

# Gender Interactions in Firm Hierarchies: Evidence from Linked Employer-Employee Data.\*

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## Abstract

In this paper we use a large linked employer-employee data set on German firms between 1993 and 2011 to investigate how the gender composition of the top layer of management, and its interaction with the gender composition of the second layer of management, affects a variety of firm and worker outcomes. We use three different measures to identify the gender composition of the top two layers of management: two based on direct survey data, and one based on the firm's salary structure. We document the following facts: a) There is a strong negative association between the fraction of women in the top layer of management and several firm outcomes, among them business volume, investment and wage bill per worker, and total employment; most of these associations vanish when we include firm fixed effects and specific time trends, except for business volume and wage bill per worker; b) The fraction of women in the top layer of management is also negatively associated with both female and male employment and wages, both full-time and part-time; with the only exception of male part-time wages, all these associations are robust to the inclusion of firm fixed effects and specific time trends; c) Interestingly, the above relationships are heterogeneous in the gender composition of the second layer of management. Women in the top layer who are surrounded entirely by men reduce business volume per worker and raise employment and wages of both men and women, but these effects are reverted as the share of women in the second layer increases. Results are consistent with a simple model of employee-based taste discrimination in which male subordinates are resistant to women in leadership positions.

**Keywords:** Gender, hierarchies, interactions, firm performance, employer-employee.

**JEL codes:** D22, J16, J70, M50

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# 1 Introduction

Despite large increases in female labor force participation rates over the past five decades, women are still substantially underrepresented in top leadership positions in the corporate world. Nevertheless, the numbers have been steadily increasing: the share of women among top corporate officers of Fortune 500 companies has risen from 8.7% in 1995, to 15.7% in 2008.<sup>1</sup> It is reasonable to expect that this trend will continue in the foreseeable future, as the gender gap in educational attainment (favoring women) continues to grow (Goldin et al., 2006), and the share of women attending and graduating from business schools now approaches 50%.<sup>2</sup>

It is natural to ask what effect the increasing representation of women at the top can have on firm outcomes. A growing literature, following Bertrand and Schoar (2003) has shown that individual manager characteristics matter for firm performance. While most of the literature has focused on management style or risk aversion, only a limited number of studies in the economics literature have looked explicitly at the effect of gender on firm's outcomes. Women advocacy groups often make the claim that a more diverse leadership can achieve better performance for the firm by leveraging to the full extent the available talent pool.<sup>3</sup> One important dimension in which the gender of the leadership may affect outcomes is in wage policies. If the gender gap in wages is at least in part due to discriminatory behavior by (mostly male) executives, one would expect that a higher representation of women in the top echelons of management would lead to a narrowing of the gender pay gap, and more opportunities for advancement of women inside the firm hierarchy.

It is possible, though, that a higher representation of women in the top layer of management, *per se*, is not sufficient to meaningfully affect firm outcomes. The top executives do not act in isolation, and necessitate the support and cooperation of their immediate subordinates to effectively implement their desired policies. Therefore, group dynamics within and between the top layers of management may play an important role. Specifically, women at the top of an organization may only be able to implement their preferred policies if they are surrounded by a sufficient number of other women among their peers and immediate

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<sup>1</sup>Source: <http://www.catalyst.org/knowledge/women-corporate-officers-fortune-500>. The Census of Corporate Officers and Top Earners of Fortune 500 Companies has been conducted annually since 1996 by Catalyst, a non-profit organization with a mission to expand the opportunities of women and business.

<sup>2</sup>NCES, Digest of Education Statistics, 2012. See also Bertrand et al., 2010.

<sup>3</sup>For example, in her best-selling book *Lean In*, Sheryl Sandberg writes that "...The laws of economics and many studies of diversity tell us that if we tapped the entire pool of human resources and talent, our collective performance would improve."

subordinates.

The goal of this paper is to explicitly investigate how the gender composition of the top layer of management, and its interaction with the gender composition of the second layer, affects firm and employee outcomes. To this purpose, we use a large linked employer-employee data set on German firms between 1993 and 2011. The longitudinal nature of the data set allows us to control for the most obvious source of bias deriving from the nonrandom allocation of women to top leadership positions, by estimating models with a rich dynamic structure of firm unobservables. Importantly, the data also enables us to identify the gender composition of the top two layers of management, making it possible to study our main question of interest. Also, the linked employer-employee nature of the data means that we can look at both firm outcomes (such as business volume, investments, profits, and total employment), and detailed employee-level outcomes, such as wages, full-time/part-time status, job turnover and mobility.

Main findings can be summarized as follows: a) There is a strong negative association between the fraction of women in the top layer of management and several firm outcomes, among them business volume, investment and wage bill per worker, and total employment; most of these associations vanish when we include firm fixed effects and specific time trends, except for business volume and wage bill per worker; b) The fraction of women in the top layer of management is also negatively associated with both female and male employment and wages, both full-time and part-time; with the only exception of male part-time wages, all these associations are robust to the inclusion of firm fixed effects and specific time trends; c) Interestingly, the above relationships are heterogeneous in the gender composition of the second layer of management. Women in the top layer who are surrounded entirely by men reduce business volume per worker and raise employment and wages of both men and women, but these effects are reverted as the share of women in the second layer increases.

We take these findings as evidence that gender interactions do play an important role in the functioning of hierarchical environments. In particular, they seem consistent with a simple model of employee-based taste discrimination in which male subordinates are resistant to women in leadership positions. The most straightforward policy implication is that female leadership should not be isolated, while instead it should be helped by increasing the number of women across all ranks.

The rest of the paper is organized as follows. In Section 2, we review the related literature. In Section 3, we describe the data. In Section 4, we describe the econometric framework and discuss the conditions under which this design identifies a parameter of interest. In Section 5

we present the main results and discuss possible interpretations to our findings. We conclude with Section 6.

## 2 Literature Review

There is a recent literature in economics that analyzes the effect of women leadership on firms' performance, with mixed results: for example, Wolfers (2006) finds no evidence of systematic differences in returns to holding S&P stock of female-headed companies. More recently, various authors have examined the introduction in Norway of gender quotas on executive boards. The main findings show that affected firms reduce short-term profits and value (Ahern and Dittmar, 2012), increase labor costs and employment levels (Matsa and Miller, 2013), with no significant differences between female vs. male workers (Bertrand et al., 2014).

Most of these studies have focused on the gender composition of the executive board. However, literature from other fields suggests that gender interactions within and between hierarchical levels, like for example those represented in the political arena (Gagliarducci and Paserman, 2012), might have an important role in explaining the performance of an organization, either by enhancing the diversity of the working environment, or by inducing discriminatory frictions. However, there is little evidence on whether these dynamics also exist in private managerial environments, where market pressure is expected to reduce the incentive for non-profitable behaviors.<sup>4</sup>

Among the few exceptions, Flabbi et al. (2013) use a matched employer-employee data set from Italy to show that the interaction between female leadership and female workers at the firm has a positive significant impact on firm performance. In particular, they interpret their results in terms of a simple model of statistical discrimination, in which an inefficient gender allocation across the firm is only corrected when female leadership takes over. Similarly, Cardoso and Winter-Ebmer (2007) use Portuguese firm-level data and find that, while a higher share of females in a firm corresponds to lower wages for both female and male workers, female workers benefit from higher wages in female-led firms than in male-led firms.

With respect to this literature, our main contribution is to move the focus on gender interactions across ranks, and in particular across the highest ranks of a company organization. Since we use data on establishments rather than firms, we will also be able to isolate

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<sup>4</sup>Amore et al. (2013) use a large dataset of family-controlled firms in Italy, and find that the joint presence of a female CEO together with other women in the rest of the board significantly improves firm profitability.

the environment where these interactions might actually take place.

### 3 Data

The IAB Establishment Panel is an annual representative survey of German establishments that has been conducted by the IAB (Institute for Employment Research - *Institut für Arbeitsmarkt und Berufsforschung*) since 1993 (1996 in East Germany). It gathers yearly information for about 4,000-16,000 establishments on employment, business policy, investments, personnel structure, wages, and general company information. Each wave has a main focus with additional information on specific topics, ranging from IT equipments to environmental standards. The last available wave is the 2011 one.<sup>5</sup>

Matched with the employee social security history from 1993 to 2008, the Establishment Panel forms the Linked Employer/Employee Data (LIAB). Individual data cover socio-demographic characteristics (gender, year of birth, nationality, education and professional qualifications), and employment-related characteristics (start and end date of employment, type of employment, gross earnings, profession, occupational status, reason for employment notification) of all employees of IAB establishments.

For our analysis, we restrict attention to establishments in West Germany that have at least 10 employees in each survey year. This restriction ensures that we have a sample of relatively large and stable firms, and allows us to have a consistently defined measure of the fraction of women in the top layer of management. All estimates are on both private and public sector establishments, except for those on business volume per worker, investments per worker and profits, which are on private sector establishments only.

In order to identify the fraction of women in the first two layers of management, we rely on three different measures. The first measure comes from the focus on senior management conducted in the 2004 and 2008 waves of the IAB Establishment Panel. In these two waves, establishments were asked to report directly the number of top and secondary managers, separately by gender.

The second measure, which also comes from the IAB Establishment Panel, is the fraction of women among working proprietors and the fraction of women among white collar workers. We identify the former as the top layer of management, and the latter as the secondary layer. This measure is available in 1993, and then every year from 1997 onwards.

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<sup>5</sup>Data is collected at the establishment level, so it is possible that some establishments belong to the same firm. Establishments cannot be linked by ownership. As is common in much of this literature, we use the terms “establishment” and “firm” interchangeably.

The third measure is derived from the employee data. We use the wage structure within the establishment to identify the different layers of management. Specifically, we assign workers in the top 10% of the within-establishment wage distribution to the top layer of management, and workers with wages between the 80th and 90th percentile to the second layer.<sup>6</sup> This measure is available every year from 1993 to 2008.

Since not all the three measures are available over the period 1993-2011, we follow Cardoso and Winter-Ebmer (2007) and combine them together. This procedure allows us to combine the specificity of each of the three measures, while at the same time increasing sample size. Specifically, we define the fraction of women in the top layer of management first using the number of top managers from the establishment survey, then the number of working proprietors, and finally the number of workers in the top 10% of the within-establishment wage distribution. Similarly, we define the fraction of women in the second layer of management first using the number of secondary managers, then the number of white collar workers, and finally the number of workers with wages between the 80th and 90th percentile of the within-establishment wage distribution.

Table 1 describes some of the basic characteristics of our sample. The second and third columns show the number of establishments present in each wave, and those that remain in our main analysis sample after imposing the geographic and size restrictions. The number of firms in the survey has significantly increased over time, as much as the corresponding number of firms in the analysis sample. The remaining columns show the evolution of the fraction of women in the top layers of management over time, according to the different measures. The survey-based measure of the fraction of women in top management went from 13.4% in 2004 to 14.7% in 2008. These numbers are only slightly higher than the fraction of women among working proprietors, which went from 7.3% in 1997 to 14.7% in 2011, and slightly lower than the fraction of women in the top 10% of the wage distribution, which went from 14.7% in 1993 to 22.9% in 2008. The survey-based measure of the fraction of women in secondary management was 22.2% in 2004 and 27% in 2008. Contrarily to the fraction of women in the top management, these numbers are significantly lower than the fraction of women among white-collar workers, which went from 34.9% in 1997 to 41% in 2011, but almost in line with the fraction of women between the 80th and 90th percentile of the wage distribution, which went from 21.4% in 1993 to 29.4% in 2008. It is interesting to notice that all measures increased pattern over time, both for the first and second layer of

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<sup>6</sup>This measure is not defined for firms with less than 3 employees. In firms with less than 10 employees we identified the top manager as the highest paid worker, and the secondary manager as the second highest paid worker, with missing observation in the case of a tie.

management, which is evidence of a reduction in the gender glass ceiling.

Table 2 shows simple correlation coefficients between the three different measures of the fraction of women in the top layer of management (Panel A) and in the second layer of management (Panel B). For the fraction of women in top management, the two measures based on the establishment data are highly correlated ( $\rho = 0.83$ ), while the correlation between each one of them and the fraction of women in the top 10% of the wage distribution is somewhat smaller, but still positive and highly significant. Looking at Panel B, the correlation coefficient between the three measures of the fraction of women in the second layer of management is always greater than 0.5 and significant.

Table 3 reports summary statistics for our key dependent variables of interest. The top panel refers to firm-level outcomes obtained from the establishment survey, while the bottom panel refers to employee-level outcomes calculated from the linked employer-employee data. The average establishment has a total of 113 employees, each of which costs about 2,155 euros per month, and produces 127,594 euros of business volume in the year. Investments per worker were in the order of 200 euros per year, while the profit performance was on average satisfactory.<sup>7</sup> Most of the individual level variables, which refer to workers in bottom 80% of the within-establishment wage distribution, are in line with what expected: on average there are more men than women, while women are overrepresented among part-time workers, both in absolute and relative terms. Wages present similar dynamics, with men being paid more than women, although the gender pattern is reversed among part-time workers.

## 4 Methodology

Let  $Y_{jt}$  be a variable representing both firm  $j$  outcomes (such as business volume, investments, profits, and total employment), and detailed employee-level outcomes (such as wages, gender-specific employment levels, full-time/part-time status, wages) at time  $t$ . We will estimate the following model through OLS:

$$Y_{jt} = \alpha + \beta FrWomTop_{jt} + \gamma' X_{jt} + \lambda_j + time_j + \epsilon_{jt} \quad (1)$$

where  $FrWomTop_{jt}$  is the fraction of women in the top layer of management of firm  $j$  at time  $t$  (based on one of the three definitions described previously);  $X_{jt}$  is a vector of firm

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<sup>7</sup>All monetary values are expressed in 2005 Euros. The profit variable is a self-reported ordinal measure based on the answer to the survey question “what is the profit situation in the current fiscal year,” ranging from 1 (“poor”) to 5 (“very good”). Business volume is either sales or assets (if a financial institution).

characteristics that includes year, region, sector and firm size dummies, plus the average age and the percentage of college graduates among the management level;  $\lambda_j$  is a firm fixed-effect that accounts for any time-invariant unobserved firm characteristics, and  $time_j$  is a firm-specific time trend that accommodates for smooth unobserved changes at firm level. By construction, the identifying sample in the model with firm fixed effects is made of firms observed at least twice in time, while the identifying sample in the model with also firm-specific time effects is made of firms observed for at least three times.<sup>8</sup>

To disentangle the effect of group dynamics within the top of the firm hierarchy, we include interaction terms between the fraction of women in the top and the second layer of management, and estimate the following model:

$$Y_{jt} = \alpha + \beta_1 FrWomTop_{jt} + \beta_2 FrWomSec_{jt} + \beta_3 FrWomTop_{jt} \times FrWomSec_{jt} + \gamma' X_{jt} + \lambda_j + time_j + \epsilon_{jt}, \quad (2)$$

where  $FrWomSec_{jt}$  is now the fraction of women in the second layer of management, and the term  $FrWomTop_{jt} * FrWomSec_{jt}$  captures any interaction between the gender composition of the first and the second layer of management. To account for potential serial correlation in the error term, we always cluster standard errors at the firm level.

## 5 Results

Table 4 presents results for the effect of the fraction of women in the top layer of management on firm outcomes. For each dependent variable (business volume per worker, investments per worker, the ordinal measure of profits, total gross pay per worker, and employment), we report the coefficients from three separate regressions: OLS, controlling for firm fixed effects, and controlling for firm fixed effects and firm-specific trends. In all estimates we control for year, region, sector and firm size dummies, plus the average age and the percentage of college graduates among the management level.

The OLS regressions show a marked negative correlation between each of the firm outcomes (with the exception of profits) and the share of women in top management. However, inclusion of firm fixed effects makes most of these negative correlations completely vanish,

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<sup>8</sup>In this draft, we present results where the  $time_j$  is a linear time trend. We have also estimated models with a quadratic time trend, with almost identical results. Note that this specification does not accommodate for sharp unobserved changes in firms' strategies, such as those deriving from a change in the composition of shareholders, which will be eventually left in the error term  $\epsilon_{jt}$ .



but for total gross pay per worker, which shows an effect as small as 1 log point. The results are essentially unchanged in the specifications with firm-specific time trends, although in this case also the effect on business volume per worker remains significant (2 log points). The contrast between the OLS and the fixed effects specifications shows that there is substantial sorting of female managers across firms: smaller and less productive firms that invest less and pay their employees lower wages are more likely to be led by women. Still, there is evidence that female leadership has a negative causal effect on establishment outcomes like business volume and total gross pay per worker.

The next tables investigate the relationship between female leadership and employment (Table 5A) and wage outcomes (Table 5B). For both employment and wage outcomes, we focus only on workers in the bottom 80% of the wage distribution within firms, to avoid any mechanical relationships between our key right hand side variable and any of the dependent variables. Table 5A shows that there is a strong negative correlation between the share of women in top management and employment. This relationship holds true even after controlling for firm fixed effects and firm-specific trends. Both full-time and part-time employment are negatively affected by a high share of women in top management, but we do not observe significant differences between the effect on male and female employment. The latter result goes counter to the popularly held opinion that female managers may be more sensitive to some of the main concerns held by women in the workplace. However, there is evidence that a high share of women in top management increases the share of part-time work among both men and women, which is suggestive of the fact that women may be able to implement more women-friendly policies.

Table 5B looks at the correlation between average wages of the bottom 80% of the wage distribution and female leadership. For both men and women, going from no women in the top layer of management to an entirely female leadership is associated with a 21-34 log points drop in average wages. The introduction of fixed effects and firm-specific trends attenuates the negative relationship, but does not cancel it altogether. For women, the negative effect is present for both full-time (2 to 4 log points) and part-time wages (6 to 12 log points), while for men the effect is more pronounced for part-time wages (6 to 12 log points), while it is close to zero for full-time wages. As a result, the fraction of women in top management does not exhibit any specific correlation with the gender wage gap (defined as log female wage minus log male wage), both in full-time and in part-time wages.

Table 6 reports the results of the model with the interaction between the share of women in the top and the second layer of management. All the regressions point to a strong negative

OLS association between the share of women in the top and the second layer of management and firm outcomes, although this effect vanishes for most of the outcomes when firm fixed effects and firm-specific time trends are included. As in the model without interaction, this is not the case for business volume per worker: women in the top layer of management who are surrounded by an entirely male second layer reduce business volume per worker, but the effect is reverted as the fraction of women in the second layer increases. Interestingly, similar patterns can be observed for investments per worker and profits, although they are not statistically significant.

In Tables 7A and 7B examine whether the above relationships between female leadership and employment and wage outcomes depend on the gender composition of the second layer of management. Table 7A shows that the coefficient on the fraction of women in top management tends to be positive and significant on the employment level, while the interaction term is almost always negative and significant. These results hold for both men and women, and for both part-time and full-time status. The results indicate that women in the top layer of management who are surrounded by an entirely male second layer tend to raise employment. But as the share of women in the second layer increases, the effect of female leadership becomes smaller, and in fact changes sign. Similar patterns, but of the opposite sign, can be observed for the share of part-time work, although in this case the estimated effects are less significant.

Finally, Table 7B shows that women in the top layer of management who are surrounded by an entirely male second layer pay lower wages to their part-time and full-time employees of both genders, but the effect on full-time employees is not significant. Like for employment, as the fraction of women in the second layer increases, wages of part-time employees fall, regardless of the gender. As a result, the gender gap in wages of part-time employees is unchanged in firms with a high share of women in the top layer and no women in the second layer of management.

For all the above estimations we conducted a series of robustness exercises: first, in all the estimates on employee outcomes we also included demographics characteristics of the bottom 80% employees (mean age and percentage of college graduates); second, we included a firm-specific quadratic trend, instead of linear; third, we used the three measures for the percentage of women in the two layers of management separately. Main results remain almost unchanged in these alternative specifications.<sup>9</sup>

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<sup>9</sup>These results available upon request. Since the three models (OLS, fixed effects, firm-specific time trends) have different identifying samples, we also estimated an OLS model over the fixed effects sample, and a fixed effects model over the firm-specific time trends sample, with no significant differences on the

Taken together, these results suggest that gender interactions between the top two layers of management have some non negligible effect on firm and employee outcomes. In particular, what our results seem to suggest is that part of the findings highlighted in the rest of the literature on the effect of women in leadership positions (lower firm performance, higher employment and wage levels) could be partly explained by the absence of women in the second layer of management. However, as female leaders are surrounded by a sufficient number of other women among their peers and immediate subordinates, almost all the differences disappear.

## 6 Conclusion

In this paper, we have documented the effect of female leadership on firm and employee outcomes in a large panel of German firms. The evidence points to a large degree of sorting, with the share of women in top management higher in firms that are smaller and less productive. However, there appears to be a significant negative effect of the share of women in top management on firm outcomes, especially on the business volume. At the same time, it appears that a high share of women in top management leads to lower employment and lower wages of both men and women in the bottom 80% of the firm distribution. However, we also find evidence that these results depend partly on the presence of other women in the second layer of management, which in many cases is enough to offset, if not revert, the effect of women in the first layer of management.

Altogether, the results are more consistent with a simple model of employee-based discrimination, rather than a Becker-type model of employer discrimination. Future research will attempt to shed further light on the mechanisms underlying these findings.

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estimated coefficients.

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**Table 1: Sample Description and Fraction of Women in Management**

Year	N. firms	N. firms in the analysis	Fraction				Fraction women		Fraction women in top layer	Fraction women in second layer
			Fraction women in top management	Fraction women in secondary management	women among working proprietors	Fraction women among white collar workers	Fraction women in top 10% of wage distribution	in 80th-90th percentile of wage distribution		
1993	4,265	1,689	-	-	0.137	0.337	0.147	0.214	0.161	0.335
1994	4,138	1,896	-	-	-	-	0.143	0.218	0.143	0.218
1995	4,096	1,637	-	-	-	-	0.153	0.216	0.153	0.216
1996	4,412	1,457	-	-	-	-	0.185	0.239	0.185	0.239
1997	4,543	1,556	-	-	0.073	0.349	0.185	0.251	0.138	0.346
1998	4,682	1,975	-	-	0.087	0.359	0.174	0.240	0.137	0.356
1999	4,949	2,513	-	-	0.095	0.364	0.185	0.262	0.149	0.363
2000	8,887	5,570	-	-	0.095	0.359	0.183	0.257	0.141	0.358
2001	10,357	6,475	-	-	0.100	0.370	0.190	0.264	0.148	0.369
2002	10,586	6,442	-	-	0.110	0.374	0.196	0.267	0.158	0.373
2003	10,617	6,012	-	-	0.109	0.379	0.191	0.266	0.155	0.378
2004	10,550	6,217	0.134	0.222	0.111	0.390	0.196	0.272	0.133	0.261
2005	10,598	6,230	-	-	0.112	0.393	0.201	0.275	0.160	0.392
2006	10,315	5,971	-	-	0.117	0.403	0.206	0.286	0.164	0.402
2007	10,447	5,813	-	-	0.117	0.402	0.214	0.292	0.164	0.403
2008	10,199	5,681	0.147	0.270	0.124	0.407	0.229	0.294	0.148	0.302
2009	10,400	5,791	-	-	0.134	0.407	-	-	0.134	0.407
2010	10,478	5,353	-	-	0.134	0.408	-	-	0.134	0.408
2011	10,224	5,366	-	-	0.144	0.410	-	-	0.144	0.410
Total	154,743	83,644	0.141	0.245	0.115	0.388	0.194	0.267	0.151	0.361

**Notes:** Author's calculations based on the IAB Establishment Panel and Linked Employer-Employee data.

**Table 2: Correlation Between Different Measures of Female Leadership**

<b>PANEL A: Top Management</b>	Fraction women in top management	Fraction women among working proprietors	Fraction women in top 10% of wage distribution	<b>Fraction of women in first layer</b>
Fraction women in top management	1 [11,383]			
Fraction women among working proprietors	0.832*** [7,689]	1 [49,972]		
Fraction women in top 10% of wage distribution	0.387*** [10,454]	0.237*** [36,045]	1 [62,308]	
<b>Fraction of women in first layer</b>	1 [11,383]	0.974*** [49,972]	0.464*** [62,308]	1 [77,103]
<b>PANEL B: Second Management</b>	Fraction women in secondary management	Fraction women among white collar workers	Fraction women in second 10% of wage distribution	<b>Fraction of women in second layer</b>
Fraction women in secondary management	1 [9,099]			
Fraction women among white collar workers	0.558*** [9,072]	1 [77,812]		
Fraction women in second 10% of wage distribution	0.551*** [8,289]	0.711*** [56,118]	1 [61,328]	
<b>Fraction of women in second layer</b>	1 [9,099]	0.930*** [77,812]	0.695*** [61,328]	1 [83,024]

**Notes:** Authors' calculations based on IAB Establishment Panel and Linked Employer-Employee data.

**Table 3: Summary Statistics of Dependent Variables**

<b>Panel A: Firm outcomes</b>						
	N	Mean	exp(Mean)	Std. Dev.	Min	Max
Log business volume per worker	48,077	11.76	127,594	1.16	-4.63	19.07
Log investments per worker	58,972	5.28	196.69	5.27	-8.83	15.95
Profits	47,191	3.03		1.09	1.00	5.00
Log wage bill per worker	71,937	7.68	2,155.98	0.44	4.15	10.10
Log employment	83,644	4.73	113.30	1.44	0	11.17
<b>Panel B: Employee Outcomes (bottom 80%)</b>						
	N	Mean	exp(Mean)	Std. Dev.	Min	Max
Log female employment	65,123	3.37	29.08	1.67	0.00	9.45
Log male employment	65,123	3.60	36.60	1.70	0.00	10.68
Log female full-time employment	61,682	3.02	20.56	1.62	0.00	18.01
Log male full-time employment	62,234	3.74	42.22	1.65	0.00	21.37
Log female part-time employment	57,070	2.52	12.40	1.65	0.00	17.07
Log male part-time employment	44,873	1.62	5.06	1.35	0.00	16.34
Share of part-time among female	61,413	0.38		0.28	0.00	1.00
Share of part-time among male	61,125	0.15		0.24	0.00	1.00
Log female wage	61,401	3.95	52.03	0.49	-4.67	5.10
Log male wage	61,112	4.17	64.72	0.55	-0.41	5.15
Gender wage gap	60,206	-0.21	-12.69	0.41	-5.57	4.21
Log female full-time wage	58,973	4.15	63.40	0.41	-4.67	5.12
Log male full-time wage	59,466	4.30	73.49	0.41	-1.58	5.15
Gender wage gap, full time	56,844	-0.14	-10.09	0.28	-4.60	5.80
Log female part-time wage	54,983	3.53	34.19	0.70	-1.27	5.14
Log male part-time wage	43,526	3.33	27.81	0.99	-1.63	5.15
Gender wage gap, part-time	41,337	0.21	6.38	0.76	-4.42	5.55

**Notes:** *Profits* on a scale from 1 (poor) to 5 (very good). *Business volume* is either sales or assets. *Wage* is per day. *Wage bill* in June. All outcomes measured at time  $t$  and in 2005 euros (where applicable).

**Table 4: Fraction of Women in Top Management and Firm Outcomes**

<b>PANEL A</b>											
	Log (business volume per worker)			Log (investments per worker)			Profits				
	OLS	FE	FE+t	OLS	FE	FE+t	OLS	FE	FE+t		
Fraction women in first management	-0.249 ***	-0.018	-0.021 *	-1.048 ***	-0.160	-0.090	0.032	-0.011	0.018		
	0.026	0.015	0.013	0.130	0.150	0.172	0.028	0.035	0.041		
	{41,841}	{41,841}	{35,116}	{48,476}	{48,476}	{41,155}	{44,196}	{44,196}	{37,086}		
<b>PANEL B</b>											
	Log (wage bill per worker)			Log (employment)							
	OLS	FE	FE+t	OLS	FE	FE+t					
Fraction women in first management	-0.134 ***	-0.014 *	-0.016 *	-0.374 ***	-0.005	0.007					
	0.011	0.008	0.009	0.032	0.009	0.007					
	{59,558}	{59,558}	{49,019}	{67,559}	{67,559}	{56,183}					

**Notes.** *Profits* on a scale from 1 (poor) to 5 (very good). *Business volume* is either sales or assets. *Wage bill* in June. All outcomes measured at time  $t$  and in 2005 euros (where applicable). In all estimates also control for year, sector and region fixed effects, plus the mean age and % college of workers in top management. *Log (business volume per worker)*, *Log (investments per worker)* and *Profits* on private sector only. Standard errors clustered at firm level in brackets, number of observations in curly brackets.



**Table 5A: Fraction of Women in Top Management and Employee Outcomes**

<b>PANEL A</b>												
	Log (female employment)						Log (male employment)					
	OLS		FE		FE+t		OLS		FE		FE+t	
Fraction women in first management	-0.066	**	-0.451	***	-0.286	***	-0.971	***	-0.484	***	-0.320	***
	0.032		0.040		0.039		0.033		0.037		0.036	
	{79,818}		{79,818}		{67,071}		{79,818}		{79,818}		{67,071}	
<b>PANEL B</b>												
	Log (female full-time employment)						Log (male full-time employment)					
	OLS		FE		FE+t		OLS		FE		FE+t	
Fraction women in first management	-0.287	***	-0.400	***	-0.238	***	-1.033	***	-0.381	***	-0.229	***
	0.034		0.038		0.035		0.035		0.036		0.034	
	{79,818}		{79,818}		{67,071}		{79,818}		{79,818}		{67,071}	
<b>PANEL C</b>												
	Log (female part-time employment)						Log (male part-time employment)					
	OLS		FE		FE+t		OLS		FE		FE+t	
Fraction women in first management	0.091	***	-0.417	***	-0.271	***	-0.339	***	-0.569	***	-0.415	***
	0.033		0.039		0.038		0.040		0.065		0.072	
	{79,818}		{79,818}		{67,071}		{79,818}		{79,818}		{67,071}	
<b>PANEL D</b>												
	Share of part-time among female						Share of part-time among male					
	OLS		FE		FE+t		OLS		FE		FE+t	
Fraction women in first management	0.086	***	0.023	***	0.010	**	0.126	***	0.032	***	0.020	***
	0.007		0.005		0.004		0.007		0.006		0.006	
	{74,816}		{74,816}		{62,073}		{74,335}		{74,335}		{61,669}	

**Notes.** All outcomes measured at time  $t$ , in 2005 euros (where applicable), and referred to bottom 80% workers. In all estimates also control for year, sector and region fixed effects, plus the mean age and % college of workers in top management. Standard errors clustered at firm level in brackets, number of observations in curly brackets.

**Table 5B: Fraction of Women in Top Management and Employee Outcomes**

<b>PANEL A</b>																
	Log (female wage)						Log (male wage)						Gender wage gap			
	OLS		FE		FE+t		OLS		FE		FE+t		OLS	FE	FE+t	
Fraction women in first management	-0.210	***	-0.147	***	-0.079	***	-0.339	***	-0.120	***	-0.063	***	0.156	***	0.008	-0.004
	0.014		0.015		0.014		0.016		0.017		0.016		0.011	0.010	0.012	
	{74,752}		{74,752}		{62,008}		{74,302}		{74,302}		{61,630}		{72,171}	{72,171}	{59,466}	
<b>PANEL B</b>																
	Log (female wage), full-time						Log (male wage), full-time						Gender wage gap, full-time			
	OLS		FE		FE+t		OLS		FE		FE+t		OLS	FE	FE+t	
Fraction women in first management	-0.104	***	-0.042	***	-0.022	***	-0.150	***	-0.016	*	-0.011		0.053	***	-0.002	-0.003
	0.010		0.009		0.009		0.011		0.009		0.009		0.007	0.007	0.009	
	{69,644}		{69,644}		{56,996}		{70,034}		{70,034}		{57,477}		{66,428}	{66,428}	{54,223}	
<b>PANEL C</b>																
	Log (female wage), part-time						Log (male wage), part-time						Gender wage gap, part-time			
	OLS		FE		FE+t		OLS		FE		FE+t		OLS	FE	FE+t	
Fraction women in first management	-0.107	***	-0.121	***	-0.064	***	-0.196	***	-0.107	***	-0.056	***	0.072	***	-0.005	-0.017
	0.016		0.015		0.015		0.020		0.021		0.021		0.017	0.018	0.020	
	{66,702}		{66,702}		{54,972}		{51,695}		{51,695}		{41,411}		{48,463}	{48,463}	{38,593}	

**Notes.** All outcomes measured at time  $t$ , in 2005 euros (where applicable), and referred to bottom 80% workers. *Wage* is per day. In all estimates also control for year, sector and region fixed effects, plus the mean age and % college of workers in top management. Estimates weighted by the total number of employees. Standard errors clustered at firm level in brackets, number of observations in curly brackets.

**Table 6: Fraction of Women in Top and Second Management and Firm Outcomes**

<b>PANEL A</b>												
	Log (business volume per worker)						Log (investments per worker)			Profits		
	OLS		FE		FE+t		OLS	FE	FE+t	OLS	FE	FE+t
Fraction women in first management	-0.346 ***		-0.044 **		-0.047 ***		-0.603 ***	-0.065	-0.129	-0.060	-0.017	-0.026
	0.037		0.020		0.020		0.210	0.232	0.266	0.045	0.053	0.061
Fraction women in second management	-0.322 ***		-0.043 **		-0.033 *		-1.219 ***	-0.406 **	-0.258	0.099 ***	-0.036	-0.031
	0.037		0.021		0.019		0.166	0.193	0.215	0.034	0.041	0.045
interaction	0.297 ***		0.062		0.061 *		-0.558	-0.201	0.074	0.162 **	0.018	0.116
	0.058		0.044		0.036		0.345	0.397	0.448	0.077	0.094	0.109
	{41,605}		{41,605}		{34,894}		{48,207}	{48,207}	{40,906}	{43,863}	{43,863}	{36,835}
<b>PANEL B</b>												
	Log (wage bill per worker)				Log (employment)							
	OLS		FE		FE+t	OLS	FE	FE+t				
Fraction women in first management	-0.178 ***		-0.012		-0.014	-0.193 ***	0.002	0.012				
	0.016		0.012		0.013	0.054	0.014	0.011				
Fraction women in second management	-0.356 ***		-0.006		-0.003	-0.356 ***	-0.031 ***	-0.025 ***				
	0.015		0.010		0.010	0.046	0.013	0.009				
interaction	0.179 ***		-0.004		-0.004	-0.246 ***	-0.014	-0.011				
	0.027		0.022		0.023	0.088	0.021	0.016				
	{59,187}		{59,187}		{48,701}	{67,125}	{67,125}	{55,798}				

**Notes.** *Profits* on a scale from 1 (poor) to 5 (very good). *Business volume* is either sales or assets. *Wage bill* in June. All outcomes measured at time  $t$  and in 2005 euros (where applicable). In all estimates also control for year, sector and region fixed effects, plus the mean age and % college of workers in top and second management, separately. *Log (business volume per worker)*, *Log (investments per worker)* and *Profits* on private sector only. Standard errors clustered at firm level in brackets, number of observations in curly brackets.

**Table 7A: Fraction of Women in Top and Second Management and Employee Outcomes**

<b>Panel A</b>											
	Log (female employment)						Log (male employment)				
	OLS		FE		FE+t		OLS		FE		FE+t
Fraction women in first management	0.644 ***		0.529 ***		0.273 ***		0.020		0.420 ***		0.243 ***
	0.064		0.050		0.043		0.057		0.048		0.040
Fraction women in second management	1.495 ***		0.465 ***		0.249 ***		-1.592 ***		0.307 ***		0.185 ***
	0.047		0.043		0.038		0.047		0.040		0.035
interaction	-1.664 ***		-1.582 ***		-0.924 ***		-0.941 ***		-1.346 ***		-0.819 ***
	0.095		0.096		0.089		0.086		0.088		0.080
	{76,577}		{76,577}		{63,337}		{76,577}		{76,577}		{63,337}
<b>Panel B</b>											
	Log (female full-time employment)						Log (male full-time employment)				
	OLS		FE		FE+t		OLS		FE		FE+t
Fraction women in first management	0.488 ***		0.396 ***		0.192 ***		-0.112 *		0.352 ***		0.190 ***
	0.064		0.048		0.040		0.061		0.048		0.039
Fraction women in second management	1.025 ***		0.391 ***		0.188 ***		-1.866 ***		0.264 ***		0.144 ***
	0.050		0.040		0.035		0.049		0.039		0.033
interaction	-1.603 ***		-1.237 ***		-0.656 ***		-0.763 ***		-1.123 ***		-0.620 ***
	0.099		0.088		0.078		0.086		0.085		0.074
	{76,577}		{76,577}		{63,337}		{76,577}		{76,577}		{63,337}
<b>Panel C</b>											
	Log (female part-time employment)						Log (male part-time employment)				
	OLS		FE		FE+t		OLS		FE		FE+t
Fraction women in first management	0.711 ***		0.513 ***		0.266 ***		0.340 ***		0.329 ***		0.203 ***
	0.060		0.050		0.043		0.046		0.045		0.039
Fraction women in second management	1.567 ***		0.424 ***		0.243 ***		0.029		0.263 ***		0.173 ***
	0.049		0.042		0.037		0.036		0.035		0.033
interaction	-1.550 ***		-1.479 ***		-0.871 ***		-0.897 ***		-1.009 ***		-0.676 ***
	0.091		0.095		0.088		0.069		0.078		0.075
	{76,577}		{76,577}		{63,337}		{76,577}		{76,577}		{63,337}
<b>Panel D</b>											
	Share of part-time among female						Share of part-time among male				
	OLS		FE		FE+t		OLS		FE		FE+t
Fraction women in first management	0.038 ***		-0.010		-0.006		-0.013		-0.023 ***		-0.011 *
	0.012		0.007		0.007		0.009		0.007		0.006
Fraction women in second management	0.107 ***		-0.012 **		-0.001		0.201 ***		-0.011 *		-0.006
	0.009		0.005		0.005		0.009		0.006		0.006
interaction	0.024		0.047 ***		0.022 **		0.154 ***		0.085 ***		0.047 ***
	0.018		0.011		0.011		0.018		0.013		0.013
	{72,988}		{72,988}		{60,000}		{72,514}		{72,514}		{59,649}

**Notes.** All outcomes measured at time  $t$ , in 2005 euros (where applicable), and referred to bottom 80% workers. In all estimates also control for year, sector and region fixed effects, plus the mean age and % college of workers in top and second management, separately. Standard errors clustered at firm level in brackets, number of observations in curly brackets.

**Table 7B: Fraction of Women in Top and Second Management and Employee Outcomes**

<b>Panel A</b>																		
	Log (female wage)						Log (male wage)						Gender wage gap					
	OLS		FE		FE+t		OLS		FE		FE+t		OLS	FE	FE+t			
Fraction women in first management	-0.112	***	0.043	***	0.037	***	-0.044	**	0.064	***	0.049	***	-0.051	***	-0.013	-0.007		
	0.022		0.018		0.015		0.022		0.019		0.017		0.017		0.014	0.018		
Fraction women in second management	-0.073	***	0.062	***	0.035	***	-0.484	***	0.050	***	0.034	**	0.438	***	0.030	***	0.012	
	0.017		0.014		0.014		0.021		0.016		0.017		0.015		0.013	0.014		
interaction	-0.052		-0.259	***	-0.170	***	-0.288	***	-0.280	***	-0.166	***	0.201	***	0.023	0.000		
	0.037		0.031		0.029		0.043		0.036		0.035		0.035		0.028	0.032		
	{72,970}		{72,970}		{59,984}		{72,497}		{72,497}		{59,625}		{71,305}		{71,305}	{58,533}		
<b>Panel B</b>																		
	Log (female wage), full-time						Log (male wage), full-time						Gender wage gap, full-time					
	OLS		FE		FE+t		OLS		FE		FE+t		OLS	FE	FE+t			
Fraction women in first management	-0.113	***	0.001		-0.001		-0.094	***	0.008		0.010		-0.010		0.002	-0.007		
	0.015		0.011		0.012		0.013		0.009		0.011		0.012		0.012	0.014		
Fraction women in second management	-0.145	***	0.019	**	0.023	***	-0.302	***	-0.002		0.006		0.188	***	0.033	***	0.023	**
	0.012		0.010		0.010		0.013		0.009		0.010		0.009		0.010	0.010		
interaction	0.098	***	-0.057	***	-0.031		0.015		-0.044	*	-0.046		0.057	***	-0.016	0.004		
	0.027		0.023		0.024		0.031		0.024		0.028		0.025		0.024	0.027		
	{68,783}		{68,783}		{56,059}		{69,028}		{69,028}		{56,386}		{65,784}		{65,784}	{53,544}		
<b>Panel B</b>																		
	Log (female wage), part-time						Log (male wage), part-time						Gender wage gap, part-time					
	OLS		FE		FE+t		OLS		FE		FE+t		OLS	FE	FE+t			
Fraction women in first management	-0.090	***	0.054	***	0.053	***	-0.083	**	0.081	***	0.070	***	-0.013		0.001	-0.004		
	0.029		0.020		0.020		0.037		0.031		0.030		0.032		0.031	0.033		
Fraction women in second management	0.121	***	0.049	***	0.030	*	-0.229	***	0.070	***	0.064	***	0.329	***	0.009	-0.017		
	0.021		0.015		0.016		0.030		0.024		0.025		0.025		0.024	0.026		
interaction	0.001		-0.228	***	-0.167	***	-0.055		-0.259	***	-0.173	***	0.025		-0.030	-0.026		
	0.045		0.033		0.033		0.059		0.048		0.048		0.052		0.048	0.053		
	{65,197}		{65,197}		{53,279}		{50,495}		{50,495}		{40,079}		{47,917}		{47,917}	{38,019}		

**Notes.** All outcomes measured at time  $t$ , in 2005 euros (where applicable), and referred to bottom 80% workers. *Wage* is per day, in 2005 euros. In all estimates also control for year, sector and region fixed effects, plus the mean age and % college of workers in top and second management, separately. Estimates weighted by the total number of employees. Standard errors clustered at firm level in brackets, number of observations in curly brackets.