Do Female Executives Make a Difference? The Impact of Female Leadership on Firm Performance and Gender Gaps in Wages and Promotions.*

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Abstract

We study whether female executives make a difference by proposing three contributions. First, we examine the relationship between gender leadership at the firm (CEOs and top executives) and firm performance. Differently from the previous literature, we focus on less volatile, more long-term measure of actual firm productivity: TFP, value added per worker and sales per worker. Second, we investigate the mechanisms behind this relationship, focusing on the impact of firm leadership on wages and promotion policies. Finally, we propose a theoretical framework consistent with our results and able to evaluate the cost of the heavy underrepresentation of women at top positions within firms. In performing our empirical work, we use a unique matched employer-employee data set from Italy where we observe the entire labor force at each firm over 17 years. We find that female executives make a difference: The interaction between female leadership and female workers at the firm has a positive significant impact on firm performance. We suggest that an important mechanism behind this interaction is the wage policy at the firm: female leadership implies wage increases for women at the top of the wage distribution and wage decreases for women at the bottom. We conclude by interpreting this evidence as being consistent with a model of statistical discrimination where female executives correct discrimination generated by male executives. If our interpretation is correct, there are productivity costs associated with the underrepresentation of women at the top of the firm.

JEL Codes: M5, M12, J7, J16.

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1 Introduction

A growing literature is showing that executives make a difference at the firm.[1] From their management style to their attitude towards risk, executives' characteristics seems to be, together with management practices,[2] one of the main drivers of firms' success and productivity. In this paper, we ask whether one specific individual characteristic - gender - makes a difference.

The labour literature has provided abundant evidence of systematic gender differentials in the labor market.[3] More recently, the economics of leadership literature has singled out an astounding empirical regularity: women are almost ten times less represented than men in top positions at the firm.[4] For example, recent data on the US show that even though females are a little more than 50% of white collar workers, they represent only 4.6% of the executives. Our own data on Italy show that a little more than 20% of white collars workers in the manufacturing sector are women compared with only 2.5% of the executives.[5] Both sets of facts suggest that looking at gender as a relevant executive characteristics is not only interesting but may also have important productivity and welfare implications.

We provide three contributions to this extremely thin literature. First, we study the relationship between gender leadership at the firm (CEOs and top executives) and firm performance. Differently from the previous literature, we focus on less volatile, more long-term measures of actual firm productivity: sales per worker, value added per worker and TFP. Second, we investigate the mechanisms behind this relationship, focusing on the im-

[1] A growing literature is following the influntial Bertrand and Schoar (2003). Among recent contributions, see Kaplan, Klebanov, Sorensen (2012); Bennedsen, Perez-Gonzales, Wolfenzon (2012); Lazear, Shaw, Stanton (2012). For work on overconfidence, see Malmendier and Tate (2005). For theoretical contributions, see for example Gabaix and Landier (2008) and Tervio (2008) For contributions focusin on both executives and firms characteristics, see Bandiera, Guiso, Prat and Sadun (2012).

[2] See Bloom and Van Reenen (2007) for one of the first constribution enphasizing this point. A recent survey is Bloom and Van Reenen (2010).

[3] For an overview of the gender gap in the US labor market in the last twenty years, see Blau and Kahn (2004), Eckstein and Nagypal (2004) and Flabbi (2010).

[4] The literature on the US is based on the Standard and Poor's Execucomp dataset, which contains information on top executives in the S&P 500, S&P MidCap 400, S&P SmallCap 600. See for example, Bertrand and Hallock (2001); Wolfers (2006); Gayle, Golan, Miller (2011); Dezso and Ross (2012). The literature on other countries is extremely scarce: see Cardoso and Winter-Ebner (2010) on Portugal, and Ahern and Dittmar (2012) and Matsa and Miller (2012) on Norway (the latter papers however consider the gender composition of corporate boards). A related literature is concerned with underrapresentation of women at the top of the wage distribution, see for example Albrecht, Bjorklund and Vroman (2003). Both phenomena are often referred to as a *glass-ceiling* preventing women from reaching top positions in the labor market.

[5] Sources for the US are: Current Population Survey data for the white collars workers and ExecuComp data for the executives. Sources for Italy are our own raw data, a rapresentative sample of the Italian manufacturing sector. See the data section of the paper for details.

pact of firm leadership on wages and promotion policies. Finally, we propose a theoretical framework consistent with our results and able to evaluate the cost of the heavy underrepresentation of women at the top of the firm.

In performing our empirical work, we use a unique matched employer-employee dataset from Italy which includes information on the entire labor force of a large sample of firms representative of the manufacturing sector in the period 1982-1997. The data set is very rich in firm-level characteristics (including balance sheet information). Crucially, we observe the gender of all workers, including the top executives and the top earners. We use this information to measure the extent of the presence of women in executive positions at the firm and to infer the gender of the CEO. We consider three measures of female leadership in the firm: 1) the share of female executives, 2) an indicator for whether females represent more than 25% of executives, and 3) an indicator for whether the firm's CEO (defined as the highest-paid executive) is female.

Thanks to these data, we can study the effect of female leadership on firm performance by conditioning on a wider range of controls than the ones included in the few previous works in the literature. We can control not only for unobserved firm heterogeneity, but also for labor force and executives' observed and unobserved heterogeneity. Specifically, we use the large panel sample of matched employer-employee data to estimate a two-way fixed effects regression on individual wages (Abowd, Kramarz and Margolis, 1999), which gives us estimates of the value of individuals' (workers and executives) unobservable (to the econometrician) skills, independent of observables and of the characteristics of the particular firms where they are employed at a given point in time. The data are particularly appropriate for this exercise because they include a large representative sample of firms observed over 17 years and *all* the workers hired by these firms or that have transited through them. This particular feature maximizes the number of transitions available to identify both firms' and workers' fixed effects. We then use the estimated individual fixed effects as controls for the composition of the unobserved ability of the labor force at the firms, and for the unobserved individual ability of the executives when estimating the impact of the female leadership on firm performance. We find that a systematic relationship between female leadership and firm performance does exist. The result is robust to three different definitions of firm performance (sales per employee, value added per employee, and TFP), two different samples (full sample and balanced panel), and to the different measures of female leadership described above. The relationship crucially depends on the gender composition of the labor force at the firm: if a sufficiently high share of the labor force is female,

then female leadership is associated with higher firm performance; the opposite is true if females represent only a small proportion of the firm's workforce.

To analyze the mechanisms behind this relationship, we look at the effect of female leadership on wages and promotions at the firm. If a large literature exists that studies gender differentials in the labor market, and a fairly developed literature exists that studies gender differentials using matched employer-employee data, the literature on the relationship between the gender of the firm's executives and gender differentials at the firm is extremely scarce. Bell (2005) looks at the impact of female leadership in US firms but only on *executives* wages. Cardoso and Winter-Ebner (2010) look at the impact on all workers on a sample of Portuguese firms but without allowing for heterogeneous effects over the distribution. Thanks to our data, we can look at the impact on the entire labor force at the firms allowing for heterogenous effects over the wage distribution. Our quantile regression results show that this heterogeneity is relevant: the impact of female leadership is positive on women at the top of the wage distribution but negative on women at the bottom of the wage distribution. Preliminary descriptive evidence on promotion to executives shows a similar pattern: female leadership increases the probability of promotion for women only if women are in the top quartile of the wage distribution.

We propose a theoretical framework able to jointly take into account all our empirical results. We embed employer statistical discrimination in an assignment model with asymmetric information, labor market frictions, turn-over and learning. We further assume that employers are better at extracting information from workers of their same gender (Cornell and Welch, 1996). Starting with initial conditions where a higher proportion of employers are male, the equilibrium generates a misallocation of women to jobs, a gender gap in wages, and a glass-ceiling effect. Female CEOs and executives optimally counteract pre-existing statistical discrimination by improving the wage and promotion prospects of high-ability females. As a result, women's wages increase at the top of the wage distribution but decrease at the bottom when female leadership arises at the firm. The results on firm performance are consistent with this model because female leadership can improve firm performance only if there are enough mismatched women at the firm.

The remainder of the paper is structured as follows. The next section sketches the theoretical framework. Section 3 describes the data and the estimation samples. Section 4 presents our analysis of the effect of female leadership on firm performance. Section 5 presents evidence on the relationship between female executives and wage and promotion policies at the firm. Section 6 concludes.

2 Theoretical Framework [PRELIMINARY]

In this section we sketch the theoretical framework that guides our empirical analyses. Our framework is based on an assignment model with asymmetric information, labor market frictions, turn-over and learning [Jovanovic (1979); Flinn (1997); Freyer, Pager and Spenkuch (2011)].

The intuition of the mechanics of the model is as follows. Productivity is match-specific but it is observed by the employer only through a noisy signal. As a result, entry wages and job assignments are determined from a score w which is essentially an estimate of the individual productivity x based on the signal s and the worker's type g (gender). Differently from a standard statistical discrimination model [Phelps (1972); Aigner and Cain (1977)], expectations are specific to the employer type, which is again the gender and which we denote with e. By "employer" we mean the decision-maker(s) at the firm: the firm's CEOs and executives. As a result:

$$w_i = E_e\left(x_i|s_i, g\right), g \in \{M, F\}, e \in \{M, F\} \tag{1}$$

We further assume that both noise and productivity are normally distributed:

$$\begin{aligned} s_i &\equiv x_i + \varepsilon_i && (2)\\ where &: \\ x|g &\sim N\left[\mu_{x|g}, \sigma^2_{x|g}\right]; && (3)\\ \varepsilon|g, e &\sim N\left[0, \sigma^2_{\varepsilon|g,e}\right] && (4) \end{aligned}$$

so that the best prediction given the signal is the arithmetic mean between the signal and the expected productivity in the population weighted by the relative variances. Equation (1) therefore becomes:

$$\begin{aligned} E_e\left(x_i|s_i, g\right) &= (1 - r_{g,e})s_i + r_{g,e}\mu_{x|g} && (5)\\ where &: \\ r_{g,e} &= \frac{\sigma^2_{x|g}}{\sigma^2_{x|g} + \sigma^2_{\varepsilon|g,e}} \end{aligned}$$

The relative variance $r_{g,e}$ regulates the precision of the signal in determining a score based on actual individual productivity. The larger is the variance of the noise relatively to the population productivity variance, the less informative is the signal and less related to productivity are the wage and job assignment performed by the employer.

The crucial assumption we make in the model is that employers are better at extracting information from workers of their same gender in the spirit of Cornell and Welch (1996). Analytically:

$$\begin{aligned} \sigma^2_{\varepsilon|F,F} &< \sigma^2_{\varepsilon|F,M} \\ \sigma^2_{\varepsilon|M,M} &< \sigma^2_{\varepsilon|M,F} \end{aligned}$$

If we start with initial conditions characterized by a gender imbalance in the number of employers - the majority of employers are men - then the model would generate the following implications (without needing to assume higher productivity for men than women):

1. Women will receive lower wages than men and they will be "mismatched" to jobs more frequently than men because their signal is noisier for a larger proportion of employers.

2. Female CEOs and executives improve performance at firms with a significant proportions of female workers (i.e., where the initial misallocation is more severe) because they are able to correct the previous "wrong" wages and job assignments of the female workforce (put in place by the previous largely male CEOs).

3. Female CEOs and executives have limited scope in re-assigning male employees because they are already better assigned to job and wages than female employees.

4. Correction of previous "wrong" wages and job assignments means both wage increases and promotions for high-productivity women and wage decreases and demotions for low-productivity women because a noisier signal in a statistical discrimination model means both discrimination *against* individuals with high productivity and discrimination *in favor of* individuals with low productivity. This implies that the male-female wage differential will be reduced at the top of the wage distribution but not at the bottom, and that the likelihood of promotion will increase for high-ability white collar female employees but not for other female employees and males.

5. A richer model (with promotions) would also imply that women will be underrepresented in top positions at the firm (glass ceiling): only females with a disproportionately large s_i will be promoted by male employers.

6. Initial conditions with an imbalance in the proportion of CEOs and executives by gender are self-sustaining in equilibrium because the subsequent learning and promotion

processes are marred by the same wrong reading of the signal that characterized the first wages and job assignments.

Formal Model: TO BE COMPLETED

3 Data and Descriptives

The data used in this paper come from two sources, INVIND-INPS and Company Accounts Data Service (CADS). INVIND-INPS is a matched employer-employee data set which has the following structure. The starting point is the Bank of Italy's annual survey of manufacturing firms (INVIND), an open panel of around 1,000 firms per year, representative of manufacturing firms with at least 50 employees. The Italian Social Security Institute (INPS) provided the complete work histories of all workers who were ever employed at an INVIND firm in the period 1980-1997, including spells of employment in which they were employed in firms not listed in the INVIND survey. The information on workers contained in the INVIND-INPS data includes gender, age, tenure,[6] occupational status (production, non-production, manager), annual gross earnings (including irregular payments such as overtime, shift work and bonuses), number of weeks worked, and a firm identifier. All records with missing entries on either the firm or the worker identifier, those corresponding to workers younger than 15 and older than 65, and those corresponding to workers with less than four weeks worked in a given year have been deleted. For each individual-year, we kept only the observation corresponding to the main job (identified in terms of number of weeks worked). Overall, the INVIND-INPS data set includes information on about a million workers per year, more than half of whom are employed in INVIND firms in any given year. The remaining workers are employed in about 450,000 other firms of which we only know the firm identifier.[7] In Table 1 we report summary statistics on workers' characteristics for the entire sample. About 66% of observations pertain to production workers, 32% to non-production employees, and 2.1% are executives. Even though females represent about 21% of the workforce, only 2.5% of executives are women. On average, workers are 37 years old, with males being about 2.5 years older than females (37.1 vs. 34.5). Average gross weekly earnings at 1995 constant prices are around 391 euros, with female earning about 28% less than males (310 euros vs. 411 euros).

[6] Our data on tenure is left-censored because we do not have information on workers prior to 1981.

[7] This is the same database used by Iranzo, Schivardi and Tosetti (2008) and Macis and Schivardi (2012).

The CADS data includes balance-sheet information for a sample of about 40,000 firms (including most INVIND firms) in the period 1982-1997. The data include information on the industry, geographic location, sales revenues, value added at the firm-year level, and a firm identifier. Because the firm identifier in CADS and INVIND-INPS are the same, we are able to match the worker-level data with the firm-level data. The merged INVIND-INPS-CADS dataset includes 7,909 firm-year and 4,567,316 worker-year observations. In Table 2 we report summary statistics on the entire, matched INVIND-INPS-CADS sample of firms as well as for a balanced panel, which we will use as our estimating sample in our main empirical analyses. A total of 822 unique firms are included in the INVIND-INPS-CADS sample. Of these, 234 form the balanced panel of firms continuously in the data set between 1987 and 1997. For the entire sample, average gross weekly earnings at 1995 constant prices are about 389 euros, and the average age of workers is 37.3 years. 68.6% of the observations are blue collars, 29% are white collars, and 2.4% are executives. The corresponding characteristics in the balanced sample are very similar.

We identify female leadership at the firm making heavy use of the classification "executive" present in the data. As already observed by Bandiera, Guiso, Prat and Sadun (2012), one advantage of using data from Italy is that this indicator is very reliable since the job title of executive is subject to a different type of labor contract and is registered is a separate account with the social security administration.[8] Within the executives, we identify the CEO as the executive with the highest earnings. Given our fairly complete measure of compensation and given the structure of the salary determination in the Italian manufacturing sector, this assumption should be quite accurate in capturing the top executive in charge of the firm.

In terms of aggregate descriptive statistics, females are 26.4% of the workforce at INVIND firms, but only 3.1% of the executives. Only 1.9% of CEOs are females. The descriptive statistics for the balanced panel are quite similar to those referring to the whole sample and confirm the underrepresentation of women in top positions at the firm found for other countries. In particular, the ratio between women in the labor force and women classified as executives is very similar to the ratio obtained from the Execucomp data for the U.S.

Figure 1 shows that the female representation in executive positions in Italy increased over time, but remains very small by the end of the period. In 1980, slightly above 10 percent of firms had at least one female executive, and females represented 2% of all executives and 1% of CEOs. In 1997, these figures were 20%, 4% and 2%, respectively. Table 3 presents

[8] The original job description in Italian is *dirigente*, which roughly corresponds to a top manager in a US firm.

the distribution of female executives across industries. Even though there is substantial variation across industries in the presence of females in the executive ranks, no obvious pattern emerges in terms of the relationship between female leadership and the presence of females in the non-executive workforce in the various industries.

Table 4A reports descriptive statistics for firms with no female executives and firms with at least one female executive. Firms with some female executives are larger, pay higher wages and appear to be more productive based on sales per employee, value added per employee, and TFP. The composition of the workforce differs in that firms with some female executives employ a larger share of non-production workers (39 percent vs. 27 percent). The raw average gender wage gap is larger in firms with some female executives (about 18 percent vs. 14 percent). In Table 4B we compare firms with a male CEO with those with a female CEO. Firms with a female CEO are smaller, both in terms of employment and in terms of revenues, pay lower wages, and employ a larger share of blue collars. Firms with a female CEO also employ a slightly larger share of female workers (35 vs. 31 percent). However, when one looks at measures of productivity (sales per employee, value added per employee, and TFP), the differences shrink considerably. For instance, total revenues are on average 6.47 times higher in firms with a male CEO than in firms with a female CEO, but revenues for employee, value added per employee and TFP are 1.33, 1.29 and 1.06 times higher, respectively.

4 Female Leadership and Firm Performance

As discussed in section 2 above, if female executives improve the allocation of female talents within the firm by counteracting pre-existing statistical discrimination, this would have efficiency consequences which could result in improved firm performance. The efficiency-enhancing effects of female executives should be stronger the larger the presence of female workers.

4.1 Econometric Model

We will be estimating the following econometric model:

$$y_{jt} = \mathbf{c}'_{jt}\beta_1 + \mathbf{z}'_{jt}\beta_2 + \mathbf{x}'_{jt}\beta_3 + \beta_4\gamma_{jt} + \boldsymbol{\alpha}'_{jt}\beta_5 + \boldsymbol{\lambda}_j + \eta_t + \varepsilon_{jt} \tag{6}$$

where y_{jt} is a measure of firm performance, z_{jt} is a vector of firm-level observable characteristics, λ_j is a vector of unobservable firm effects; c_{jt} is a vector of observable firm executives' characteristics, including indicators of female leadership (our main object of interest), γ_{jt}

is a measure of executives' unobservable ability, x_{jt} is a vector of workforce characteristics aggregated at the firm-year, and α_{jt} is unobservable workforce ability (mean and standard deviation of workers' ability in each firm-year); η_t are year dummies.

The main parameter of interest is the first element of the vector of coefficients β_1, i.e., the coefficient on the indicators of female leadership. We will use three measures of female leadership: 1) the share of female executives in a firm-year, 2) dummy variables for whether females represent 0%, between 0 and 25%, or more than 25% of executives in a given firm-year, and 3) a dummy variable equal to 1 if the firm's CEO is female in a firm-year.

If relevant unobserved heterogeneity at the worker- and firm-level were left out of the equation, three sources of bias would arise. First, the labor force composition at the firm may be different: firms with important female leadership representation may have systematically higher or lower ability workers. Second, on top of labor force composition, other unobservable firm effects may make one firm more productive than another and this unobserved firm-level component may not be randomly assigned between male- and female-led firms. Third, the selection on unobserved individual ability in the position of executive/CEO may not be the same by gender so that women executives/CEOs may be of systematically higher or lower ability than men executives/CEOs, and female leadership indicators might be capturing such difference rather than a "pure" gender effect.

We perform the estimation in two steps. In the *second* step, we estimate (6). In the *first* step, we jointly estimate the set of unobservables $\left(\gamma_{jt}, \lambda_j, \alpha_{jt}\right)$. We do so by estimating a two-way fixed effects regressions following the identification strategy outlined in Abowd, Kramarz and Margolis (1999) (AKM henceforth) and the estimation strategy proposed by Abowd, Creecy and Kramarz (2002).[9] Specifically, ther regression is the following:

$$w_{it} = \mathbf{s}'_{it}\beta + \eta_t + \alpha_i + \sum_{j=1}^{J} dj_{it}\Psi_j + \zeta_{it} \tag{7}$$

where w_{it} is the wage for individual i at time t, $\mathbf{s}'$ is a vector of observable individual characteristics, α_i is the individual fixed effect, dj_{it} is a dummy equal 1 if worker i is in firm j at time t and Ψ_j are the firms' fixed effects.

In the *second* step we plug the unobserved heterogeneity components thus estimated into (6). We perform the analysis in two steps because the gender of the executives is observed only for a subset of firms in our sample (those included in the INVIND survey) while we want to exploit the full set of transitions in the complete INPS sample to obtain a more robust identification of the unobserved heterogeneity at the worker and firm level. In

[9] We use the code developed by Ouazad (2008) for Stata.

fact, the identification of both the individual α_i and firm Ψ_j effects in equation (7) requires mobility of workers across firms in the sample. Prior to the actual estimation, we need to identify the groups of "connected" workers and firms. A connected group includes all the workers ever employed by any firm in the group, and all the firms that any worker in the group has ever worked for. It is only within connected groups that worker- and firm-effects can be identified (Abowd, Creecy and Kramarz 2002).[10] Finally, we adopt the usual assumption in this literature of random mobility of workers across firms conditional on observables. Under this assumption, the estimated worker fixed effects can be interpreted as the component of wages due to the worker's pure ability, irrespective of the characteristics of the particular firm that employes the worker in a given year, and net of the personal, time-variant characteristics included in the controls. Likewise, the firm effect is interpreted as the component of wages specific to the firm where the employee works, and it might respond to particular compensation policies, such as effciency wages or rent-sharing.

4.2 Estimation Results

4.2.1 Estimating worker and firm effects

In Table 5, we present the first stage results, i.e., the results from estimation of Equation (7). The dependent variable is the natural logarithm of weekly wages. The vector of observable individual characteristics, $\mathbf{s}'$, includes age, age squared, tenure, tenure squared, a dummy variable for non-production workers and a dummy for executives (occupational status changes over time for a considerable number of workers), as well as a full set of interactions of these variables with a female dummy (to allow the returns to age, tenure and occupation to vary by gender), and a set of year dummies. As we mentioned when we discussed the identification issues, the first step in implementing the Abowd, Creecy and Kramarz (2002) methodology is the identification of connected groups of workers and firms. As it turns out, our sample consists of essentially one large connected group, with 99% of the sample forming a single connected group. Thus, in our estimation we focus on the largest connected group and disregard the remaining observations. The identification of firm effects and worker effects is guaranteed by the relatively high mobility of workers in the sample: about 70% have more than one employer during the 1980-1997 period, and between 8 and 15 percent of workers change employer from one year to the next. The estimated coefficients on the workers' observable characteristics shown in Table 5 deliver unsurprising

[10] The Abowd, Creecy and Kramarz (2002) estimation algorithm sets the average of worker effects to zero, and one of the firm-year effects to zero. Therefore, the absolute size of the estimated effects is meaningless.

results: wages appear to exhibit concave age and tenure profiles, and there is a substantial wage premium associated with white collar jobs and, especially, with executive positions.

Figure 2 shows the distribution (Kernel density) of the estimated individual fixed effects for executives (Figure 2A) and CEOs (Figure 2B), separately by gender. In both cases, the distribution of the estimated fixed effects for females is shifted to the right compared to that of males. This is consistent with female executives and CEOS being selected from the top of the (overall) ability distribution.

4.2.2 Female Leadership and Firm Performance

Table 6 presents our first set of results on firm performance, i.e. coefficients from estimating model (6). We present results for our three measures of female leadership at the firm and three measures of firm performance. We focus our analysis on the balanced panel (firms that were continuously observed from 1987 through 1997) to avoid the selection of firms entering and exiting the sample. In Table 8 we present robustness checks where we use the full INVIND-INPS-CADS sample.[11]

The results from Table 6 broadly confirm what found in the previous literature [Wolfers (2006) and Albanesi and Olivetti (2008)][12]: female leadership does not appear to have a significant impact on firm performance.[13] However, a change in the specification leads to different results. Previous literature on the impact of female leadership has shown that one important channel of this interaction are policies related to the work force at the firm. The labor literature on gender differential has shown the importance of segregation, i.e. concentration of minority workers in given occupations, industries or firms. Finally, our own theoretical framework implies an important interaction between female leadership and gender composition of the workforce at the firm. This all indicates that empirical specifications should take these interactions into account.

The results are shown in Table 7. On all three measures of female leadership and three measures of firm performance, we find the same result: the interaction between female

[11] Tables A1-1, A1-2 and A1-3 in the Web Appendix present the full results.

[12] Recent works on the impact of gender quota for firms' boards have found a negative impact on short-term profits (Ahern and Dittmar (2012); Matsa and Miller (2012)). However, first, these papers consider the composition of boards, not executive bodies; second, it is not clear whether the impact is due to imposing a constraint on the composition of the board or to the fact that the added members of the boards are female.

[13] The only exception is represented by the proportion of female executives, for which we estimate a negative, large and significant coefficient when the dependent variable is value added for employee and TFP (columns 6 and 9 of Table 6). However, the interpretation of the coefficient is the partial effect on firm performance of a one-unit change in the explanatory variable, i.e. a jump from 0% to 100% in the proportion of female exexutives. Evaluated at reasonable values of the share of female executives, the magnitude of this effect is quite small.

leadership and the proportion of non-executive female workers at the firm is positive and significant. In term of magnitude, the positive interaction term together with the negative intercept generates a non-significant impact at the mean of the proportion of women at the firm (about 20%). The result indicates that the non-significant impact we found in Table 6 was therefore entirely due to composition effects. If the proportion of women at the firm is about one standard deviation higher than the mean we obtain a positive significant impact, if it is about one standard deviation lower than the mean we obtain a negative significant impact. We want to emphasize that, contrary to previous literature, we obtain this result on measures of firm performance that are less affected by the perceptions of financial market operators on female leadership. In fact, our dependent variables are closer to actual measures of firm productivity. In particular, TFP is a measure of the efficiency with which the factors of production (labor, capital, materials) are combined to obtain a firm's output, and, according to Lucas (1978), TFP is directly determined by the ability of the firm's top executive(s). We computed TFP using the Olley and Pakes (1996) procedure.[14]

Our result of a positive effect of female leadership provided that a sufficient fraction of the workforce is female holds on the larger unbalanced sample. In Table 8 we replicate all of our main analyses using the full INVIND sample and we find that our results broadly hold qualitatively and, with a few exceptions, also quantitatively.

5 Female Leadership and Wages at the Firm

5.1 Econometric Model

We will be estimating by Quantile Regression the following econometric model:

$$w_{ijt}|g = FLead'_{ijt}\boldsymbol{\beta}^g + Work'_{ijt}\boldsymbol{\delta}^g + Firm'_{ijt}\boldsymbol{\gamma}^g + Exec'_{ijt}\boldsymbol{\chi}^g + \eta^g_t + \varepsilon_{ijt} \tag{8}$$

where w_{ijt} are the log weekly gross earnings of worker i at firm j in year t of gender g. $FLead_{ijt}$ are the same measures of female leadership we have used in the performance regressions: female CEO (dummy); proportion of female executives $> 25\%$ (dummy); and the proportion of female executives in the firm. We control for firm heterogeneity through two sets of variables. The vector $Firm_{ijt}$, which includes the following variables: 2-digit industry dummies, region dummies, employment dummies (100-250, 250-500, 500+), share females in non-executive workforce, average age of workforce, share blue collars, firm fixed-effect from the 2-way F.E. regression reported in Table 5. And the vector $Exec_{ijt}$, which

[14] See Iranzo et al. (2008) for the details.

includes the following Executive/CEO characteristics averaged at firm-year level: age, experience, tenure, executive fixed-effect from the 2-way F.E. regression reported in Table 5. We control for worker heterogeneity through the vector $Work'_{ijt} =$, wich includes: age, age squared, production worker dummy, average and SD of worker fixed-effect from the 2-way F.E. regression reported in Table 5. Finally, we control for time effects with the year dummies η_t.

5.2 Estimation Results

We run the quantile regressions separately on female workers and male workers. In Figures 3A-3C, we report the coefficients on the female leadership indicators for the 10th, 25th, 50th, 75th and 90th percentile regressions.[15] We begin, in Figure 3A, with reporting the coefficients on the share of female executives. Our results indicate that the share of female executives at the firm is associated with lower wages for female workers at the bottom decile of the conditional wage distribution, with zero or slightly positive effects at the 25th and 50th percentiles, and with positive and effects at the 75th and especially at the 90th percentile of the female wage distribution. As for males, the estimated coefficients are negative at the bottom, and very small and not statistically significant at the top of the male wage distribution. Thus, the male-female wage gap is reduced especially at the top of the wage distribution. In Figure 3B we show the coefficients on the dummy variable equal to 1 if the share of female executives is at least 25% , and we obtain a very similar pattern: this measure of female leadership is associated with higher wages for females at the top quantiles of the female wage distribution, and it does not have a significant effect on the wages of men. Finally, in Figure 3C we look at the coefficient on the female CEO dummy. Here we obtain that a female CEO substantially reduces wages for females at the bottom and increases them at the top.

These results are consistent with female CEOs raising wages and therefore reducing the gender wage gap for female workers at the top of the ability distribution, as predicted by a model where female executives counteract pre-existing statistical discrimination. In contrast, if female executives were simply favoring female workers, we would have observed a more uniform increase of female wages across the whole wage distribution.

[15] Tables A2-1, A2-2 and A2-3 in the Web Appendix present the full results.

6 Female Leadership and Promotions at the Firm [PRELIMINARY]

The INVIND-INPS data include an indicator for workers' occupation: production worker, non-production worker and executives. This enables us to observe promotions of workers to the executive rank.

In Table 9, we present a descriptive exploration of whether female executives have any impact on this gap. We limit the sample to white collars, which is the group of workers from which the vast majority of new executives comes from. The descriptive evidence presented in the table indicates a positive correlation between female leadership at the firm and the probability that a female white collar in year t is promoted to executive in year t+1 only if the female worker is in the top 25% of the (firm-gender-year-specific) wage distribution. This preliminary unconditional correlation points to a similar behavior to the one observed on wage determination: female leadership favors only top women at the firm.

Of course, this descriptive evidence does not account for possible individual and firm-level heterogeneity. In fact, it is possible that "female friendly" firms have both an important representation of females in leadership positions and higher promotion rates for female employees for some common, unobserved reason. Also, it is possible that high-ability females, who therefore have a higher probability to be promoted to executives, disproportionately join firms with female CEOs. Both factors might generate a spurious positive association between female leadership and promotion rates of female employees.

Econometric analysis: TO BE COMPLETED

7 Conclusion

We use a unique matched employer-employee dataset from Italy - which includes information on the entire labor force of a large sample of firms - to study whether female leadership at the firm makes a difference. Our empirical analysis suggests that it does: 1) The interaction between female leadership and the proportion of women at the firm has a positive impact on firm performance; 2) The impact of female leadership on women's wages is heterogenous: positive at the top and negative at the bottom of the wage distribution; 3) the unconditional correlation between female leadership at the firm and the proportion of women promoted to executive positions is also heterogenous: it is positive only for women in the top 25% of the white collar wage distribution.

Our proposed theoretical framework can account for all of these results. We start with a standard Statistical Discrimination model where workers' productivity is observed through a noisy signal and executives decides wages and job assignments based on the signal and the worker's type (gender). We assume, following Cornell and Welch (1996), that executives are better at extracting information from workers of their same type (gender). If most of the executives are male, then most of high productivity women are underpaid and misallocated in relatively low productivity jobs. Low productivity women, instead, are overpaid but also matched to the wrong jobs. When female leadership takes over a firm, this statistical discrimination is corrected. As a result, wages of high productivity women increase and wages of low productivity women decrease, as our second empirical result shows. At the same time, women are reallocated to jobs better matching their productivity, generating an increase in firm performance directly proportional to the fraction of women at the firm. This implication matches our first empirical result. By the same mechanism, only high wage / high ability women will see their chance of promotion to executive increase, as our third empirical evidence suggests.

We conclude that if our model correctly describes the mechanism behind our empirical results, then the observed strong underrepresentation of women in top positions at the firm may have high costs in terms of firm productivity and efficient allocation of resources.

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Table 1 - Descriptive statistics: Full INVIND-INPS sample

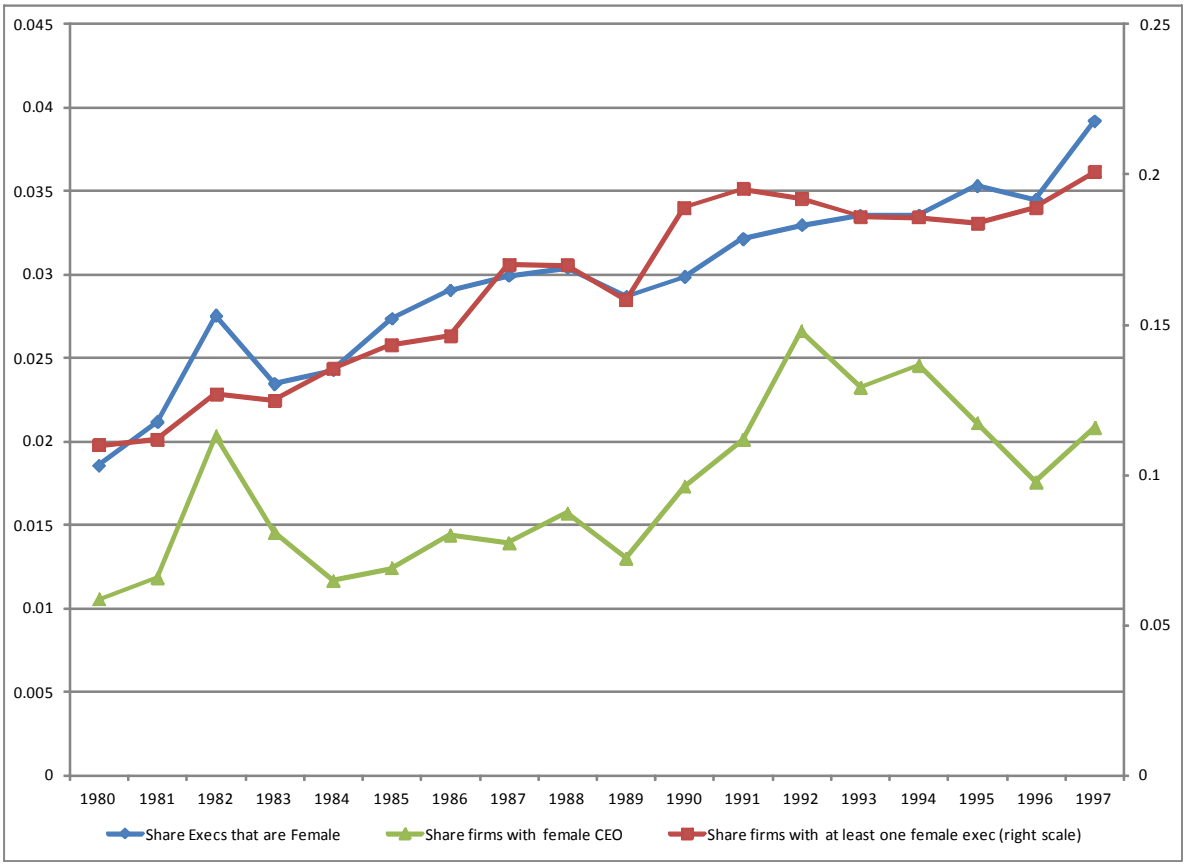
INVIND-INPS Data, 1980-1997		
	mean	(st.dev.)
% Production workers	65.7%	
% Non-prod. workers	32.2%	
% Executives	2.1%	
% Females	20.9%	
% Female execs.	2.5%	
Age	37.1	(10.1)
Age (Males)	34.5	(9.6)
Age (Females)	37.7	(10.1)
Wage (earnings/weeks)	390.6	(255.7)
Wage (Males)	411.8	(273.3)
Wage (Females)	310.3	(148.1)
Number of worker-year observations	18,938,837	
N. of unique workers	1,726,836	
N. of unique firms	453,000	

Table 2 - Descriptive statistics: INVIND-INPS-CADS sample

	Full sample		Balanced panel	
	Mean	(Std. Dev.)	Mean	Std. Dev.
Average employment	698.6	(3,269.3)	706.7	(1,309.1)
Average age of employees	37.3	(3.5)	37.6	(3.4)
Average wage (weekly)	389.1	(83.6)	406.9	(89.3)
Share non-prod. workers	29.0%		30.4%	
Share executives	2.4%		2.6%	
Share females	26.4%		25.0%	
Female executives (share of execs)	3.1%		3.8%	
Female CEO	1.9%		2.3%	
Sales (thousand euros)	92,770	(370,428)	118,890	(231,614)
Sales per worker	146.2	(147.6)	167.72	(110.76)
Value added per worker	43.9	(21.4)	48.23	(20.20)
TFP	2.42	(0.51)	2.50	(0.48)
Firm-Year Obs. (firms) [years]	7,909 (822) [16]		2,340 (234) [10]	

Notes: INVIND-INPS-CAD data. The balanced panel includes firms continuously observed in the period 1987-1997.

Figure 1 - Female Leadership in Italian Manufacturing Firms, INVIND 1980-1997.



Notes: INVIND-INPS data, 1980-1997.

Table 3 - Females in the Workforce and Executive Positions, by Industry

	INVIND firms, 1982-1997		
Industry	Non-exec	Executives	CEOs
	% females	% female	% female
Wood and cork, except furniture.	26.1%	7.6%	7.0%
Wearing apparel; dressing and dyeing of fur	73.0%	6.5%	3.9%
Leather; luggage, handbags, saddlery, harness and footwear	46.8%	6.3%	0.5%
Chemicals, Coke, refined petroleum and nuclear fuel	24.4%	5.0%	2.3%
Motor vehicles, trailers and semi-trailers	17.7%	4.0%	2.9%
Other transport equipment	6.3%	3.2%	1.5%
Basic metals	7.7%	3.2%	4.2%
Textiles	45.8%	3.1%	3.2%
Fabricated metal products, except machinery and equipment	22.5%	1.6%	1.1%
Furniture; manufacturing.	21.1%	1.4%	0.0%
Pulp, paper and paper products	18.4%	1.4%	0.0%
Radio, television and communication equipment and apparatus	33.2%	0.6%	0.6%
Office machinery and computers	33.4%	0.5%	0.0%
Medical, precision and optical instruments, watches and clocks	37.6%	0.3%	0.0%

Notes: INVIND-INPS-CAD data, 1982-1997.

Table 4A - Descriptive statistics

Firms with No Female Executives and with some Female Executives

	No Female Execs		Some Female Execs	
	Mean	(St.Dev.)	Mean	(St.Dev.)
CEO's age	48.64	(7.0)	49.78	(7.1)
CEO's tenure	4.15	(3.3)	3.64	(2.9)
CEO's pay	147,506	(108,628)	234,372	(178,054)
Female Execs. age			44.70	(7.1)
Male Execs. age	46.49	(4.8)	46.63	(3.9)
Female Execs mean pay			99,033	(42,695)
Male Execs mean pay	103,855	(45,834)	118,076	(46,574)
Average employment	490.99	(1,971.4)	1563.64	(6,173.05)
Average age of employees	37.20	(3.5)	37.84	(3.15)
Average wage (weekly)	378.54	(75.5)	432.67	(99.7)
Average wage (Females)	324.38	(58.6)	352.21	(68.8)
Average wage (Males)	374.83	(67.8)	422.49	(89.2)
Share females	0.25	(0.21)	0.31	(0.21)
Share non-prod. workers	0.27	(0.16)	0.39	(0.21)
Share Executives	0.02	(0.02)	0.03	(0.02)
Female executives			0.16	(0.19)
Sales (thousand euros)	64,903	(298,668)	181,535	(301,686)
Sales per worker	140.27	(150.5)	171.13	(132.29)
Value added per worker	42.70	(20.8)	49.41	(23.16)
TFP	2.38	(0.49)	2.56	(0.56)
Firm-Year Obs. (firms) [years]	6,378 (746) [16]		1,531 (229) [16]	

Notes: INVIND-INPS-CAD data, 1982-1997.

Table 4B - Descriptive statistics

Firms with Male and Female CEO

	Male CEO		Female CEO	
	Mean	St.Dev.	Mean	St.Dev.
CEO's age	48.91	(7.0)	45.92	(7.6)
CEO's tenure	4.05	(3.3)	4.04	(2.7)
CEO's pay	165,238	(130,560)	115,936	(54,030)
Female Execs. age	44.70	(7.11)	44.66	(6.55)
Male Execs. age	46.54	(4.54)	45.23	(7.81)
Female Execs mean pay	97,938	(42,134)	109,348	(46,564)
Male Execs mean pay	106,773	(46,443)	90,659	(31,719)
Average employment	707.42	(3,299.1)	234.92	(360.78)
Average age of employees	37.35	(3.5)	35.91	(3.3)
Average wage (weekly)	389.85	(83.7)	345.15	(61.7)
Average wage (Females)	330.32	(61.5)	300.53	(66.7)
Average wage (Males)	384.67	(75.1)	351.78	(54.9)
Share females	0.31	(0.20)	0.35	(0.28)
Share non-prod. workers	0.41	(0.21)	0.23	(0.14)
Share Executives	0.04	(0.02)	0.02	(0.01)
Female executives	0.12	(0.11)	0.54	(0.32)
Sales (thousand euros)	93,949	(373,760)	30,525	(48,827)
Sales per worker	146.45	(148.4)	131.87	(92.60)
Value added per worker	44.08	(21.5)	39.24	(14.13)
TFP	2.42	(0.51)	2.40	(0.43)
Firm-Year Obs. (firms) [years]	7,762 (815) [16]		147 (40) [16]	

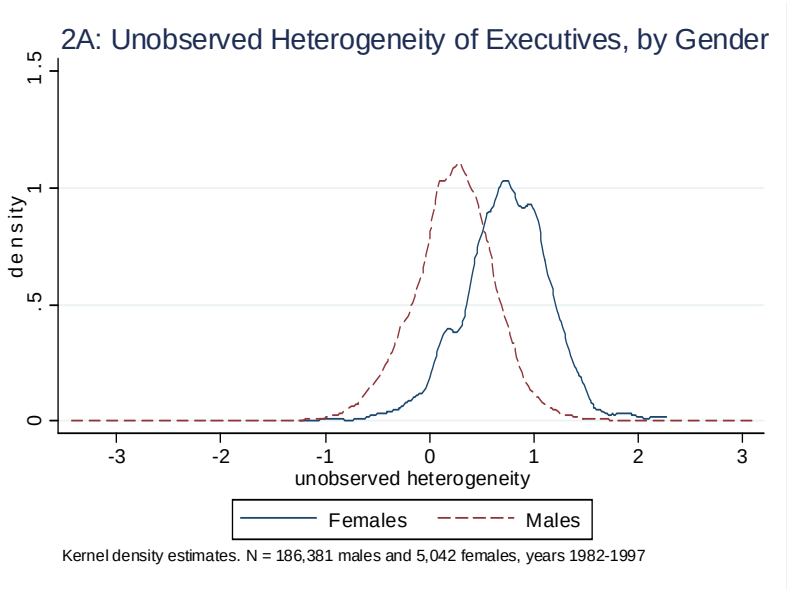
Notes: INVIND-INPS-CAD data, 1982-1997.

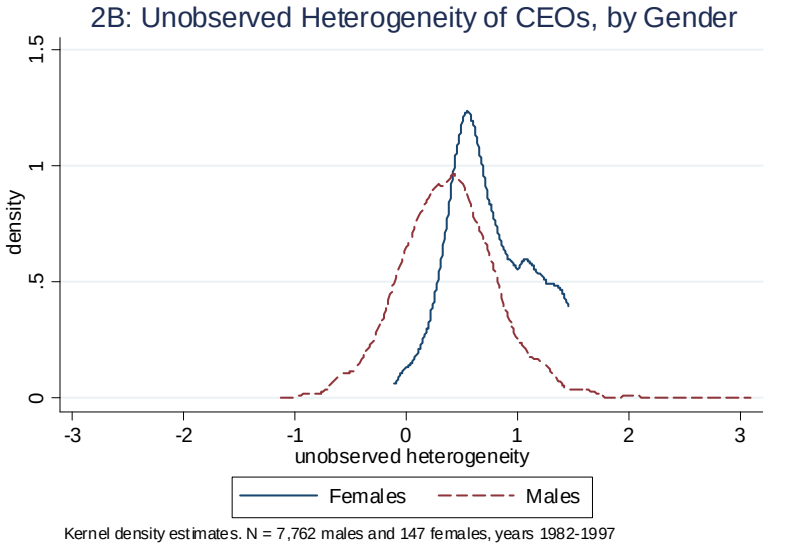
Table 5: Worker and Firm Unobserved Heterogeneity: Two-Way Fixed Effects Regressions

Number of Observations	18,938,837
Number of Individual FEs	1,726,836
Number of Firm FEs	453,000
F	39.68
Prob > F	0.000
Adj. R-squared	0.82
Coeffs. on worker characteristics:	
Age	0.0619
Age squared	-0.0002
Age * Female	-0.0194
Age squared * Female	0.0002
Tenure	0.0051
Tenure squared	-0.0004
Tenure * Female	-0.0031
Tenure squared * Female	0.0001
White collar	0.0704
Executive	0.5734
White collar * Female	0.0007
Executives * Female	0.0328
Year effects	(not reported)
Standard deviation of fixed effects:	
SD of worker effects	0.510
SD of firm effects	0.153
Correlation	-0.087

Notes: The sample includes all firms and all workers in the largest connected group, years 1980-1997. The estimation was performed using the conjugate gradient algorithm introduced by Abowd, Creecy and Kramarz (2002) and implemented by the Stata code "a2reg" written by Ouazad (2008). See Section 2.2 for details.

Figure 2: Distributions of Executives' Estimated Unobserved Heterogeneity





Notes: Kernel density estimates. In 2A, the sample includes all executives of INVIND firms (N = 186,381 males and 5,042 females) and in 2B it includes CEOs (N = 7,762 males and 147 females), years 1982-1997.

Table 6: Impact of Female Leadership on Firm Performance

- Balanced Panel Sample -

Female Leadership Measures:	Firm Performance Measures:								
	Sales per Employee (Log)			Value Added per Employee (Log)			TFP		
Fem CEO	0.034			-0.078			-0.084*		
	(0.040)			(0.049)			(0.048)		
FemEx>25%		0.036			-0.063			-0.070	
		(0.045)			(0.055)			(0.054)	
FemEx			-0.078			-0.263***			-0.231***
			(0.077)			(0.094)			(0.092)
R-sq	0.59	0.59	0.59	0.22	0.22	0.22	0.17	0.17	0.18
NT	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340
N	234	234	234	234	234	234	234	234	234
T	10	10	10	10	10	10	10	10	10

Notes: The sample includes a balanced panel of INVIND firms, years 1987-1997. Each observation is a firm-year. The dependent variables are the log of sales per employee (columns 1-3), the log of value added per employee (columns 4-6) and TFP (columns 7-9). FemEx is the share of female executives at the firm-year, FemEx>25% is a dummy equal to 1 if females represent more than 25% of executives at the firm-year (0% female executives is the omitted category; 0-25% dummy is included in the regression but coefficient is not reported), and Fem CEO is a dummy variable equal to 1 if the CEO is a female in a given firm-year. All regressions include firm fixed effects, year effects, 2-digit industry dummies, industry-specific time trends, region dummies, time-varying firm characteristics (employment dummies (100-250, 250-500, 500+), share non-production workers, average employee age, average worker unobserved heterogenity, standard deviation of worker unobserved heterogenity), executives/CEO observable characteristics (age, tenure), and executives/CEO unobserved heterogeneity. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 percent confidence levels, respectively.

Table 7: Impact of Female Leadership on Firm Performance with Interaction Effects

- Balanced Panel Sample -

Female Leadership Measures:	Firm Performance Measures:								
	Sales per Employee (Log)			Value Added per Employee (Log)			TFP		
Fem CEO	-0.12*			-0.27***			-0.23***		
	(0.06)			(0.08)			(0.08)		
Fem CEO *FemNonEx	0.62***			0.78***			0.59**		
	(0.20)			(0.24)			(0.24)		
FemEx>25%		-0.15*			-0.27***			-0.27***	
		(0.08)			(0.10)			(0.09)	
FemEx>25% *FemNonEx		0.53***			0.65***			0.62***	
		(0.19)			(0.23)			(0.23)	
FemEx			-0.49***			-0.50***			-0.44**
			(0.13)			(0.16)			(0.15)
FemEx *FemNonEx			1.29***			0.76*			0.66*
			(0.32)			(0.39)			(0.39)
R-sq	0.60	0.59	0.60	0.22	0.22	0.22	0.18	0.18	0.18
NT	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340
N	234	234	234	234	234	234	234	234	234
T	10	10	10	10	10	10	10	10	10

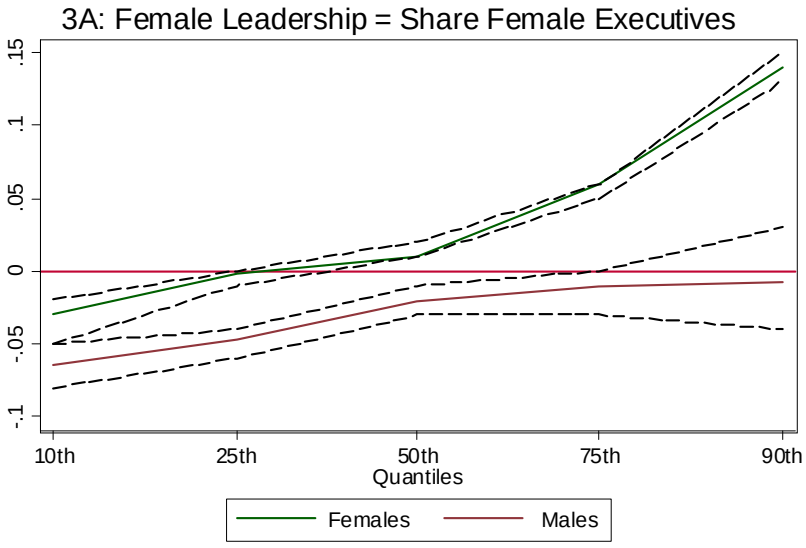
Notes: The sample includes a balanced panel of INVIND firms, years 1987-1997. Each observation is a firm-year. The dependent variables are the log of sales per employee (columns 1-3), the log of value added per employee (columns 4-6) and TFP (columns 7-9). FemEx is the share of female executives at the firm-year, FemNonEx is the share of females in the non-executive workforce at the firm-year, FemEx<25% (FemEx>25%) is a dummy equal to 1 if females represent less than (more than) 25% of executives at the firm-year (0% female executives is the omitted category), and Fem CEO is a dummy variable equal to 1 if the CEO is a female in a given firm-year. All regressions include firm fixed effects, year effects, 2-digit industry dummies, industry-specific time trends, region dummies, time-varying firm characteristics (employment dummies (100-250, 250-500, 500+), share non-production workers, average employee age, average worker unobserved heterogenity, standard deviation of worker unobserved heterogenity), executives/CEO observable characteristics (age, tenure), and executives/CEO unobserved heterogeneity. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 percent confidence levels, respectively.

Table 8: Impact of Female Leadership on Firm Performance with Interaction Effects
- All INVIND Firms Sample -

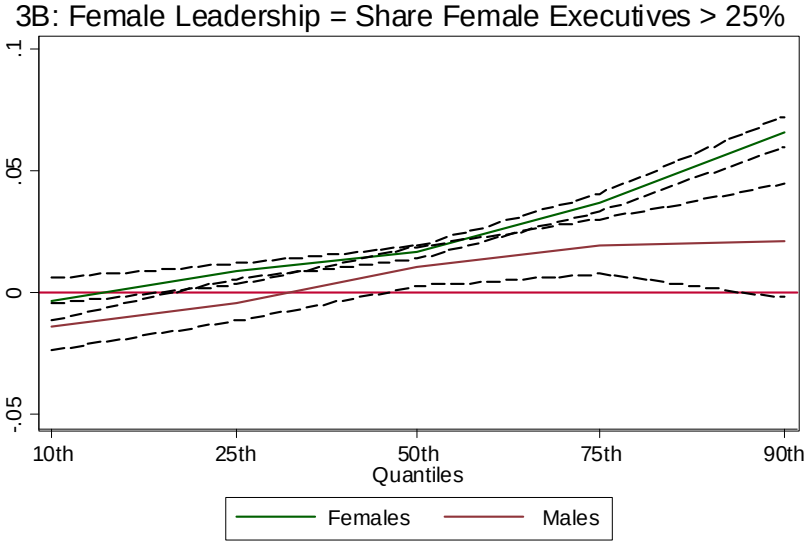
Female Leadership Measures:	Firm Performance Measures:								
	Sales per Employee (Log)			Value Added per Employee (Log)			TFP		
Fem CEO	-0.02			-0.11**			-0.09*		
	(0.04)			(0.05)			(0.05)		
Fem CEO *FemNonEx	0.15*			0.11			-0.03		
	(0.09)			(0.11)			(0.11)		
FemEx>25%		-0.04			-0.23***			-0.22***	
		(0.04)			(0.05)			(0.05)	
FemEx>25% *FemNonEx		0.21**			0.31***			0.25**	
		(0.09)			(0.11)			(0.11)	
FemEx			-0.21***			-0.32***			-0.29***
			(0.08)			(0.09)			(0.09)
FemEx *FemNonEx			0.56***			0.40**			0.26
			(0.15)			(0.18)			(0.17)
R-sq	0.75	0.75	0.75	0.30	0.30	0.30	0.24	0.24	0.24
NT	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909
N	822	822	822	822	822	822	822	822	822
T	15	15	15	15	15	15	15	15	15

Notes: The sample includes all INVIND firms, years 1982-1997. Each observation is a firm-year. The dependent variables are the log of sales per employee (columns 1-3), the log of value added per employee (columns 4-6) and TFP (columns 7-9). FemEx is the share of female executives at the firm-year, FemNonEx is the share of females in the non-executive workforce at the firm-year, FemEx<25% (FemEx>25%) is a dummy equal to 1 if females represent less than (more than) 25% of executives at the firm-year (0% female executives is the omitted category), and Fem CEO is a dummy variable equal to 1 if the CEO is a female in a given firm-year. All regressions include firm fixed effects, year effects, 2-digit industry dummies, industry-specific time trends, region dummies, time-varying firm characteristics (employment dummies (100-250, 250-500, 500+), share non-production workers, average employee age, average worker unobserved heterogenity, standard deviation of worker unobserved heterogenity), executives/CEO observable characteristics (age, tenure), and executives/CEO unobserved heterogeneity. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 percent confidence levels, respectively.

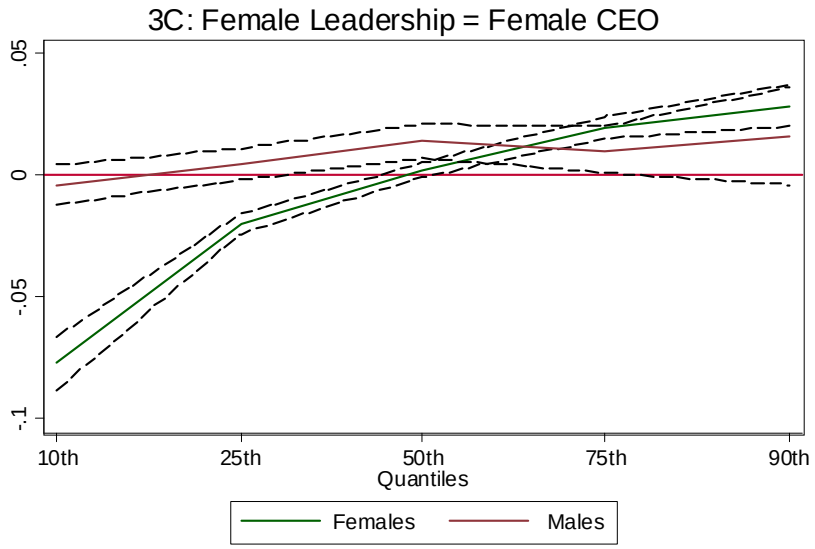
Figure 3: Female Leadership and the Male-Female Wage Gap
Coefficients from quantile regressions, separately by gender



Note: Coefficients from quantile regressions. Dashed lines represent 95% confidence interval.



Note: Coefficients from quantile regressions. Dashed lines represent 95% confidence interval.



Notes: Coefficients on "Female Leadership" indicators from quantile ln wage regressions, sepeartely by gender. The sample includes workers employed at INVIND firms, 1982-1997. Each observation is a worker-year. Additional regressors include individual-level controls: age, age squared, production worker dummy; firm-level controls: 2-digit industry dummies, region dummies, employment dummies (100-250, 250-500, 500+), share females in non-executive workforce, average age of workers, average worker ability, standard deviation of worker ability, average age of executives (age of CEO in 2C), average experience of executives (experience of CEO in 2C), average tenure of executives (tenure of CEO), average ability of executives (ability of CEO in 2C); and year effects. Dashed lines represent 95% confidence intervals.

Table 9: Female Leadership and Promotion to Executive

Promotion Probabilities of Female White Collar Employees (% Year to Year)

Wage Quartile	Female Leadership		Male Leadership
	Female CEO	Prop Fem Exec. > 25%	
1st	0.000	0.000	0.017
2nd	0.000	0.000	0.005
3rd	0.000	0.000	0.009
4th	0.726	0.844	0.210
N worker-year obs.	1,787	3,475	166,992

Notes: The sample includes the longest uninterrupted job spell of all female white collar workers employed at INVIND firms in the years 1982-1997. Wage quartiles are by firm-gender-year.

Do Female Executives Make a Difference? The Impact of Female Leadership on Firm Performance and Gender Gaps in Wages and Promotions.

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Mario Macis (Johns Hopkins University and IZA)

Fabiano Schivardi (University of Cagliari, EIEF and CEPR)

Web Appendix

This web appendix includes tables with the full results of the firm performance regressions (presented in section 4.2.2 of the paper) and of the wage quantile regressions (section 5.2).

A1-1: Impact of Female Leadership on Firm Performance.

Sample	Balanced Panel								
Dependent variable	Sales per Employee			Value Added per Employee			TFP		
Fem CEO	0.034			-0.078			-0.084*		
	(0.040)			(0.049)			(0.048)		
0 < FemEx < 25%		-0.003			-0.059***			-0.035	
		(0.019)			(0.023)			(0.022)	
FemEx > 25%		0.036			-0.063			-0.070	
		(0.045)			(0.055)			(0.054)	
FemEx			-0.078			-0.263***			-0.231**
			(0.077)			(0.094)			(0.092)
Exec Ability	-0.021	0.019	0.055	0.031	-0.000	0.038	0.027	-0.083	-0.052
	(0.023)	(0.067)	(0.068)	(0.029)	(0.082)	(0.083)	(0.028)	(0.081)	(0.082)
Exec Tenure	-0.003	-0.003	-0.002	-0.001	0.000	0.001	-0.001	-0.000	0.001
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Exec Age	0.000	0.000	0.000	0.000	-0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FemNonEx	-0.383**	-0.397**	-0.366**	-0.575***	-0.517***	-0.508***	-0.570***	-0.518***	-0.504***
	(0.158)	(0.160)	(0.160)	(0.194)	(0.196)	(0.195)	(0.191)	(0.192)	(0.192)
Mean Age Workforce	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.002**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Share White Collars	0.275**	0.269**	0.266**	-0.008	-0.022	-0.011	0.037	0.032	0.044
	(0.132)	(0.132)	(0.132)	(0.162)	(0.162)	(0.161)	(0.159)	(0.159)	(0.159)
Mean AKM Worker Effect	1.297***	1.279***	1.284***	1.350***	1.389***	1.362***	1.008***	1.033***	1.011***
	(0.237)	(0.237)	(0.237)	(0.290)	(0.289)	(0.289)	(0.286)	(0.285)	(0.284)
SD of AKM Worker Effect	0.359**	0.376**	0.391**	0.585***	0.639***	0.646***	0.724***	0.746***	0.762***
	(0.179)	(0.179)	(0.179)	(0.219)	(0.219)	(0.219)	(0.215)	(0.215)	(0.215)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.593	0.592	0.592	0.217	0.218	0.219	0.173	0.174	0.175
Firm-Year Observations	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340
N. of firms	234	234	234	234	234	234	234	234	234
N. of years	10	10	10	10	10	10	10	10	10

Notes: The sample includes a balanced panel of INVIND firms, years 1987-1997. Each observation is a firm-year. FemEx is the share of female executives at the firm-year, FemNonEx is the share of females in the non-executive workforce at the firm-year, 0<FemEx<25% is a dummy equal to 1 if females represent more than zero but less that 25% of executives at the firm-year, and FemEx>25% is a dummy equal to 1 if females represent more than 25% of executives (0% female executives is the omitted category). Fem CEO is a dummy variable equal to 1 if the CEO is a female in a given firm-year. Firm size dummies are for less than 100, between 100 and 250, between 250 and 500, and more than 500 employees. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 percent confidence levels, respectively.

A1-2: Impact of Female Leadership on Firm Performance with Interaction Effects.

Sample	Balanced Panel								
Dependent variable	Sales per Employee			Value Added per Employee			TFP		
Fem CEO	-0.122*			-0.272***			-0.231***		
	(0.064)			(0.078)			(0.077)		
Fem CEO	0.623***			0.775***			0.588**		
* FemNonEx	(0.199)			(0.244)			(0.240)		
0 < FemEx < 25%		-0.036			-0.033			-0.010	
		(0.032)			(0.039)			(0.039)	
0 < FemEx < 25%		0.091			-0.120			-0.112	
* FemNonEx		(0.090)			(0.110)			(0.108)	
FemEx > 25%		-0.146*			-0.273***			-0.270***	
		(0.079)			(0.096)			(0.095)	
FemEx > 25%		0.529***			0.649***			0.618***	
*FemNonEx		(0.191)			(0.233)			(0.230)	
FemEx			-0.484***			-0.501***			-0.439***
			(0.127)			(0.155)			(0.153)
FemEx			1.292***			0.760*			0.663*
*FemNonEx			(0.321)			(0.394)			(0.388)
Exec Ability	-0.020	0.027	0.075	0.031	0.007	0.050	0.027	-0.076	-0.042
	(0.023)	(0.067)	(0.068)	(0.029)	(0.082)	(0.084)	(0.028)	(0.081)	(0.082)
Exec Tenure	-0.003	-0.002	-0.001	-0.001	0.001	0.002	-0.000	-0.000	0.001
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Exec Age	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FemNonEx	-0.463***	-0.498***	-0.518***	-0.675***	-0.566***	-0.597***	-0.646***	-0.565***	-0.582***
	(0.160)	(0.165)	(0.164)	(0.196)	(0.202)	(0.200)	(0.193)	(0.199)	(0.197)
Mean Age Workforce	0.003***	0.003***	0.003***	0.004***	0.003***	0.003***	0.003**	0.002**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Share White Collars	0.262**	0.275**	0.269**	-0.023	-0.021	-0.009	0.025	0.033	0.046
	(0.132)	(0.132)	(0.132)	(0.161)	(0.161)	(0.161)	(0.159)	(0.159)	(0.159)
Mean AKM Worker Effect	1.344***	1.257***	1.295***	1.409***	1.342***	1.369***	1.052***	0.988***	1.017***
	(0.237)	(0.237)	(0.236)	(0.290)	(0.289)	(0.289)	(0.286)	(0.285)	(0.284)
SD of AKM Worker Effect	0.356**	0.398**	0.440**	0.582***	0.640***	0.674***	0.721***	0.747***	0.787***
	(0.179)	(0.179)	(0.179)	(0.218)	(0.219)	(0.219)	(0.215)	(0.215)	(0.216)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.595	0.594	0.595	0.221	0.222	0.220	0.175	0.178	0.176
Firm-Year Observations	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340	2,340
N. of firms	234	234	234	234	234	234	234	234	234
N. of years	10	10	10	10	10	10	10	10	10

Notes: The sample includes a balanced panel of INVIND firms, years 1987-1997. Each observation is a firm-year. FemEx is the share of female executives at the firm-year, FemNonEx is the share of females in the non-executive workforce at the firm-year, 0<FemEx<25% is a dummy equal to 1 if females represent more than zero but less that 25% of executives at the firm-year, and FemEx>25% is a dummy equal to 1 if females represent more than 25% of executives (0% female executives is the omitted category). Fem CEO is a dummy variable equal to 1 if the CEO is a female in a given firm-year. Firm size dummies are for less than 100, between 100 and 250, between 250 and 500, and more than 500 employees. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 percent confidence levels, respectively.

A1-3: Impact of Female Leadership on Firm Performance with Interaction Effects. Full Sample.

Sample	Full Sample								
Dependent variable	Sales per Employee			Value Added per Employee			TFP		
Fem CEO	-0.018			-0.114**			-0.085*		
	(0.039)			(0.047)			(0.047)		
Fem CEO	0.150			0.109			-0.031		
* FemNonEx	(0.092)			(0.111)			(0.110)		
0 < FemEx < 25%		-0.082***			-0.050**			-0.034	
		(0.019)			(0.023)			(0.023)	
0 < FemEx < 25%		0.244***			0.075			0.033	
* FemNonEx		(0.050)			(0.061)			(0.060)	
FemEx > 25%		-0.038			-0.231***			-0.218***	
		(0.044)			(0.053)			(0.052)	
FemEx > 25%		0.206**			0.310***			0.248**	
*FemNonEx		(0.088)			(0.106)			(0.105)	
FemEx			-0.209***			-0.320***			-0.292***
			(0.075)			(0.090)			(0.089)
FemEx			0.557***			0.401**			0.263
*FemNonEx			(0.146)			(0.176)			(0.174)
Exec Ability	0.015	0.030	0.036	0.074***	0.107***	0.110***	0.079***	0.115***	0.121***
	(0.014)	(0.030)	(0.030)	(0.017)	(0.036)	(0.037)	(0.017)	(0.036)	(0.036)
Exec Tenure	-0.002	0.001	0.001	-0.001	0.002	0.002	-0.000	0.001	0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Exec Age	0.000	-0.000	-0.000	0.000***	0.000**	0.000**	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FemNonEx	-0.937***	-0.995***	-0.963***	-0.972***	-0.974***	-0.976***	-0.785***	-0.777***	-0.783***
	(0.080)	(0.081)	(0.080)	(0.096)	(0.098)	(0.097)	(0.095)	(0.097)	(0.096)
Mean Age Workforce	0.006***	0.006***	0.006***	0.004***	0.004***	0.004***	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Share White Collars	0.326***	0.343***	0.326***	-0.000	0.002	0.008	0.059	0.054	0.065
	(0.062)	(0.062)	(0.062)	(0.075)	(0.075)	(0.075)	(0.074)	(0.074)	(0.074)
Mean AKM Worker Effect	1.791***	1.781***	1.794***	1.381***	1.379***	1.377***	1.055***	1.059***	1.053***
	(0.116)	(0.116)	(0.116)	(0.140)	(0.140)	(0.140)	(0.138)	(0.138)	(0.138)
SD of AKM Worker Effect	0.656***	0.674***	0.662***	0.785***	0.787***	0.790***	0.935***	0.927***	0.933***
	(0.086)	(0.086)	(0.086)	(0.104)	(0.103)	(0.103)	(0.102)	(0.102)	(0.102)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.748	0.749	0.749	0.303	0.303	0.302	0.237	0.237	0.236
Firm-Year Observations	7,906	7,906	7,906	7,906	7,906	7,906	7,906	7,906	7,906
N. of firms	822	822	822	822	822	822	822	822	822
N. of years	16	16	16	16	16	16	16	16	16

Notes: The sample includes the full sample of INVIND firms, years 1987-1997. Each observation is a firm-year. FemEx is the share of female executives at the firm-year, FemNonEx is the share of females in the non-executive workforce at the firm-year, 0<FemEx<25% is a dummy equal to 1 if females represent more than zero but less that 25% of executives at the firm-year, and FemEx>25% is a dummy equal to 1 if females represent more than 25% of executives (0% female executives is the omitted category). Fem CEO is a dummy variable equal to 1 if the CEO is a female in a given firm-year. Firm size dummies are for less than 100, between 100 and 250, between 250 and 500, and more than 500 employees. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 percent confidence levels, respectively.

A2-1: Quantile regressions. Female leadership = Share of female executives.

Sample			Females					Males		
Dependent variable			ln wage					ln wage		
Quantile	10th	25th	50th	75th	90th	10th	25th	50th	75th	90th
FemEx	-0.033***	-0.002	0.013***	0.055***	0.141***	-0.058***	-0.045***	-0.022***	-0.017***	-0.003
	(0.007)	(0.003)	(0.002)	(0.003)	(0.005)	(0.003)	(0.002)	(0.002)	(0.003)	(0.007)
Mean Exec Ability	-0.020***	-0.007***	0.001	0.003**	-0.001	0.022***	0.010***	0.003***	0.016***	0.026***
	(0.004)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)
Mean Exec Experience	-0.002**	0.002***	0.003***	0.003***	-0.002***	0.002***	0.001***	0.002***	0.003***	0.001**
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Mean Exec Tenure	0.000	0.000	-0.001***	-0.001***	-0.001***	0.001***	0.001***	0.001***	0.000	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mean Exec Age	-0.006***	-0.005***	-0.004***	-0.005***	-0.013***	-0.003***	-0.006***	-0.008***	-0.002***	-0.008***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
FemNonEx	-0.344***	-0.264***	-0.235***	-0.226***	-0.225***	-0.227***	-0.240***	-0.236***	-0.211***	-0.170***
	(0.005)	(0.002)	(0.001)	(0.002)	(0.004)	(0.002)	(0.001)	(0.001)	(0.002)	(0.004)
Mean Age Workforce	0.203***	0.135***	0.114***	0.117***	0.128***	0.168***	0.181***	0.201***	0.199***	0.190***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)
Age	0.199***	0.181***	0.145***	0.089***	0.056***	0.333***	0.297***	0.262***	0.234***	0.158***
	(0.004)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)
Age Squared	-0.019***	-0.018***	-0.014***	-0.006***	-0.001**	-0.037***	-0.032***	-0.026***	-0.021***	-0.007***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share prod. workers	-0.179***	-0.166***	-0.185***	-0.245***	-0.353***	-0.192***	-0.224***	-0.306***	-0.440***	-0.645***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Firm Effect from AKM	0.678***	0.570***	0.562***	0.605***	0.653***	0.746***	0.804***	0.884***	0.926***	0.936***
	(0.007)	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)	(0.002)	(0.002)	(0.003)	(0.006)
Mean AKM Worker Effect	0.702***	0.477***	0.420***	0.441***	0.484***	0.428***	0.468***	0.554***	0.596***	0.608***
	(0.008)	(0.003)	(0.002)	(0.003)	(0.006)	(0.003)	(0.002)	(0.002)	(0.003)	(0.006)
SD of AKM Worker Effect	-0.150***	0.081***	0.131***	0.147***	0.144***	0.014***	-0.016***	-0.047***	-0.045***	-0.055***
	(0.012)	(0.004)	(0.003)	(0.005)	(0.009)	(0.003)	(0.003)	(0.003)	(0.004)	(0.008)
< 100 Employees	-0.029***	-0.020***	-0.016***	-0.013***	-0.009***	-0.013***	-0.008***	-0.007***	-0.007***	0.003
	(0.004)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)
250-500 Employees	0.017***	0.009***	0.007***	0.008***	0.006***	-0.003***	-0.001	-0.001	-0.004***	-0.007***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
> 500 Employees	0.032***	0.020***	0.016***	0.018***	0.020***	0.010***	0.007***	0.005***	-0.001	-0.011***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)
Constant	2.802***	3.467***	3.696***	3.788***	3.948***	2.971***	3.009***	3.059***	3.195***	3.546***
	(0.039)	(0.014)	(0.012)	(0.016)	(0.029)	(0.035)	(0.027)	(0.030)	(0.041)	(0.087)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,060,714	1,060,714	1,060,714	1,060,714	1,060,714	3,507,148	3,507,148	3,507,148	3,507,148	3,507,148

Notes: Quantile log wage regressions, separately by gender. The sample includes workers employed at INVIND firms, 1982-1997. Each observation is a worker-year. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 percent confidence levels, respectively.

A2-2: Quantile regressions. Female leadership = Share of female executives > 25%.

Sample	Females					Males				
Dependent variable	ln wage					ln wage				
Quantile	10th	25th	50th	75th	90th	10th	25th	50th	75th	90th
0 < FemEx < 25%	0.003***	0.003***	-0.001**	-0.003***	0.002**	-0.019***	-0.018***	-0.018***	-0.019***	-0.019***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
FemEx>25%	-0.003	0.009***	0.017***	0.037***	0.066***	-0.010***	-0.005***	0.008***	0.018***	0.043***
	(0.004)	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Mean Exec Ability	-0.024***	-0.009***	-0.000	0.005***	0.001	0.023***	0.012***	0.006***	0.019***	0.030***
	(0.004)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Mean Exec Experience	-0.001**	0.002***	0.003***	0.003***	-0.003***	0.001***	0.000	0.001***	0.002***	0.001**
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mean Exec Tenure	0.000	0.000	-0.001***	-0.001***	-0.001***	0.001***	0.001***	0.001***	0.000***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mean Exec Age	-0.007***	-0.006***	-0.004***	-0.005***	-0.011***	-0.004***	-0.006***	-0.008***	-0.003***	-0.009***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
FemNonEx	-0.346***	-0.264***	-0.236***	-0.228***	-0.221***	-0.231***	-0.245***	-0.239***	-0.213***	-0.174***
	(0.005)	(0.002)	(0.001)	(0.002)	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)
Mean Age Workforce	0.203***	0.134***	0.115***	0.119***	0.127***	0.176***	0.189***	0.208***	0.205***	0.196***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Age	0.198***	0.181***	0.145***	0.089***	0.055***	0.333***	0.298***	0.263***	0.235***	0.158***
	(0.004)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Age Squared	-0.019***	-0.018***	-0.014***	-0.006***	-0.001**	-0.037***	-0.032***	-0.026***	-0.021***	-0.007***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share prod. workers	-0.179***	-0.166***	-0.185***	-0.245***	-0.354***	-0.192***	-0.224***	-0.306***	-0.441***	-0.646***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm Effect from AKM	0.673***	0.568***	0.564***	0.611***	0.657***	0.747***	0.803***	0.885***	0.930***	0.938***
	(0.007)	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)
Mean AKM Worker Effect	0.701***	0.475***	0.422***	0.446***	0.485***	0.441***	0.486***	0.569***	0.609***	0.623***
	(0.008)	(0.003)	(0.002)	(0.003)	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)
SD of AKM Worker Effect	-0.156***	0.077***	0.133***	0.153***	0.148***	0.020***	-0.007***	-0.035***	-0.033***	-0.046***
	(0.012)	(0.004)	(0.003)	(0.005)	(0.009)	(0.003)	(0.002)	(0.002)	(0.003)	(0.005)
100-250 Employees	0.029***	0.020***	0.016***	0.013***	0.010***	0.014***	0.009***	0.008***	0.008***	-0.003*
	(0.004)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
250-500 Employees	0.017***	0.009***	0.008***	0.009***	0.007***	0.012***	0.009***	0.008***	0.005***	-0.008***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
> 500 Employees	0.032***	0.020***	0.017***	0.020***	0.021***	0.029***	0.021***	0.018***	0.012***	-0.008***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Constant	2.825***	3.478***	3.687***	3.763***	3.952***	2.935***	2.973***	3.024***	3.157***	3.522***
	(0.039)	(0.015)	(0.012)	(0.016)	(0.029)	(0.033)	(0.025)	(0.024)	(0.030)	(0.050)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,060,714	1,060,714	1,060,714	1,060,714	1,060,714	3,507,148	3,507,148	3,507,148	3,507,148	3,507,148

Notes: Quantile log wage regressions, separately by gender. The sample includes workers employed at INVIND firms, 1982-1997. Each observation is a worker-year. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 percent confidence levels, respectively.

A2-3: Quantile Regressions. Female leadership = Female CEO.

Sample	Females					Males				
Dependent variable	ln wage					ln wage				
Quantile	10th	25th	50th	75th	90th	10th	25th	50th	75th	90th
Female CEO	-0.077***	-0.020***	0.002	0.019***	0.028***	-0.003	-0.004**	0.010***	0.015***	0.011***
	(0.006)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Mean Exec Ability	-0.005***	-0.006***	-0.010***	-0.014***	-0.018***	-0.001***	-0.005***	-0.008***	-0.009***	-0.008***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mean Exec Experience	-0.000	-0.000***	-0.001***	-0.001***	-0.001***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mean Exec Tenure	0.001***	0.001***	0.002***	0.002***	0.001***	-0.000	0.001***	0.001***	0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mean Exec Age	0.001	-0.003***	-0.005***	-0.007***	-0.006***	0.014***	-0.001**	-0.005***	-0.004***	-0.002***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
FemNonEx	-0.341***	-0.267***	-0.240***	-0.226***	-0.216***	-0.166***	-0.232***	-0.247***	-0.241***	-0.214***
	(0.005)	(0.002)	(0.001)	(0.002)	(0.004)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
Mean Age Workforce	0.202***	0.138***	0.118***	0.119***	0.122***	0.160***	0.174***	0.189***	0.207***	0.204***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age	0.199***	0.181***	0.145***	0.089***	0.056***	0.270***	0.333***	0.298***	0.263***	0.235***
	(0.004)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age Squared	-0.019***	-0.018***	-0.014***	-0.006***	-0.001**	-0.023***	-0.037***	-0.032***	-0.026***	-0.021***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share prod. workers	-0.179***	-0.166***	-0.185***	-0.247***	-0.356***	-0.388***	-0.192***	-0.224***	-0.306***	-0.440***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm Effect from AKM	0.676***	0.572***	0.569***	0.617***	0.673***	0.901***	0.746***	0.806***	0.886***	0.931***
	(0.007)	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Mean AKM Worker Effect	0.685***	0.477***	0.426***	0.445***	0.485***	0.532***	0.441***	0.486***	0.569***	0.608***
	(0.008)	(0.003)	(0.002)	(0.003)	(0.006)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
SD of AKM Worker Effect	-0.151***	0.079***	0.127***	0.144***	0.142***	0.029***	0.014***	-0.016***	-0.048***	-0.046***
	(0.012)	(0.004)	(0.003)	(0.005)	(0.009)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
< 100 Employees	-0.029***	-0.020***	-0.016***	-0.014***	-0.014***	-0.002*	-0.015***	-0.009***	-0.008***	-0.008***
	(0.004)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
250-500 Employees	0.013***	0.009***	0.009***	0.010***	0.006***	-0.005***	-0.001*	0.001***	0.001	-0.002***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
> 500 Employees	0.028***	0.022***	0.021***	0.025***	0.025***	-0.003***	0.013***	0.012***	0.008***	0.002***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Constant	2.760***	3.443***	3.683***	3.798***	3.874***	3.074***	2.804***	2.830***	2.848***	2.987***
	(0.037)	(0.014)	(0.011)	(0.015)	(0.027)	(0.008)	(0.035)	(0.027)	(0.030)	(0.041)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,060,714	1,060,714	1,060,714	1,060,714	1,060,714	3,507,148	3,507,148	3,507,148	3,507,148	3,507,148

Notes: Quantile log wage regressions, separately by gender. The sample includes workers employed at INVIND firms, 1982-1997. Each observation is a worker-year. Robust standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1 percent confidence levels, respectively.