled Blue-collars	Employee	.189	.392	1.59	0	0	1	1855885
Unskilled Blue-collars	Employee	.163	.369	1.82	0	0	1	1855885
Fixed term job	Employee	.111	.315	2.47	0	0	1	1855885
Part-time job	Employee	.166	.372	1.8	0	0	1	1855885
Foreign employee : EU	Employee	.02	.14	6.85	0	0	1	1855885
Foreign employee : outside EU	Employee	.0493	.217	4.16	0	0	1	1855885

Table 2: Firm-level gender gap analysis

This table presents OLS estimates of the sensitivity of the gender gap on several firm-level variables. The sample period is 2009 to 2015. Union is a binary variable indicating the presence of labor unions. Feminization is the full-time equivalent percentage of females in the workforce. Female CEO equals one if a female is earning the highest wage in the firm, zero otherwise. Columns 2 to 5 include interaction terms between the variables of interest. Appendix B provides definitions for all variables. T-values are displayed in parentheses, corresponding standard errors are adjusted for heteroscedasticity and clustered by firm. *** (**) (*) indicate significance at the 1% (5%) (10%) level.

Dependent variable	Gender gap	Gender gap	Gender gap	Gender gap	Gender gap
Column	(1)	(2)	(3)	(4)	(5)
Union	**-0.0079*** **	**-0.0115** **	**-0.0086*** **	**-0.0079*** **	**-0.0128** **
	(-3.39)	**(-2.09)**	**(-3.47)**	**(-3.40)**	**(-2.15)**
Feminization	**0.0137** **	**0.0077**	**0.0136** **	**0.0089**	**0.0019**
	(2.00)	**(0.74)**	**(2.00)**	**(1.27)**	**(0.16)**
female CEO	**-0.0232*** **	**-0.0231*** **	**-0.0269*** **	**-0.0425*** **	**-0.0562*** **
	(-10.84)	**(-10.81)**	**(-7.48)**	**(-7.61)**	**(-4.73)**
Union * Feminization		**0.0077**			**0.0084**
		(0.78)			**(0.75)**
Union * female CEO			**0.0055**		**0.0166**
			(1.27)		**(1.24)**
female CEO * Feminization				**0.0358*** **	**0.0507** **
				(3.80)	**(2.53)**
Union * female CEO * Feminization					**-0.0157**
					(-0.70)
Firm size	-0.0013	-0.0013	-0.0013	-0.0013	-0.0014*
	(-1.59)	(-1.60)	(-1.60)	(-1.64)	(-1.70)
Capital intensity	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003
	(-0.49)	(-0.48)	(-0.48)	(-0.45)	(-0.43)
Group : dominant firm	0.0031	0.0031	0.0031	0.0030	0.0030
	(1.23)	(1.22)	(1.23)	(1.20)	(1.19)
Group : non dominant firm	0.0005	0.0004	0.0004	0.0003	0.0003
	(0.18)	(0.17)	(0.18)	(0.13)	(0.12)
R&D	0.0048**	0.0048**	0.0048**	0.0048**	0.0049**
	(2.07)	(2.09)	(2.08)	(2.10)	(2.13)
Workforce age	0.0031***	0.0031***	0.0031***	0.0031***	0.0031***
	(11.51)	(11.53)	(11.52)	(11.60)	(11.62)
High skilled White-collars	0.1381***	0.1377***	0.1378***	0.1389***	0.1383***
	(15.35)	(15.33)	(15.34)	(15.45)	(15.42)
Skilled White-collars	0.0619***	0.0618***	0.0619***	0.0619***	0.0618***
	(7.53)	(7.52)	(7.52)	(7.52)	(7.50)
Skilled Blue-collars	0.0374***	0.0373***	0.0373***	0.0376***	0.0375***
	(4.52)	(4.51)	(4.51)	(4.55)	(4.53)
Unskilled Blue-collars	-0.0125*	-0.0129*	-0.0125*	-0.0117	-0.0121
	(-1.68)	(-1.73)	(-1.69)	(-1.58)	(-1.62)
Constant	-0.1247***	-0.1216***	-0.1240***	-0.1254***	-0.1209***
	(-7.54)	(-7.10)	(-7.49)	(-7.59)	(-7.00)
Industry FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	19784	19784	19784	19784	19784
Adjusted R-squared	0.257	0.257	0.257	0.257	0.257

Table 3: Employee-level wage analysis

This table reports the regression results on the relation between wages and the gender gap in unionized and nonunion firms at the employee level. The dependent variable is HWAGE (natural logarithm of wage over the number of hours under job contract). Samples: MALE (male employees), FEMALE (female employees), *-MF (in masculinized firms), and *-FF (in feminized firms). Masculinized and feminized firm indicators are obtained by splitting the distribution of firm-year observations from the firm-level dataset in half depending on the feminization rate. Union is a binary variable indicating the presence of labor unions. Feminization is the full-time equivalent percentage of females in the workforce. The gender gap is the firm-level gender gap computed using the one-to-one matching algorithm. Appendix B provides definitions for all variables. T-values are displayed in parentheses, corresponding standard errors are adjusted for heteroscedasticity and clustered by firm. *** (**) (*) indicate significance at the 1% (5%) (10%) level, respectively.

Sample	FULL	MALE	FEMALE	MALE	FEMALE	MALE-MF	FEMALE-MF	MALE-FF	FEMALE-FF
Dependent variable	HWAGE	HWAGE	HWAGE	HWAGE	HWAGE	HWAGE	HWAGE	HWAGE	HWAGE
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female	**-0.1004*** **								
	(-93.18)								
Union	**0.0062****	**0.0157*****	**0.0050**	**0.0348*****	**0.0468*****	**0.0267*****	**0.0295*****	**-0.0062**	**-0.0015**
	(1.98)	**(3.42)**	**(1.36)**	**(4.57)**	**(6.21)**	**(3.42)**	**(3.77)**	**(-1.22)**	**(-0.36)**
Gender gap	**0.1311*****	**0.2890*****	**-0.0208**	**0.2282*****	**-0.0183**	**0.2792*****	**0.0311**	**0.3390*****	**-0.0148**
	(8.92)	**(10.24)**	**(-0.91)**	**(13.35)**	**(-1.25)**	**(6.57)**	**(0.74)**	**(9.66)**	**(-0.54)**
Union * Gender gap		**-0.0830*****	**0.0041**			**-0.1492*****	**-0.1276*****	**0.0924****	**0.0357**
		(-2.67)	**(0.15)**			**(-3.26)**	**(-2.81)**	**(2.21)**	**(1.08)**
Feminization	**-0.0427*****	**-0.0263****	**-0.0586*****	**0.0327****	**-0.0029**	**-0.0604****	**-0.1528*****	**-0.0414****	**-0.0709*****
	(-4.18)	**(-2.23)**	**(-5.58)**	**(1.99)**	**(-0.20)**	**(-2.07)**	**(-5.23)**	**(-2.03)**	**(-4.36)**
Union * Feminization				**-0.0753*****	**-0.0733*****				
				(-4.99)	**(-5.64)**				
Firm size	0.0124***	0.0121***	0.0127***	0.0125***	0.0126***	0.0124***	0.0108***	0.0132***	0.0133***
	(8.81)	(7.48)	(9.07)	(7.72)	(9.09)	(5.58)	(4.54)	(6.45)	(7.93)
Capital intensity	0.0114***	0.0131***	0.0079***	0.0131***	0.0079***	0.0157***	0.0153***	0.0084***	0.0052***
	(8.84)	(9.21)	(6.00)	(9.23)	(6.08)	(8.79)	(8.71)	(4.32)	(3.29)
Productivity Q2	0.0214***	0.0209***	0.0227***	0.0201***	0.0222***	0.0173***	0.0150***	0.0291***	0.0257***
	(7.30)	(6.20)	(7.77)	(5.92)	(7.63)	(3.95)	(3.22)	(6.78)	(7.51)
Productivity Q3	0.0484***	0.0498***	0.0458***	0.0487***	0.0449***	0.0478***	0.0420***	0.0463***	0.0449***
	(14.71)	(13.19)	(13.65)	(12.86)	(13.45)	(9.79)	(8.70)	(8.95)	(10.99)
Productivity Q4	0.0817***	0.0869***	0.0730***	0.0855***	0.0722***	0.0890***	0.0781***	0.0695***	0.0671***
	(22.26)	(20.85)	(19.08)	(20.42)	(18.94)	(16.48)	(14.70)	(12.34)	(14.29)
Productivity Q5	0.1388***	0.1487***	0.1236***	0.1476***	0.1228***	0.1510***	0.1304***	0.1283***	0.1149***
	(30.06)	(27.88)	(26.85)	(27.60)	(26.75)	(21.76)	(19.61)	(19.19)	(20.48)
Group : dominant firm	-0.0138***	-0.0160***	-0.0110***	-0.0156***	-0.0110***	-0.0194***	-0.0176***	-0.0101**	-0.0088**
	(-4.23)	(-4.09)	(-3.45)	(-3.97)	(-3.45)	(-3.39)	(-3.02)	(-2.29)	(-2.40)
Group : non dominant firm	0.0156***	0.0158***	0.0142***	0.0163***	0.0143***	0.0135**	0.0083	0.0170***	0.0153***
	(4.54)	(3.89)	(4.19)	(4.00)	(4.23)	(2.33)	(1.41)	(3.54)	(3.86)
R&D	0.0080**	0.0061*	0.0110***	0.0056	0.0106***	0.0035	0.0017	0.0070	0.0132***
	(2.54)	(1.76)	(3.15)	(1.62)	(3.00)	(0.85)	(0.41)	(1.33)	(2.76)
Leverage	-0.0286***	-0.0320***	-0.0224***	-0.0330***	-0.0231***	-0.0201	-0.0279**	-0.0358***	-0.0165**
	(-3.99)	(-3.70)	(-3.36)	(-3.82)	(-3.46)	(-1.64)	(-2.33)	(-3.80)	(-2.18)
Constant	2.4978***	2.3803***	2.2518***	2.3559***	2.2186***	2.1398***	1.9526***	2.4491***	2.2253***
	(15.68)	(13.91)	(27.58)	(13.73)	(27.44)	(12.24)	(15.29)	(24.69)	(29.41)
Workforce composition	YES	YES	YES	YES	YES	YES	YES	YES	YES
Employee characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES
Employment zone FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1855885	1096930	758955	1096930	758955	737003	204988	359927	553967
Adjusted R-squared	0.671	0.662	0.661	0.662	0.661	0.637	0.603	0.704	0.668

Table 4: Gender gap, union and firm performance

This table reports the regression results on the relation between various financial variables, such as total payroll, labor productivity or the return on assets, and gender gap in unionized and nonunion firms. Union is a binary variable indicating the presence of labor unions. Feminization is the full-time equivalent percentage of females in the workforce. The gender gap is the firm-level gender gap computed using the one-to-one matching algorithm. The dependent variables are: Wages (salaries and benefits), Productivity (natural logarithm of the ratio of value-added over full-time equivalent employees) and ROA (EBIT over total assets). Appendix B provides definitions for all variables. T-values are displayed in parentheses, corresponding standard errors are adjusted for heteroscedasticity and clustered by firm. *** (**) (*) indicate significance at the 1% (5%) (10%) level, respectively.

Dependent variable	Wages	Wages	Productivity	Productivity	ROA	ROA
Column	(1)	(2)	(3)	(4)	(5)	(6)
Union	**0.0369*** **	**0.0477*** **	**-0.0106**	**-0.0218**	**-0.0197*** **	**-0.0330*** **
	(4.64)	**(4.44)**	**(-0.85)**	**(-1.45)**	**(-6.07)**	**(-8.07)**
Gender gap	**0.2982*** **	**0.3695*** **	**0.2018*** **	**0.1268***	**-0.0116**	**-0.1005*** **
	(12.50)	**(8.42)**	**(3.99)**	**(1.65)**	**(-0.89)**	**(-5.10)**
Union * Gender gap		**-0.1029** **		**0.1082**		**0.1285*** **
		(-2.02)		**(1.18)**		**(5.57)**
Feminization	**-0.1612*** **	**-0.1620*** **	**-0.1034*** **	**-0.1029*** **	**0.0234** **	**0.0239** **
	(-7.76)	**(-7.80)**	**(-2.62)**	**(-2.61)**	**(2.13)**	**(2.18)**
Workforce age	0.0101***	0.0101***	0.0036**	0.0036**	-0.0032***	-0.0032***
	(10.56)	(10.58)	(2.01)	(2.00)	(-6.96)	(-7.01)
Firm size	-0.0065*	-0.0067*	-0.0205***	-0.0202***	-0.0045***	-0.0042***
	(-1.88)	(-1.94)	(-3.63)	(-3.57)	(-3.48)	(-3.22)
Capital intensity	0.0118***	0.0119***	0.1203***	0.1202***	0.0051***	0.0050***
	(3.80)	(3.81)	(19.77)	(19.75)	(4.86)	(4.76)
Group : dominant firm	-0.0178***	-0.0180***	0.0113	0.0115	0.0110***	0.0112***
	(-2.69)	(-2.71)	(0.86)	(0.87)	(3.23)	(3.29)
Group : non dominant firm	0.0024	0.0021	0.0219	0.0222	0.0023	0.0026
	(0.33)	(0.29)	(1.59)	(1.61)	(0.61)	(0.70)
R&D	0.0066	0.0070	0.0384***	0.0379***	0.0071**	0.0066**
	(1.32)	(1.40)	(3.04)	(3.00)	(2.26)	(2.09)
High skilled White-collars	0.8878***	0.8857***	1.1214***	1.1234***	-0.0054	-0.0030
	(34.30)	(34.16)	(24.58)	(24.60)	(-0.43)	(-0.24)
Skilled White-collars	0.2715***	0.2715***	0.3195***	0.3197***	-0.0030	-0.0029
	(11.33)	(11.32)	(6.36)	(6.36)	(-0.20)	(-0.19)
Skilled Blue-collars	-0.0102	-0.0106	-0.1566***	-0.1558***	-0.0390***	-0.0382***
	(-0.36)	(-0.37)	(-3.03)	(-3.01)	(-2.77)	(-2.72)
Unskilled Blue-collars	-0.1186***	-0.1193***	-0.3204***	-0.3194***	-0.0342**	-0.0330**
	(-3.21)	(-3.22)	(-6.18)	(-6.16)	(-2.45)	(-2.37)
Constant	3.4348***	3.4276***	10.4952***	10.5030***	0.2217***	0.2312***
	(51.58)	(51.69)	(83.38)	(83.54)	(8.55)	(8.93)
Additional wage model controls	YES	YES	NO	NO	NO	NO
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observations	19772	19772	19645	19645	19784	19784
Adjusted R-squared	0.732	0.733	0.493	0.493	0.063	0.065

Table 5: Feminized versus Masculinized firms

This table reports the regression results on the relation between various financial variables, such as total payroll, labor productivity or the return on assets, and the gender gap in unionized and nonunion firms. The dependent variables are: Wages (salaries and benefits), Productivity (natural logarithm of the ratio of value-added on full-time equivalent employees) and ROA (EBIT over total assets). Samples: MF (masculinized firms) and FF (feminized firms). Masculinized and feminized firm indicators are obtained by splitting the distribution of firm-year observations in half depending on the feminization rate. Union is a binary variable indicating the presence of labor unions. Feminization is the full-time equivalent percentage of females in the workforce. The gender gap is the firm-level gender gap computed using the one-to-one matching algorithm. Appendix B provides definitions for all variables. T-values are displayed in parentheses, corresponding standard errors are adjusted for heteroscedasticity and clustered by firm. *** (**) (*) indicate significance at the 1% (5%) (10%) level, respectively.

Sample	FULL	MF	FF	FULL	MF	FF	FULL	MF	FF
Dependent variable	Wages	Wages	Wages	Productivity	Productivity	Productivity	ROA	ROA	ROA
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Union	**0.0868*** (4.19)**	**0.0900*** (3.54)**	**0.0159* (1.87)**	**0.0592** (2.46)**	**0.0395 (1.57)**	**-0.0602*** (-3.29)**	**-0.0056 (-0.84)**	**-0.0214*** (-3.07)**	**-0.0365*** (-7.31)**
Feminization	**-0.0796** (-2.14)**	**-0.1439** (-2.22)**	**-0.1455*** (-4.78)**	**0.0101 (0.22)**	**0.0855 (0.82)**	**-0.1736** (-2.52)**	**0.0463*** (3.28)**	**0.1176*** (4.35)**	**-0.0081 (-0.42)**
Union * Feminization	**-0.1059*** (-3.10)**			**-0.1481*** (-3.27)**			**-0.0299** (-2.26)**		
Gender gap	**0.2993*** (12.53)**	**0.5132*** (5.64)**	**0.2693*** (5.52)**	**0.2034*** (4.02)**	**0.2699** (2.22)**	**0.0290 (0.29)**	**-0.0113 (-0.86)**	**-0.0431 (-1.61)**	**-0.1170*** (-4.18)**
Union * Gender gap		**-0.3361*** (-3.24)**	**0.0726 (1.23)**		**-0.1308 (-0.93)**	**0.2781** (2.20)**		**0.0581* (1.85)**	**0.1656*** (4.78)**
Workforce age	0.0100*** (10.33)	0.0119*** (7.82)	0.0110*** (11.02)	0.0034* (1.91)	-0.0010 (-0.38)	0.0089*** (4.28)	-0.0032*** (-7.03)	-0.0039*** (-5.62)	-0.0029*** (-5.02)
Firm size	-0.0063* (-1.84)	-0.0011 (-0.20)	-0.0109*** (-2.92)	-0.0202*** (-3.58)	-0.0133 (-1.53)	-0.0234*** (-3.37)	-0.0044*** (-3.43)	-0.0012 (-0.65)	-0.0058*** (-3.19)
Capital intensity	0.0119*** (3.85)	0.0180*** (5.18)	0.0138*** (2.69)	0.1202*** (19.78)	0.1145*** (13.28)	0.1279*** (17.06)	0.0051*** (4.85)	0.0035** (2.09)	0.0053*** (4.11)
Group : dominant firm	-0.0175*** (-2.65)	-0.0176 (-1.46)	-0.0219*** (-3.20)	0.0118 (0.89)	0.0186 (0.85)	0.0052 (0.33)	0.0111*** (3.25)	0.0125** (2.06)	0.0115*** (2.87)
Group : non dominant firm	0.0028 (0.38)	-0.0045 (-0.33)	0.0068 (0.91)	0.0225 (1.63)	0.0452** (2.00)	0.0057 (0.33)	0.0024 (0.63)	0.0080 (1.27)	-0.0003 (-0.06)
R&D	0.0061 (1.22)	0.0023 (0.39)	0.0168** (2.16)	0.0375*** (2.96)	0.0209 (1.27)	0.0658*** (3.64)	0.0069** (2.21)	-0.0012 (-0.31)	0.0168*** (3.44)
High skilled White-collars	0.8937*** (35.29)	0.8201*** (18.32)	0.9237*** (30.31)	1.1285*** (24.83)	0.9155*** (11.83)	1.1659*** (19.45)	-0.0039 (-0.31)	-0.0145 (-0.61)	0.0022 (0.14)
Skilled White-collars	0.2725*** (11.41)	0.2192*** (6.12)	0.3045*** (8.86)	0.3208*** (6.39)	0.1562** (2.01)	0.3671*** (5.13)	-0.0028 (-0.19)	0.0082 (0.29)	-0.0089 (-0.50)
Skilled Blue-collars	-0.0098 (-0.35)	0.0014 (0.04)	-0.1697*** (-4.42)	-0.1554*** (-3.01)	-0.2547*** (-3.21)	-0.3201*** (-4.78)	-0.0388*** (-2.75)	-0.0380 (-1.52)	-0.0238 (-1.17)
Unskilled Blue-collars	-0.1138*** (-3.10)	-0.0813 (-1.41)	-0.2516*** (-5.44)	-0.3130*** (-6.04)	-0.3232*** (-3.63)	-0.4547*** (-7.16)	-0.0327** (-2.35)	-0.0299 (-1.14)	-0.0186 (-1.09)
Constant	3.3902*** (53.81)	3.2452*** (35.04)	3.0823*** (46.70)	10.4355*** (83.23)	10.8342*** (66.60)	9.4502*** (72.83)	0.2097*** (8.04)	0.2410*** (5.87)	0.1708*** (5.37)
Additional wage model control variables	YES	YES	YES	NO	NO	NO	NO	NO	NO
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	19772	9889	9883	19645	9814	9831	19784	9892	9892
Adjusted R-squared	0.733	0.687	0.772	0.494	0.441	0.551	0.064	0.058	0.079

Table 6: Instrumental variable analysis

This table reports the 2SLS regression results on the relation between return on assets and the gender gap in unionized and nonunion firms. Instrumental variables for Union: Support for extremist political parties (far-left and far-right parties). Instrumental variables for Gender gap: female CEO (equals one if the highest paid employee is a woman, zero otherwise); Female High skilled White-collar (full-time equivalent percentage of firm's employees who are women in high skilled white-collar positions). The dependent variables are: Union, Gender gap and ROA. Union is a binary variable indicating the presence of labor unions. The gender gap is the firm-level gender gap computed using the one-to-one matching algorithm. ROA is earnings before interests and taxes (EBIT) over total assets. Appendix B provides definitions for all variables. T-values are displayed in parentheses, corresponding standard errors are adjusted for heteroscedasticity and clustered by firm. *** (**) (*) indicate significance at the 1% (5%) (10%) level, respectively.

Stage	First stage	Second stage	First stage	Second stage	Second stage
Model	Probit	Linear	Linear	Linear	Linear
Dependent variable	Union	ROA	Gender gap	ROA	ROA
Column	(1)	(2)	(3)	(4)	(5)
Union		**-0.0483*** **	**-0.0085*** **	**-0.0211*** **	**-0.0806*** **
		(-4.09)	**(-3.60)**	**(-6.27)**	**(-8.76)**
Gender gap	**-0.6756*** **	**-0.0169**		**-0.0348**	**-0.3924*** **
	(-4.36)	**(-1.26)**		**(-0.25)**	**(-2.67)**
Union * Gender gap					**0.5743*** **
					(6.76)
Support for extremist political parties	**1.0393** **				
	(2.48)				
female CEO			**-0.0240*** **		
			(-11.06)		
Female High skilled White-collar			**0.1613*** **		
			(5.03)		
Firm size	0.8418***	0.0001	-0.0013	-0.0041***	-0.0026*
	(36.96)	(0.05)	(-1.54)	(-3.16)	(-1.93)
Capital intensity	-0.0162	0.0050***	-0.0002	0.0051***	0.0044***
	(-1.33)	(4.71)	(-0.28)	(4.78)	(4.20)
Group : dominant firm	0.0142	0.0128***	0.0021	0.0117***	0.0121***
	(0.32)	(3.66)	(0.82)	(3.38)	(3.47)
Group : non dominant firm	0.4312***	0.0069*	-0.0003	0.0033	0.0047
	(9.64)	(1.72)	(-0.10)	(0.87)	(1.24)
R&D	-0.0199	0.0058*	0.0050**	0.0061*	0.0035
	(-0.43)	(1.84)	(2.14)	(1.88)	(1.06)
Workforce age	0.0941***	-0.0027***	0.0033***	-0.0032***	-0.0033***
	(18.86)	(-5.18)	(12.05)	(-5.12)	(-5.45)
Feminization	-0.2439*	0.0220**	-0.0084	0.0228**	0.0246**
	(-1.92)	(1.97)	(-1.16)	(2.05)	(2.22)
High skilled White-collars	-0.3636**	-0.0048	0.0767***	-0.0002	0.0047
	(-2.55)	(-0.38)	(4.90)	(-0.01)	(0.21)
Skilled White-collars	0.3494**	0.0022	0.0563***	0.0000	-0.0019
	(2.42)	(0.14)	(6.76)	(0.00)	(-0.11)
Skilled Blue-collars	0.3400**	-0.0325**	0.0276***	-0.0362**	-0.0341**
	(2.13)	(-2.24)	(3.28)	(-2.36)	(-2.24)
Unskilled Blue-collars	-0.3844***	-0.0315**	-0.0181**	-0.0321**	-0.0266*
	(-2.58)	(-2.23)	(-2.39)	(-2.26)	(-1.86)
Constant	-7.8996***	0.1381***	-0.0299**	0.1646***	0.2025***
	(-24.86)	(5.41)	(-2.09)	(6.96)	(8.40)
Observations	19326	19326	19326	19326	19326
Adjusted R-squared		0.058	0.258	0.063	0.040

Table 7: Balancing Covariates

This table reports the regression results on the relation between return on assets and the gender gap in unionized and nonunion firms on a reweighted sample to ensure covariate balance between nonunion and unionized firms. Weights are obtained using entropy balancing. The dependent variable is: ROA (earnings before interest and taxes (EBIT) over total assets). Union is a binary variable indicating the presence of labor unions. The gender gap is the firm-level gender gap computed using the one-to-one matching algorithm. Appendix B provides definitions for all variables. T-values are displayed in parentheses, corresponding standard errors are adjusted for heteroscedasticity and clustered by firm. *** (**) (*) indicate significance at the 1% (5%) (10%) level, respectively.

Estimation method	WLS	WLS
Dependent variable	ROA	ROA
Column	(1)	(2)
Union	**-0.0055**	**-0.0148***
	(-0.79)	**(-1.78)**
Gender gap	**-0.0321**	**-0.0778****
	(-1.38)	**(-1.99)**
Union * Gender gap		**0.0852****
		(1.98)
Feminization	0.0419	0.0422
	(1.50)	(1.51)
Workforce age	-0.0023***	-0.0023***
	(-2.76)	(-2.77)
Firm size	-0.0108***	-0.0107***
	(-2.95)	(-2.93)
Capital intensity	0.0083***	0.0085***
	(3.21)	(3.26)
Group : dominant firm	0.0155**	0.0160**
	(2.26)	(2.33)
Group : non dominant firm	-0.0089	-0.0082
	(-1.29)	(-1.18)
R&D	0.0028	0.0029
	(0.40)	(0.42)
High skilled White-collars	0.0489*	0.0491*
	(1.87)	(1.88)
Skilled White-collars	0.0134	0.0136
	(0.58)	(0.59)
Skilled Blue-collars	0.0177	0.0165
	(0.89)	(0.83)
Unskilled Blue-collars	-0.0320	-0.0324
	(-1.34)	(-1.35)
Constant	0.1528***	0.1567***
	(3.33)	(3.43)
Observations	19784	19784
Adjusted R-squared	0.114	0.115

Covariates balance tests					
	Pseudo R2	Mean bias	Median bias	Rubin's B	Rubin's R
Original sample	0.391	11.6	5.7	175.9	1.27
Reweighted Sample	0.001	0.7	0	5.7	1.82

Table 8: Analysis of alternative gender gap measures

This table reports the regression results on the relation between return on assets and the gender gap in unionized and nonunion firms using alternative gender gap measures. The dependent variable is: ROA (earnings before interests and taxes (EBIT) over total assets). Union is a binary variable indicating the presence of labor unions. The gender gap is the firm-level gender gap computed using the one-to-one matching algorithm. Detailed definitions of the alternate gender gap measures are provided in Appendix A. Appendix B gives definitions for all other variables. T-values are displayed in parentheses, corresponding standard errors are adjusted for heteroscedasticity and clustered by firm. *** (**) (*) indicate significance at the 1% (5%) (10%) level, respectively.

Dependent variable	ROA	ROA	ROA	ROA	ROA	ROA
Column	(1)	(2)	(3)	(4)	(5)	(6)
Union	**-0.0197*** **	**-0.0184*** **	**-0.0188*** **	**-0.0330*** **	**-0.0296*** **	**-0.0304*** **
	(-6.07)	**(-5.52)**	**(-5.46)**	**(-8.07)**	**(-6.61)**	**(-6.87)**
Gender gap	**-0.0116**			**-0.1005*** **		
	(-0.89)			**(-5.10)**		
Gender gap (group)		**-0.0155**			**-0.0906*** **	
		(-1.08)			**(-3.94)**	
Gender gap (law)			**-0.0261**			**-0.1804*** **
			(-0.93)			**(-4.34)**
Union * Gender gap				**0.1285*** **		
				(5.57)		
Union * Gender gap (group)					**0.1055*** **	
					(4.06)	
Union * Gender gap (law)						**0.2217*** **
						(4.50)
Feminization	0.0234**	0.0230**	0.0252**	0.0239**	0.0233**	0.0250**
	(2.13)	(2.03)	(2.15)	(2.18)	(2.06)	(2.15)
Workforce age	-0.0032***	-0.0032***	-0.0032***	-0.0032***	-0.0032***	-0.0032***
	(-6.96)	(-6.71)	(-6.71)	(-7.01)	(-6.75)	(-6.68)
Firm size	-0.0045***	-0.0036***	-0.0048***	-0.0042***	-0.0034**	-0.0045***
	(-3.48)	(-2.71)	(-3.58)	(-3.22)	(-2.52)	(-3.32)
Capital intensity	0.0051***	0.0049***	0.0055***	0.0050***	0.0047***	0.0054***
	(4.86)	(4.49)	(5.00)	(4.76)	(4.40)	(4.91)
Group : dominant firm	0.0110***	0.0104***	0.0103***	0.0112***	0.0106***	0.0103***
	(3.23)	(2.93)	(2.87)	(3.29)	(2.98)	(2.85)
Group : non dominant firm	0.0023	0.0007	0.0010	0.0026	0.0010	0.0011
	(0.61)	(0.18)	(0.26)	(0.70)	(0.26)	(0.28)
R&D	0.0071**	0.0071**	0.0072**	0.0066**	0.0067**	0.0067**
	(2.26)	(2.24)	(2.18)	(2.09)	(2.11)	(2.02)
High skilled White-collars	-0.0054	-0.0003	-0.0056	-0.0030	0.0017	-0.0037
	(-0.43)	(-0.03)	(-0.44)	(-0.24)	(0.13)	(-0.29)
Skilled White-collars	-0.0030	0.0023	-0.0054	-0.0029	0.0022	-0.0052
	(-0.20)	(0.15)	(-0.34)	(-0.19)	(0.14)	(-0.33)
Skilled Blue-collars	-0.0390***	-0.0321**	-0.0428***	-0.0382***	-0.0317**	-0.0421***
	(-2.77)	(-2.19)	(-2.86)	(-2.72)	(-2.16)	(-2.82)
Unskilled Blue-collars	-0.0342**	-0.0310**	-0.0395***	-0.0330**	-0.0301**	-0.0382***
	(-2.45)	(-2.09)	(-2.66)	(-2.37)	(-2.04)	(-2.58)
Constant	0.2217***	0.2150***	0.2216***	0.2312***	0.2256***	0.2310***
	(8.55)	(8.00)	(8.15)	(8.93)	(8.37)	(8.52)
Observations	19784	19050	18234	19784	19050	18234
Adjusted R-squared	0.063	0.058	0.065	0.065	0.059	0.066