Female-Led Firms and Gender Wage Policies*

Ana Rute Cardoso
IAE Barcelona (CSIC) and IZA Bonn†

and

Rudolf Winter-Ebmer
University of Linz, Vienna Institute for Advanced Studies, CEPR and IZA

May 2009

Abstract

We explore the impact of female employers and gender segregation on wages using a large longitudinal data set for Portugal. Female managers can act less discriminatory, protect and mentor female employees by paying them higher wages than male-led firms would do. We find that females enjoy higher wages in female-led firms, the opposite being true for males. In both cases is a higher share of females in a firm reducing the wage level. These results are compatible with a theory where job promotion is an important factor of wage increases: if more females are to be mentored, less promotion slots are available for males, but also the expected chance of a female to be promoted is lower.

KEYWORDS: female entrepreneurs; wages; gender gap; matched employer-employee data.
JEL CODES: M52; D21; J31; J16.

*We thank Sherrilyn Billger, Linda Bell, René Böheim, Marco Francesconi, Dan Hamermesh and Doris Weichselbaumer as well as seminar participants at Essex and London for helpful conversations. We are grateful to the Ministry of Employment, Statistics Department, Portugal, for access to the data and the Austrian Science Fund for funding (NRN Labor Economics and the Welfare State).

†IAE-CSIC, Institute for Economic Analysis, Spanish National Research Council, Campus UAB, 08193 Bellaterra, Barcelona, Spain. E-mail: anarute.cardoso@iae.csic.es

1 Introduction

Females get lower pay for equal work, as detected by numerous studies that looked at possible reasons for this gender wage gap. Weichselbaumer and Winter-Ebmer (2005) presented a meta-analysis of 263 international gender pay gap studies and found that females earned in the 1990s on average 26% less than males; when decomposing this earnings gap into a productivity-related component and an unexplained component, they found an unexplained gender pay gap of 19% (p. 483). This pay gap shrank in the last 40 years — taking different methods of data collection and analysis into account — only by 0.17 percentage points per year. Recent studies explain these trends to a certain degree with labor market institutions and general inequality (Blau and Kahn, 2003), as well as competition and equal treatment laws (Weichselbaumer and Winter-Ebmer, 2007).

Surprisingly, a less explored route is the role of supervisors, managers and entrepreneurs. Already Becker's taste for discrimination theory (1957) gives the employer a paramount role: as employers set wages, looking at male and female employers would shed some light on taste-based discrimination. Recent policy measures in various countries are along these lines: while in the past equal opportunities and equal treatment laws were the main focus, more recently the imposition of gender quotas or gender parity in top positions has dominated political discussions. Promoting or hiring more females to top and influential positions is meant to have both a direct impact on female employment and wages — particularly at the top end — and an indirect one, as female decision makers might hire more subordinate females and pay them better wages.

Despite these arguments, the empirical literature about the impact of female employers on gender hiring and pay gaps is small, especially in economics. In this paper we focus on the impact of female leadership on the wages the firm pays to its male and female workers and investigate whether the gender of the manager of a firm has a significant impact on gender wage differences. In particular, we want to test the hypothesis that female-led firms tend to protect and mentor female employees by paying them higher wages than male-led firms would.

A remarkable longitudinal matched employer-employee dataset is used, which covers the whole manufacturing and service non-public sector in Portugal for more than ten years. The longitudinal character of our data allows us to control for firm

unobserved attributes that might be correlated with the gender of the employer, by using firm-fixed effects. The impact of female managers is thus identified by situations where a change in management resulted in a different gender of the manager; uncontrollable structural firm attributes can so be eliminated. We will perform extensive robustness checks, such as restricting the analysis to new firms, which are not constrained by past policies and regulations when setting their wage policy.

The paper is organized as follows. Section 2 discusses the previous literature on the impact of the gender of the employer on the gender wage gap, highlighting both theoretical predictions and the major empirical results. Section 3 describes the data and Section 4 presents descriptive evidence on female- and male-led firms in Portugal. Results of the econometric estimations are reported in Section 5, before concluding comments in Section 6.

2 Gender of the employer and gender pay gap: previous literature

As early as Becker's theory of taste for discrimination (1957), the role of employer preferences in wage setting and its influence on the gender pay gap have been highlighted. If we would assume that female employers have less taste for discrimination, Becker's model would predict that employers with the lowest taste for discrimination — among them many female employers — will hire more female workers, but at the ongoing equilibrium wage. In a market with homogeneous workers, female-led firms would not necessarily pay higher wages to females. In practice, workers and jobs are far from homogeneous and job descriptions are typically not unambiguously defined so that female employers can always put women in somewhat more favorable positions — with somewhat higher pay. Explicit positive preferences for females in the form of mentoring (Brown and Scandura, 1994) might take the form of helping females to climb up the corporate ladder, to lead them into on-the-job training and networks. While such practices might be considered favoritism in favor of females, they are not necessary to explain higher wages for females in female-led firms. In case of discrimination in the labor market, a reduction of discrimination could accomplish the same.

Wage differentials between men and women are often also associated with segre-

gated workplaces. Segregation by gender as such is seen by many studies as a sign of bad jobs: firms with a high share of minorities or females generally pay lower wages (Pfeffer and Davis-Blake, 1987). As far as this phenomenon describes different job- or worker-quality in such firms, segregation across firms — i.e. the share of female workers — can be seen as a confounding factor in studies of wage determination. Jobs in more-female dominated work-places might be different from those in male-dominated work-places: in particular they might differ in characteristics typically unobservable to the econometrician. Moreover, the amount of females in the firm might give some indication as to the female-friendliness of the work-place, which we might want to control for. On the other hand, as mentoring is costly and time-consuming, it might not be possible to mentor all females equally in the firm: we would thus observe that female-led firms with a higher share of women in the workforce have a harder time to mentor and protect female workers.

The allocation of more females to top positions in the firm is therefore expected to have, on one hand, a direct impact on the gender employment and wage structures, reducing the "glass ceiling" (see Albrecht et al. (2003) and Arulampalam et al. (2005) for evidence on increasing gender pay gaps further up the wage distribution); on the other hand, it is expected to have an indirect impact, as female decision makers might hire more females and pay them better wages.

Despite the relevance that the gender of the employer may have on worker outcomes, the issue has been subject to little empirical scrutiny, specially in economics. This topic has mainly been taken up by social psychologists, who distinguish between the similarity-attraction paradigm (Byrne 1971) and the self-enhancement drive (Graves and Powell, 1995). While the former claims that individuals who are similar are attracted to each other, the latter states that groups of lower status tend to identify with members of the higher status group. Almost all studies in management and social psychology relate to hiring decisions, experiments or evaluations of recruiters, e.g. Graves and Powell (1995), Bon Reis et al. (1999), Heilman et al. (1988), Goldberg (2005), with mixed results. One recent extensive study by Bagues and Esteve-Volart (2007) looks at recruitment committees for Spanish public service positions and finds that female recruiters treat female candidates more disfavorably. Giuliano et al (2006) have analyzed the impact of demographic differences between manager and worker on worker quits, dismissals

and first promotion, modeled using duration models based on data on one large firm in the US. They found that gender and ethnicity differences between worker and manager have a relevant impact on worker outcomes, though larger in the case of ethnicity, and that such impact may be positive, if the manager has a "lower status" than the worker s/he supervises. Economists have studied the influence of gender on their own profession in some detail. Broder (1993) finds that female reviewers of economics proposals for National Science Foundation grants grade proposals from females lower. Blank (1991) finds no gender-difference of referees for the American Economic Review. Hilmer and Hilmer (2007) and Neumark and Gardecki (1998) investigate mentoring by economics PhD advisors: working with a female advisor relative to a male one has practically no effect on early-career outcomes of young female economists.

The impact of gender segregation across firms on wages has been devoted some attention in economics, with mixed results. Evidence by Carrington and Troske (1995) and Bayard et al (2003) for the US shows that the concentration of women into lower-paying establishments contributes to the gender pay gap. Carrington and Troske (1995) show that a higher proportion of women in a firm is associated with lower wages, both for females and for males, whereas results by Vieira et al (2005), using data on Portugal, indicate that a higher concentration of women in a firm is associated with lower females' wages but higher males' wages.

Concentrating on the gender of the managers, a few studies have dealt with the wage gaps for managers themselves (e.g. Bertrand and Hallock (2001), Bell (2005), Jurajda et al. (2006) or Lausten (2005)), while Smith et al. (2005) dealt with the effects of female managers on firm performance.

We are only aware of three studies looking at wage effects of female managers. Bell (2005) shows that in firms led by women (CEOs, chairs, and directors) the gender gap between men and women executives is narrowed. Cohen and Huffman (2007) use aggregate data on female managers in particular industries to look at wages of non-managerial workers and find that industries with a higher percentage of female managers pay lower wages to both sexes. Hultin and Szulkin (2003) find for Sweden that a strong male representation among organizational managers is correlated with wider gender wage gaps.

There is therefore a long way in grabbing the relationship between the gender

of the employer and the gender pay gap, and the available data in Portugal enable shedding some new light on the issue.

3 Data set and concepts used

3.1 Data set

The study is based on a linked employer-employee dataset gathered annually by the Ministry of Employment in Portugal, which covers the population of private firms with wage-earners in manufacturing and services. The years 1987 to 2000 are used.[1] Given the legally binding nature of the inquiry, the response rate is extremely high.

Reported data include the firm's location, industry, employment, sales, ownership, legal setting, and the worker's gender, age, occupation, professional status, schooling, date of admission into the company, skill, monthly earnings and duration of work. For owners of the firm, labor earnings and hours of work are not reported.

Workers aged 16 to 65, full-time wage-earners or owners of the company, are the focus of attention. Firms in manufacturing and the services in mainland Portugal, employing at least 10 full-time wage-earners in at least one year, were kept for analysis. We have set this minimum firm size threshold given the aim of analyzing the gender pay gap inside the firm and thus the requirement that a minimum number of employees and gender diversity would be present. The size restriction leads to dropping a large share of firms in Portugal, but a small share of the workforce, as reported in Table 9 in the appendix.

3.2 Identification of female-led firms

To identify the person(s) leading the firm, the following variables were considered:

1. Owner of the firm. The variable professional status is coded as: owner, wage-earner, unpaid family member, or member of a cooperative. Owners are reported if they are actually "performing functions in the firm". Thus, if the owner is actively engaged working for the firm, his/her identification is straightforward.

[1] However, for 1990 no worker data are reported.

2. Top manager. The variable occupation is coded at the six-digit level using the Portuguese Classification of Occupations version 1994. Top managers were defined as the occupations "corporate directors and chief executives" (code 121) and "directors of small firms" (code 131).

3. Middle manager. Using also the variable occupation, middle managers were defined as "other managers" (codes 122 and 123), which includes directors of production, finance and administration, marketing, sales, human resources, etc.

4. Best wage in the firm. The worker(s) with the top wage in the firm was identified.

The first criterion — owner of the firm — provides an unambiguous identification of the person(s) leading the firm. Almost half the firms report information on their owner(s) and one fourth reports just one owner. In these cases, the share of females in the firm leadership was quantified using simply the gender composition of the owner(s).

Given that the dataset reports very detailed occupations, we have a clear idea of the tasks performed by each individual. Almost all owners are declared as managers of the firm (7% as top managers, i.e. corporate directors or directors of small firms, and 85% as middle rank managers), suggesting these occupations as the key ones in terms of firm leadership. Note also that firms whose owner is reported working in the firm tend not to have wage-earners as top managers.[2] Therefore, whenever the firm owner was not reported, an alternative procedure was followed to identify the firm leader(s), relying on its salaried managers. We first relied on the top manager; if the firm did not have any top managers, we progressed to consider middle rank managers.

For firms whose leadership could not be identified using either the owner or manager criteria, we have considered a third criterion, the best paid worker(s) as the one(s) leading the firm. The share of females leading the firm was then collapsed into a dichotomous classification: female- and male-led firms.[3]

To summarize, in practice the procedure was implemented as follows. Beginning with the owners, a firm was defined as female-headed if over 50% of its owners

[2]Just 1% of the firms with the owner present have wage-earners as top managers.

[3]Results do not change qualitatively if we use the share of female managers instead, as reported below in the robustness checks.

were female (similarly, as male-headed if over 50% of owners were male; and not classified if insufficient information was available, i.e. if exactly half the owners were male and half female or no owners were reported). For firms with insufficient information on the above criterion, a similar procedure was followed using the variable top management. Next, the procedure was extended to middle managers and finally, if none of the above criterion was conclusive, females among the top wage in the firm were considered. Table 1 reports the classification of firms into male- and female-led as these successive criteria were considered. Appendix B reports the results of robustness checks on our classification of firms into female- and male-led once alternative procedures are used.

Firms not classified as either male- or female-led were dropped from the analysis. Moreover, some firms change classification over time. Since wage and other firm outcomes may reflect the choices of past management, specially in a regulated labor market such as the Portuguese, firms that change classification may bring noise into the analysis, a problem that is particularly acute if the firm changed classification more than once, back and forth. Therefore, in the first analysis that follows, only firms that changed classification never or only once, maintaining the same classification afterwards, were kept for analysis.[4] This condition led to dropping 24% of the observations on male-led firms and 49% on female-led firms. As robustness checks we will report results on other alternatives for firm selection.

3.3 Wages

Gross monthly earnings are defined as monthly base-wage plus seniority-indexed components of pay and other regularly paid benefits. Wages were deflated using the Consumer Price Index (base 2000) and wage outliers have been dropped.[5] Whenever the firm leader was identified as the worker(s) with the best wage in the firm, that worker was dropped from the analysis, to avoid a mechanical relationship between the gender of the firm leader and the workers gender pay gap. Tables 10 and 11 in the appendix provide descriptive statistics on the firm and worker datasets.

[4] We will refer to this sample of firms as "all firms", in the tables and text that follow.

[5] Wages below half the national minimum wage or above 20 times the percentile 99 were dropped. Outliers in wage growth (log wage change below -.5 or above 1.5) led to dropping the full history of the worker, since mistakes coding the wage in one year usually lead to outliers in wage growth that carry over to the year afterwards (with opposite sign), and thus the whole history of the worker was judged unreliable, even when not captured as an outlier.

4 Women-led firms and men-led firms in Portugal

Women tend to lead smaller firms, with a strong sectoral concentration in clothing, education, and health and social services. Female-led firms tend to have a younger and better educated labor force, and they employ predominantly females. Also, the leadership of female-led firms is younger and better educated (see table 10 in appendix). The share of female-led firms increased from approximately 13% in 1987 to 19% in 2000, whereas their employment share increased from 7% to 14% over the period.

Figure 1 provides a visual description of the trend in wage policies for male- and female-led firms. Male-led firms pay on average higher wages than female-led firms, for both males (Panel A) and females (Panel B), which could be due to their different sectoral and firm size composition. The gap between the two types of firms seems to be larger for male workers. Panel C shows the aggregate wages in male- and female-led firms; the higher differential reflects the gender-based employment segregation: female-led firms employ females to a much larger extent. Comparing Panels A and B shows that there is a large gender wage gap. Average females' and males' wages are plotted in Panel D, which shows that the raw gender wage gap in Portugal remained roughly stable over time.

5 Gender wage differentials: can female-led firms make a difference?

To explore gender wage differentials we use augmented Mincer-type (log) wage regressions for males and females separately, concentrating in particular on the influence of the gender of the manager as well as the segregation of the workforce. Table 2 presents OLS estimates using all firms that changed ownership type only once or never. Table 3 further includes firm fixed effects to control for unobserved and unobservable firm differences which might influence wage setting. The impact of female managers is identified now only by changes in the gender of the manager within a firm. The summary tables provide a comparison of the most relevant coefficients estimated under alternative specifications. The regressions additionally include controls for age, tenure and education of the worker as well as size, industry,

region, legal setting and origin of the capital of the firm, and the year.[6] A wider set of estimated coefficients is presented in the appendix, Tables 12 and 13, for our preferred specification (wage regression with firm fixed effects).

At first sight, females do not seem to profit from having a female boss: Column (1) in Table 2 shows a negative effect for females in female-led firms. We learn from Column (2) that this result seems to be due to the fact that female-led firms tend to have a higher share of females in the workforce, which is typically a sign for lower pay. Correcting for this and looking at the interaction effect (Column (3)), we see that female-led firms do pay a premium to the first female worker of almost 3%, but this advantage becomes smaller the more females there are in the firm. If 80% of the workforce is female, women still earn a wage premium of 1% if they are led by a female boss, when compared to a male boss.

For males, the impact of a female manager is definitely detrimental. In all specifications, males earn lower wages in female-led firms than in male-led firms. Males get wages between three and six percentage points lower in female-led firms.

On the other hand, a larger share of female co-workers is associated with higher males' wages. Our results confirm previous studies on segregation effects in Portugal (Vieira et al. 2005): females get lower wages in firms with a predominantly female workforce, whereas males enjoy higher wages, which might be interpreted as an effect of segregation in tasks. Males do get the better jobs as supervisors or middle managers: the more females there are around in the workplace, the better are the chances for the isolated males to reach a supervisor position (Column 2). These effects are considerable: the male-female wage differential in an almost complete female workforce is 20% higher as compared to an almost full male workforce.

But our results in Table 2 go beyond these insights. Distinguishing between female- and male-led firms, we find (Column 3) that the overall pattern just described — a larger share of female co-workers having a positive impact on males' wages and a negative impact on females' wages — holds in male-led firms, whereas in female-led firms both males and females earn lower wages the larger the proportion of female workers (see the negative interaction coefficient). This result could be due to structural differences between firms with a male- vs. female-dominated

[6] Note that in such a large dataset some firms are observed changing size, major industry, region, legal setting, or the origin of their capital.

workforce.

Combining the effect of female managers and female workforce, we see that women can profit less — maybe they can get less mentoring and protection by a female boss — if there are many female coworkers around. For males, the detrimental impact of a female boss is amplified if there is also a female dominance in the firm's workforce: in a firm with 50% females, males working under a female manager have 7 percent lower wages than if working under a male manager[7]; in a firm with 80% female workforce, they lose 9.4%.

Although we do control for a wide set of variables, the OLS results might suffer from a bias if male- and female-led firms differ according to unobserved characteristics. Therefore, we recourse to firm-fixed effects estimates. These results, in Table 3, confirm our main insights: females profit from a female boss and males lose out. Already Column 1 — disregarding the gender-composition of the workforce — shows a clear picture: females gain 0.8% whereas males lose 0.7%; thus a female boss is reducing the wage gap by 1.5%. Extending the analysis by considering also the composition of the workforce, we see that the results for females' wages are almost unchanged as compared to the OLS results, whereas for males' wages, the effects are still present, but somewhat smaller.

If one would interpret our results in the light of discrimination theories one would conclude that female employers might have a smaller taste for discrimination as compared to their male counterparts. While Becker's taste for discrimination on the part of the employer would predict higher numbers of female workers in female-led — less discriminatory — firms, Becker's co-worker discrimination theory would require higher wages for males to induce them to work in a female-dominated workforce: a phenomenon we do see in the OLS regressions, but which disappears in the fixed-effects results. The fixed effects seem to capture some structural differences among firms that were responsible for the higher effect in the OLS model. The moderating effect of female dominance on both male and female wages in the presence of a female employer are consistent with a mentoring story: if female employers mentor females, they can do less so if there are many around and male workers will increasingly suffer.

Our results are also compatible with a model where job assignment and job promotion are important factors determining wages. If employers decide about

[7]Computed as -0.028-0.082*0.5.

promoting workers according to the expected duration of stay in the firm, the fear of pregnancy-related quits might lead to statistical discrimination of females (Lazear and Rosen, 1990, Winter-Ebmer and Zweimüller, 1997). As there is in general a fixed number of such supervisory jobs, the higher the number of potential candidates, the less likely it is that an individual person can get this job. This would explain the pattern that in male managed firms a higher share of females has a positive impact on males' wages and a negative one on females' wages: as females are discriminated against in promotion decisions, the higher the share of females, the less likely it is that one of them gets promoted; on the other hand, more females make it easier for each individual male to finish first in male-led firms.

Female managers might either have better information about expected turnover or they might simply want to break through this logic by mentoring females better in order to promote them to supervisory or foreman jobs. If females do protect fellow-females in promotion decisions, this would explain the positive effect of female managers on females' wages and the negative effect on males' wages. The consequence is that a higher female share in the firm reduces the chances for an individual woman to grab one of these rare jobs; the average wage of females must be lower. Likewise, for males, a higher share of females in the firm is increasing the competition for the remaining males and reducing their chances.

5.1 Robustness checks

5.1.1 Selection of sample

Our main results from fixed effects regressions showed that female managers mentor female workers, in the sense that they pay them better wages than male managers would. However, the possibilities for mentorship get weaker the more female co-workers there are around. Here we report several robustness checks by changing the selection of our samples.

In Table 4 results for newly founded firms are shown. We consider one single year of observation for each firm, the year the firm was created.[8] It is highly likely that incumbent firms will have an established pay scale: if there are discriminatory aspects in these pay scales, it can be assumed that many aspects of these pay scales

[8]Note that we can only report OLS results here, since the inclusion of a firm fixed effect wipes out the dummy variable of female management.

might be persistent — even persisting a change in management. One could assume that newly founded firms would set a pay scale which is much more reactive to current economic and social considerations, and in particular female managers may find it easier to escape traditional gender-based payment rules. This is one way to overcome the problem of sluggishness of changes in the wage structure which might hamper models with fixed firm effects.

The results for newly founded firms do confirm these expectations. Whereas the main pattern is unchanged, female workers do profit to a much higher extent from having female bosses as compared to the previous results. Comparable female workers in newly founded female-led firms earn significantly higher wages than those in newly founded male-led firms. If half of the workforce is female, the gain is 6%; it is still 2.3% if only 20% males are among the coworkers (and 80% are females).

In our second robustness check we included all the firms in our sample, regardless whether they changed gender of their leadership once or more often. However, given that changes implemented by the new management may take some time to have an impact, we have excluded the year the firm changed type of leadership and the subsequent year from the analysis. This again allows some time for changes in management to take effect. Results are reported in Table 5. Also in this case, results are very consistent with the ones previously reported.

In a third robustness check we have measured the femaleness of the firm leadership as a continuous variable, instead of adopting a dichotomous partition into female- or male-led firms. The results, reported in table 6, are remarkably robust to this change in the form of measurement of our variable of interest.

5.1.2 Different types of firms

Firms size might be an important factor determining the impact of management changes on wages. In particular, female-led firms are smaller, and therefore a comparison with male-led firms might be inappropriate. Moreover, firm size might also be important in the speed with which changes in management can be realized. If mentoring is the main explanation for the phenomenon, looking at the gender of the CEO alone might be misleading: in a big firm, mentoring might be delegated to much lower levels than the CEO. For this reason, looking at smaller firms might be very interesting.

We have performed identical wage regressions separately for small and large firms. Since a firm may change size over the period under observation, we have considered its average size to define the two size categories. Table 7 reports the results separately for firms with up to 100 workers and those larger than 100 workers, again using firm fixed effects.[9]

The general patterns stay the same, in that female employers are in favor of female workers. It turns out that workers in small firms in general profit from the presence of female employers, both males and females, but females to a much larger extent. Moreover, for men the effect turns negative once the share of females in the firm is above one third, which is often the case. In large firms, we see the general pattern confirmed that females earn higher wages in the presence of a female employer, males lower ones. Consistent with our mentoring theory, females in smaller firms profit more from a female manager than females in larger firms.

Finally, we check the robustness of our results for sub-samples of the data by differentiating by the type of firm leader identified in the data: owner, top manager(s), other manager(s) or best wage in the firm.[10] As there are now two potential changes in ownership — gender and type — we restrict ourselves to the case of new-founded firms, where the type of firm leader is unambiguously identifiable.[11] Results are reported in table 8. They are, by and large, very consistent with the previous pattern. With the exception of the case of top managers, where the number of observations is too small, females always profit considerably from having a female employer; for males, we find practically no effect for the case of owners and top managers and negative effects for other managers and managers identified by the highest wage in the firm. The result that female owners are positively associated with higher female wages is a reassuring sign that, in fact, the gender of the owner of the firm is the decisive factor and not a general female-friendly policy in a firm, which might also make female managers more likely.

[9] Note the small firm size structure in this economy. Indeed, even after we impose the constraint that the firm must employ at least 10 workers in at least one year, the mean firm size is 32 workers (the median is 12 and the 90-percentile is 52). This is consistent with the structure of the overall Portuguese private sector, where the average firm size is 9 workers and 83% of the firms have less than 10 workers (data referring to 2005).

[10] For firms where the person with the highest wage is identified as the boss, this person is always excluded from the wage regressions.

[11] In fact, if we restricted ourselves to firms where there is no change in the type of ownership, the changes in gender were in some cases too few.

6 Conclusion

In contrast to the textbook model of perfect competition, employers can influence pay setting and the structure of pay in non-perfect markets. This should also apply to gender-based pay. Starting with Becker (1957) economists embraced the idea that pay differences between men and women could be explained by a taste for discrimination by a part of the employers. Depending on the extent of this distaste and the number of discriminating employers, a gender wage gap will materialize in equilibrium.

In this paper we look at a potential role the gender of the employer or manager could play. Using a large longitudinal data set for Portugal we show that, indeed, a female-led firm is paying higher wages to females but lower ones to males. These results are robust to a set of specification tests: we identify the effect only by firms who changed the gender of the manager in order to control for unobserved firm-specific features; we use only start-up firms to allow for a newly decided pay structure; and we also used firms who changed management more often. Our results are consistent with a situation where job promotion is an important part of the pay scale and the number of such supervisory jobs is limited. When female managers are actively mentoring and protecting female co-workers they may increase their promotion chances and thus the expected wage for females. The higher the share of females in the firm is, the lower are the promotion changes for an individual person, both female and male. While being an important factor in the structure of male-female wages differentials, the rise in female-led firms in Portugal is too small to contribute significantly to the development of the overall gender wage gap.

References

Albrecht, James, Anders Bjorklund and Susan Vroman (2003). Is there a glass ceiling in Sweden?, *Journal of Labor Economics* 21(1), 145-177.

Arulampalam, Wiji, Booth, Alison L. and Mark L. Bryan (2005). Is there a glass ceiling over Europe? Exploring the gender pay gap across the wages distribution. ISER Working Paper 2005-25, Essex.

Bagues, Manuel F. and Berta Esteve—Volart (2007). Can gender parity break the glass ceiling? Evidence from a repeated randomized experiment. FEDEA Working Paper 2007-15, Madrid.

Bayard, Kimberly, Judith Hellerstein, David Neumark and Kenneth Troske (2003). New evidence on sex segregation and sex differences in wages from matched employer-employee data, *Journal of Labor Economics*, 21(4), 887-922.

Becker, Gary S. (1957). *The Economics of Discrimination*. Chicago: University of Chicago Press.

Bell, Linda (2005). Women-led firms and the gender gap in top executive jobs. IZA discussion paper 1689. Bonn: IZA.

Bertrand, Marianne and Kevin F. Hallock (2001). The gender gap in top corporate jobs, *Industrial and Labor Relations Review*, 55(1), 3-21.

Blank, Rebecca M. (1991). The effects of double-blind versus single-blind reviewing: Experimental evidence from the American Economic Review, *American Economic Review*, 81(5), 1041-1067.

Blau, Francine D. and Lawrence M. Kahn (2003). Understanding international differences in the gender pay gap, *Journal of Labor Economics*, 21(1), 106-144.

Blau, Francine D. and Jed DeVaro (2007). New evidence on gender differences in promotion rates: An empirical analysis of a sample of new hires. *Industrial Relations*, 46(3): 511-550.

Bon Reis, Susan, Phillip Young and James C. Jury (1999). Female administrators: A crack in the glass ceiling, *Journal of Personnel Evaluation in Education*, 13(1), 71-82.

Broder, Ivy E. (1993). Review of NSF Economics Proposals: Gender and Institutional Patterns, *American Economic Review*, 83(4), 964-970.

Brown Johnson, Nancy and Terri A. Scandura (1994). The effect of mentorship and sex-role style on male-female earnings, *Industrial Relations* 33(2), 263-274.

Byrne, Don (1971). The Attraction Paradigm. New York: Academic Press.

Carrington, William J. and Kenneth R. Troske (1995). Gender segregation in small firms, *Journal of Human Resources*, 30(3), 503-533.

Cohen, Philip N. and Matt L. Huffman (2007). Working for the Woman? Female Managers and the Gender Wage Gap, *American Sociological Review* forthcoming.

Goldberg, Daren B. (2005). Relational demography and similarity attraction in interview assessments and subsequent offer decisions, *Group and Organization Marketing*, 30(6), 597-624.

Graves, L.M. and G.N. Powell (1995). The effect of sex similarity on recruiters' evaluations of actual applicants: A test of the similarity-attraction paradigm, *Personnel Psychology*, 48(1), 85-98.

Giuliano, Laura, David I. Levine, and Jonathan Leonard (2006). Do race, age, and gender differences affect manager-employee relations? An analysis of quits, dismissals, and promotions at a large retail firm. Mimeo, University of Miami.

Heilman, M.E., Martell, R.F. and M.C. Simon (1988). The vagaries of sex bias: Conditions regulating the undervaluation, equivaluation and overvaluation of female job applicants, *Organizational Behavior and Human Decision Processes*, 41, 98-110.

Hilmer, Christiana and Michael Hilmer (2007). Women helping women, men helping women? Same-Gender mentoring, initial job placements, and

early career publishing success for economics PhDs, *American Economic Review, Papers and Proceedings*, 97(2), 422-426.

Hultin, Mia and Ryszard Szulkin (2003). Mechanisms of inequality. Unequal access to organizational power and the gender wage gap, *European Sociological Review*, 19(2), 143-159.

Jurajda, Stepan and Teodora Paligorova (2006). Female Managers and their Wages in Central Europe. Working Paper:Institute for the Study of Labor (IZA) No 2303. Bonn.

Lausten, Mette (2005). Gender differences in managerial compensation - evidence from Danish data. Working Paper: Danish National Institute of Social Research. Copenhagen.

Lazear, Edward P. and Sherwin Rosen (1990). Male-female wage differentials in job ladders, *Journal of Labor Economics* 8, 106-123.

Melero, Eduardo (2004). Sex differences in managerial style: from individual leadership to organisational labour relationships, IZA discussion paper 1387. Bonn: IZA.

Neumark, David and Rosella Gardecki (1998). Women helping women? Role-model and mentoring effects on female PhD students in economics, *Journal of Human Resources* 33(1), 220-246.

Pfeffer, Jeffrey and Alison Davis-Blake (1987). The effect of the proportion of women on salaries: the case of College administrators, *Industrial and Labor Relations Review*, 31(1), 1-24.

Portugal. Ministério da Segurança Social e do Trabalho (1987 to 2000). Quadros de Pessoal. Data in magnetic media.

Smith, Nina, Valdemar Smith and Mette Verner (2005). Do women in top management affect firm performance? IZA discussion paper 1708. Bonn: IZA.

Vieira, José A. Cabral Vieira, Ana Rute Cardoso and Miguel Portela (2005). Gender segregation and the wage gap in Portugal: an analysis at the establishment level, *Journal of Economic Inequality*, 3(2), 145-168.

Weichselbaumer, Doris and Rudolf Winter-Ebmer (2005). A meta-analysis of the international gender wage gap, *Journal of Economic Surveys*, 19(3), 479-512.

Weichselbaumer, Doris and Rudolf Winter-Ebmer (2007). The effects of competition and equal treatment laws on gender wage differentials, *Economic Policy*, 50, 235-287.

Winter-Ebmer, Rudolf and Josef Zweimüller (1997). Unequal assignment and unequal promotion in job ladders, *Journal of Labor Economics*, 15(1), 43-71.

Tables and figures

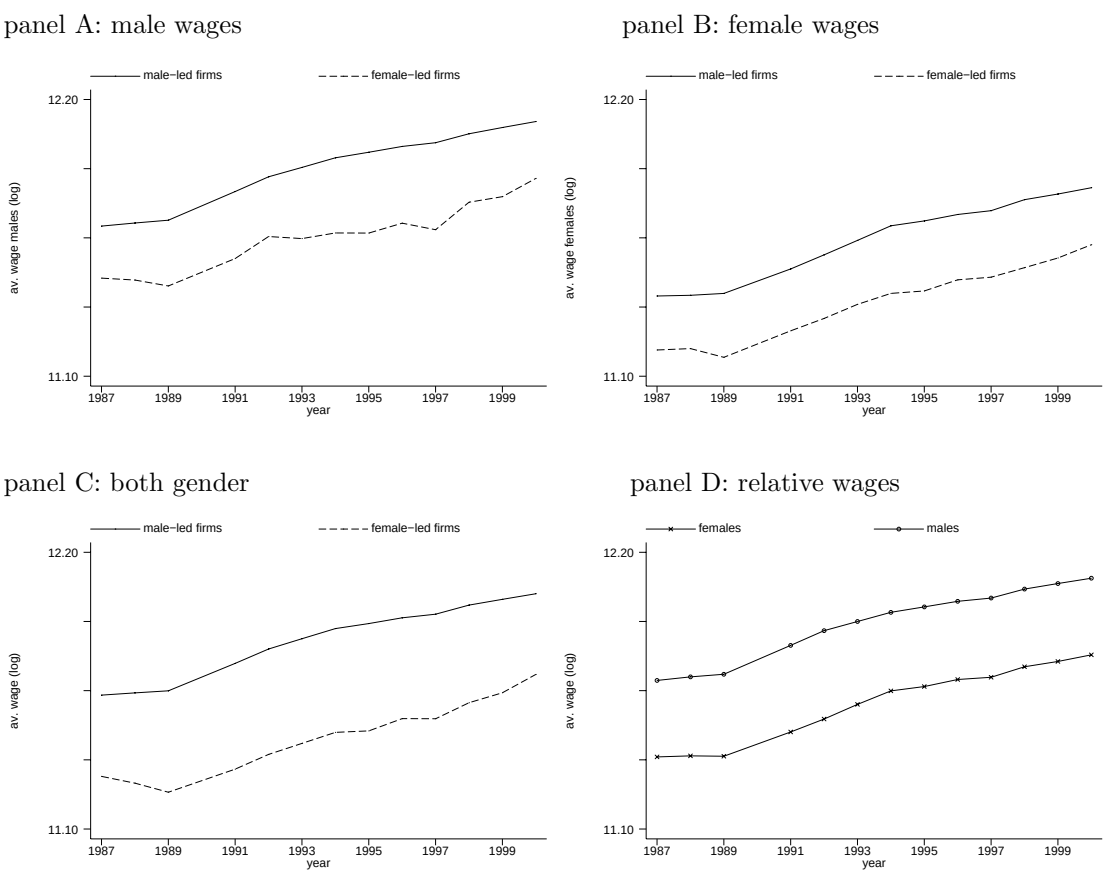

Figure 1: Monthly wages (male, female, and overall). Source: Computations based on Portugal, MTSS (1987-2000). Notes: Panels A to C: the average real monthly wage at the firm level (male, female, and overall) was averaged for the two groups of firms using as weights the male, female, and overall employment in the firm, respectively; log wages are plotted. Panel D: the average real monthly wage for males and females was computed; log wages are plotted.

Criterion	Female-led	Male-led	Insuf. info.(*)
Owners	23,372	131,778	231,218
Top managers	24,442	138,398	223,528
Middle managers	33,791	178,584	173,993
Top wages	83,666	298,680	4,022

Table 1: Successive criteria used to identify the firm leadership and its degree of femaleness. Source: Computations based on Portugal, MTSS (1987-2000). Note (*): Information on the criterion either missing or pointing exactly to half males and half females in the firm leadership.

A: Female Workers	(1)	(2)	(3)
female-led firm	-.016	.010	.030
	$(.0005)^{***}$	$(.0005)^{***}$	$(.002)^{***}$
share females		-.139	-.136
		$(.0009)^{***}$	$(.0009)^{***}$
fem.-led * share fem.			-.025
			$(.002)^{***}$
Obs.	2855643	2855643	2855643
R^2	.702	.705	.705
F statistic	132009.8	131188.6	128722.5
B: Male Workers	(1)	(2)	(3)
female-led firm	-.052	-.060	-.028
	$(.0008)^{***}$	$(.0008)^{***}$	$(.001)^{***}$
share females		.055	.061
		$(.0009)^{***}$	$(.0009)^{***}$
fem.-led * share fem.			-.082
			$(.003)^{***}$
Obs.	5674418	5674418	5674418
R^2	.638	.638	.638
F statistic	195698	192121.5	188539.2

Table 2: Summary of wage regression, ordinary least squares, all firms. Source: Computations based on Portugal, MTSS (1987-2000). Note: Includes controls for age, tenure and education of the worker, size, industry, region, legal setting, and origin of the capital of the firm, and year.

A: Female Workers	(1)	(2)	(3)
female-led firm	.008	.011	.029
	$(.0008)^{***}$	$(.0008)^{***}$	$(.002)^{***}$
share females		-.097	-.093
		$(.002)^{***}$	$(.003)^{***}$
fem.-led * share fem.			-.025
			$(.003)^{***}$
Obs.	2855643	2855643	2855643
R^2	.805	.805	.805
F statistic	36498.11	35845.37	35170.93
B: Male Workers	(1)	(2)	(3)
female-led firm	-.007	-.007	-.004
	$(.001)^{***}$	$(.001)^{***}$	$(.002)^{**}$
share females		-.017	-.017
		$(.002)^{***}$	$(.002)^{***}$
fem.-led * share fem.			-.009
			$(.004)^{**}$
Obs.	5674418	5674418	5674418
R^2	.754	.754	.754
F statistic	81307.51	79745.49	78240.99

Table 3: Summary of wage regression, firm fixed effects, all firms. Source: Computations based on Portugal, MTSS (1987-2000). Note: Includes controls for age, tenure and education of the worker, size, industry, region, legal setting, and origin of the capital of the firm, and year.

A: Female Workers	(1)	(2)	(3)
female-led firm	-.020	.019	.121
	(.003)***	(.003)***	(.012)***
share females		-.214	-.189
		(.007)***	(.007)***
fem.-led * share fem.			-.122
			(.014)***
Obs.	42561	42561	42561
R^2	.612	.621	.621
F statistic	1314.587	1337.066	1315.87
B: Male Workers	(1)	(2)	(3)
female-led firm	-.031	-.033	-.011
	(.005)***	(.006)***	(.010)
share females		.010	.022
		(.010)	(.011)**
fem.-led * share fem.			-.059
			(.020)***
Obs.	48534	48534	48534
R^2	.532	.532	.532
F statistic	1080.135	1059.384	1039.713

Table 4: Summary of wage regression, ordinary least squares, just new firms. Source: Computations based on Portugal, MTSS (1987-2000). Note: Includes controls for age, tenure and education of the worker, size, industry, region, legal setting, and origin of the capital of the firm, and year.

A: Female Workers	(1)	(2)	(3)
female-led firm	.014	.018	.017
	(.001)***	(.001)***	(.003)***
share females		-.095	-.095
		(.003)***	(.003)***
fem.-led * share fem.			.0008
			(.004)
Obs.	2734332	2734332	2734332
R^2	.808	.808	.808
F statistic	35321.18	34685.07	34030.63
B: Male Workers	(1)	(2)	(3)
female-led firm	-.007	-.006	-.007
	(.002)***	(.002)***	(.003)***
share females		-.017	-.017
		(.003)***	(.003)***
fem.-led * share fem.			.001
			(.006)
Obs.	5575566	5575566	5575566
R^2	.755	.755	.755
F statistic	80380.8	78836.48	77348.98

Table 5: Summary of wage regression, firm fixed effects, excluding year t when firm changed type of leadership and year t+1. Source: Computations based on Portugal, MTSS (1987-2000). Note: Includes controls for age, tenure and education of the worker, size, industry, region, legal setting, and origin of the capital of the firm, and year.

A: Female Workers	(1)	(2)	(3)
female-led firm (continuous)	.009	.012	.026
	(.0008)***	(.0008)***	(.002)***
share females		-.098	-.093
		(.002)***	(.003)***
fem.-led (continuous) * share fem.			-.021
			(.003)***
Obs.	2855643	2855643	2855643
R^2	.805	.805	.805
F statistic	36498.99	35846.83	35172.11
B: Male Workers	(1)	(2)	(3)
female-led firm (continuous)	-.016	-.015	-.017
	(.0009)***	(.0009)***	(.001)***
share females		-.014	-.015
		(.002)***	(.003)***
fem.-led (continuous) * share fem.			.007
			(.004)*
Obs.	5674418	5674418	5674418
R^2	.754	.754	.754
F statistic	81316.32	79753.64	78248.94

Table 6: Summary of wage regression, firm fixed effects, femaleness of firm leadership measured as continuous variable (instead of dicothomous). Source: Computations based on Portugal, MTSS (1987-2000). Note: Includes controls for age, tenure and education of the worker, size, industry, region, legal setting, and origin of the capital of the firm, and year.

	small firms			large firms		
A: Female Workers	(1)	(2)	(3)	(1)	(2)	(3)
female-led firm	-.001	.003	.029	.026	.025	.019
	(.0009)	(.0009)***	(.003)***	(.001)***	(.001)***	(.004)***
share females		-.069	-.063		-.164	-.165
		(.003)***	(.003)***		(.005)***	(.005)***
fem.-led * share fem.			-.035			.008
			(.004)***			(.006)
Obs.	1621216	1621216	1621216	1234427	1234427	1234427
R^2	.75	.75	.75	.813	.813	.813
F statistic	18285.12	17953.34	17617.43	18288.13	17972.35	17633.29
B: Male Workers	(1)	(2)	(3)	(1)	(2)	(3)
female-led firm	.001	.0004	.014	-.018	-.019	-.037
	(.001)	(.001)	(.002)***	(.002)***	(.002)***	(.003)***
share females		.017	.02		-.122	-.124
		(.003)***	(.003)***		(.005)***	(.005)***
fem.-led * share fem.			-.041			.051
			(.005)***			(.008)***
Obs.	2825907	2825907	2825907	2848511	2848511	2848511
R^2	.692	.692	.692	.741	.741	.741
F statistic	31808.13	31197.55	30610.94	50094.55	49153.95	48228.04

Table 7: Summary of wage regression, firm fixed effects, separately for small and large firms. Source: Computations based on Portugal, MTSS (1987-2000). Note: Small firms defined as having average size (over the period under analysis) below or equal to 100 workers. The regression includes controls for age, tenure and education of the worker, size, industry, region, legal setting, and origin of the capital of the firm, and year.

	owners			top managers			other managers			best wage		
A: Female Workers	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
female-led firm	-.006	.018	.041	.011	.044	.003	-.006	.04	.087	-.029	.017	.099
	(.004)	(.005)***	(.020)**	(.051)	(.054)	(.126)	(.012)	(.013)***	(.038)**	(.003)***	(.004)***	(.016)***
share females		-.15	-.146		-.192	-.211		-.293	-.28		-.217	-.194
		(.010)***	(.011)***		(.112)*	(.123)*		(.026)***	(.028)***		(.009)***	(.010)***
fem.-led * share fem.			-.026			.071			-.067			-.097
			(.023)			(.194)			(.051)			(.019)***
Obs.	15732	15732	15732	711	711	711	5198	5198	5198	20920	20920	20920
R^2	.471	.478	.478	.655	.656	.656	.677	.685	.685	.573	.584	.584
F statistic	279.425	281.66	276.274	28.724	28.232	27.586	211.863	215.264	211.264	548.604	562.689	553.278
B: Male Workers	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
female-led firm	-.0002	-.0005	.001	-.022	.004	-.001	-.073	-.069	-.037	-.056	-.049	-.059
	(.008)	(.008)	(.012)	(.051)	(.053)	(.157)	(.018)***	(.019)***	(.035)	(.008)***	(.009)***	(.015)***
share females		.002	.003		-.151	-.151		-.023	-.012		-.032	-.038
		(.015)	(.016)		(.097)	(.100)		(.029)	(.031)		(.015)**	(.016)**
fem.-led * share fem.			-.007			.012			-.078			.025
			(.029)			(.358)			(.072)			(.029)
Obs.	19795	19795	19795	1255	1255	1255	7057	7057	7057	20427	20427	20427
R^2	.425	.425	.425	.685	.686	.686	.603	.603	.603	.408	.408	.408
F statistic	292.156	286.414	280.893	58.458	57.307	56.041	208.494	204.488	200.657	275.086	269.936	264.853

Table 8: SUMMARY OF WAGE REGRESSION, ORDINARY LEAST SQUARES, JUST NEW FIRMS, SEPARATELY FOR EACH CRITERIA THAT ENABLED IDENTIFICATION OF FIRM LEADERSHIP: OWNER(S), TOP MANAGER(S), OTHER MANAGER(S), OR BEST WAGE. Source: Computations based on Portugal, MTSS (1987-2000). Note: Includes controls for age, tenure and education of the worker, size, industry, region, legal setting, and origin of the capital of the firm, and year.

Appendix A: Additional tables

Firm size restriction	Workers	Firms	Owners	Female owners
No size restriction	17,116,973	1,457,183	1,192,282	302,265
Firms ever larger than 10 workers	13,202,761	386,368	297,982	63,291

Table 9: Initial sample sizes (number of unit-year observations). Source: Computations based on Portugal, MTSS (1987-2000).

	Male-led Firms		Female-led Firms	
Variable	Mean	Std. Dev.	Mean	Std. Dev.
Firm size (log)	2.714	1.055	2.522	0.861
Firm age	23.859	19.237	22.647	36.582
Share females	0.255	0.251	0.797	0.272
Av. schooling (yrs)	6.283	2.327	6.908	2.454
Av. age	35.824	6.02	33.789	6.492
Av. age firm leader	43.312	9.741	38.021	10.178
Av. schooling firm leader	8.24	4.335	9.26	4.567
Female-led firm (continuous variable)	0.036	0.12	0.958	0.132
Legal setting				
sole proprietorship	0.067		0.104	
partnership	0.803		0.613	
joint stock	0.093		0.038	
other	0.035		0.245	
Ownership				
public	0.005		0.002	
foreign	0.036		0.019	
Location				
Center Coast	0.186		0.127	
lisbon	0.354		0.348	
inland and south	0.127		0.123	
Industry				
textiles	0.035		0.048	
clothing, leather	0.063		0.267	
wood, cork	0.072		0.018	
paper, printing	0.028		0.012	
chemicals	0.025		0.01	
stone, clay, glass	0.038		0.015	
basic metals	0.008		0.001	
metal prod, machin.	0.109		0.021	
elect., water	0.001		0.000	
construction	0.167		0.028	
wholesale trade	0.122		0.051	
retail trade	0.104		0.087	
restaurants, hotels	0.052		0.041	
transport, communic.	0.038		0.016	
banking, insurance	0.011		0.004	
real estate	0.02		0.018	
education	0.008		0.106	
health, social serv.	0.006		0.172	
other	0.051		0.067	
N	218980		40350	

Table 10: Descriptive statistics on the firm. Source: Computations based on Portugal, MTSS (1987-2000). Note: Reports firms that changed ownership type once or never.

	Males		Females	
Variable	Mean	Std. Dev.	Mean	Std. Dev.
Wage(log)	11.769	0.53	11.488	0.479
Female-led firm (dicotomous variable)	0.034		0.196	
Female-led firm (continuous variable)	0.081	0.2	0.235	0.378
Share females	0.207	0.189	0.571	0.281
Age	38.065	11.653	34.123	10.425
Tenure	10.038	9.521	8.261	8.408
Tenure< =1	0.126		0.137	
Education				
4 yrs	0.473		0.4	
6 yrs	0.191		0.212	
9 yrs	0.115		0.128	
12 yrs	0.127		0.166	
16 yrs	0.054		0.059	
Firm size (log)	5.032	2.101	4.625	1.846
Legal setting				
sole proprietorship	0.021		0.025	
partnership	0.505		0.562	
joint stock	0.373		0.28	
other	0.032		0.105	
Ownership				
public	0.134		0.067	
foreign	0.097		0.114	
Location				
center coast	0.134		0.154	
lisbon	0.485		0.415	
inland and south	0.077		0.09	
Industry				
textiles	0.051		0.107	
clothing, leather	0.028		0.19	
wood, cork	0.048		0.033	
paper, printing	0.024		0.019	
chemicals	0.04		0.028	
stone, clay, glass	0.04		0.028	
basic metals	0.018		0.004	
metal prod, machin.	0.141		0.081	
elect., water	0.028		0.009	
construction	0.149		0.018	
wholesale trade	0.081		0.068	
retail trade	0.057		0.067	
restaurants, hotels	0.024		0.049	
transport, communic.	0.104		0.046	
banking, insurance	0.059		0.049	
real estate	0.013		0.012	
education	0.004		0.029	
health, social serv.	0.004		0.057	
other	0.045		0.051	
N	5674418		2855643	

Table 11: Descriptive statistics on the worker. Source: Computations based on Portugal, MTSS (1987-2000).

	(1)	(2)	(3)
female-led firms	.008	.011	.029
	(.0008)***	(.0008)***	(.002)***
share females		-.097	-.093
		(.002)***	(.003)***
fem.-led * share fem.			-.025
			(.003)***
age	.026	.025	.025
	(.00008)***	(.00008)***	(.00008)***
age sq.	-.0003	-.0003	-.0003
	(1.10e-06)***	(1.10e-06)***	(1.10e-06)***
tenure	.008	.008	.008
	(.00003)***	(.00003)***	(.00003)***
tenure<1	-.060	-.060	-.060
	(.0004)***	(.0004)***	(.0004)***
educ: 4 yrs	.085	.085	.085
	(.0008)***	(.0008)***	(.0008)***
educ: 6 yrs	.179	.179	.179
	(.0008)***	(.0008)***	(.0008)***
educ: 9 yrs	.302	.301	.301
	(.0009)***	(.0009)***	(.0009)***
educ: 12 yrs	.376	.375	.375
	(.0009)***	(.0009)***	(.0009)***
educ: 16 yrs	.805	.804	.804
	(.001)***	(.001)***	(.001)***
firm size (log)	.013	.012	.012
	(.0004)***	(.0004)***	(.0004)***
sole proprietorship	.022	.024	.024
	(.007)***	(.007)***	(.007)***
partnership	.054	.054	.055
	(.002)***	(.002)***	(.002)***
joint stock	.041	.042	.042
	(.001)***	(.001)***	(.001)***
other	.027	.027	.027
	(.003)***	(.003)***	(.003)***
public	-.044	-.043	-.043
	(.001)***	(.001)***	(.001)***
foreign	.001	.0009	.0008
	(.001)	(.001)	(.001)
Obs.	2855643	2855643	2855643
R^2	.805	.805	.805
F statistic	36498.11	35845.37	35170.93

Table 12: WAGE REGRESSION, FIRM FIXED EFFECTS, FEMALE WORKERS, ALL FIRMS. Source: Computations based on Portugal, MTSS (1987-2000). Note: Includes controls for industry (19 dummies), year, and region (3 dummies).

	(1)	(2)	(3)
female-led firms	-.007	-.007	-.004
	(.001)***	(.001)***	(.002)**
share females		-.017	-.017
		(.002)***	(.002)***
fem.-led * share fem.			-.009
			(.004)**
age	.044	.044	.044
	(.00007)***	(.00007)***	(.00007)***
age sq.	-.0004	-.0004	-.0004
	(8.39e-07)***	(8.39e-07)***	(8.39e-07)***
tenure	.008	.008	.008
	(.00002)***	(.00002)***	(.00002)***
tenure <1	-.050	-.050	-.050
	(.0004)***	(.0004)***	(.0004)***
educ: 4 yrs	.145	.145	.145
	(.0006)***	(.0006)***	(.0006)***
educ: 6 yrs	.241	.241	.241
	(.0007)***	(.0007)***	(.0007)***
educ: 9 yrs	.346	.346	.346
	(.0007)***	(.0007)***	(.0007)***
educ: 12 yrs	.434	.434	.434
	(.0007)***	(.0007)***	(.0007)***
educ: 16 yrs	.963	.963	.963
	(.0008)***	(.0008)***	(.0008)***
firm size (log)	.010	.010	.010
	(.0004)***	(.0004)***	(.0004)***
sole proprietorship	.027	.028	.028
	(.006)***	(.006)***	(.006)***
partnership	.054	.054	.054
	(.001)***	(.001)***	(.001)***
joint stock	.049	.049	.049
	(.0009)***	(.0009)***	(.0009)***
other	-.012	-.012	-.012
	(.002)***	(.002)***	(.002)***
public	-.024	-.024	-.024
	(.0008)***	(.0008)***	(.0008)***
foreign	-.002	-.002	-.002
	(.0009)**	(.0009)**	(.0009)**
Obs.	5674418	5674418	5674418
R^2	.754	.754	.754
F statistic	81307.51	79745.49	78240.99

Table 13: WAGE REGRESSION, FIRM FIXED EFFECTS, MALE WORKERS, ALL FIRMS. Source: Computations based on Portugal, MTSS (1987-2000). Note: Includes controls for industry (19 dummies), year, and region (3 dummies).

Appendix B: Alternative procedure to identify the firm leadership

We have checked the robustness of our classification of firms into male- and female-led. Whereas the first criterion used to define the firm leadership — its owner — raises no doubts, the order in which the other variables are considered may be less consensual, and one could argue for instance that the best paid worker is more likely to be the firm leader, even if (s)he is not formally called a manager. We have therefore identified the person leading the firm using the criteria in the following alternative sequence: 1. Owner of the firm; 2. Top wage in the firm; 3. Top manager; 4. Middle manager. Table 14 reports the cross-classification using the two procedures.

	Procedure 2			
Procedure 1	Male-led	Female-led	Insuf. info.	Total
Male-led	296,031	2,649		298,680
Female-led	3,810	79,856		83,666
Insuf. info.			4,022	4,022
Total	299,841	82,505	4,022	386,368

Table 14: Classification of firms into male- and female-led using alternative procedures. Source: Computations based on Portugal, MTSS (1987-2000). Note: Procedure 1 uses the following ordering of variables to identify the firm leader(s): owner, manager, best wage in firm; procedure 2 uses the ordering: owner, best wage in firm, manager.

Almost all the firms (99%) classified as male-headed under procedure 1 get the same classification under procedure 2: for female-headed firms, that share is 95%. The two procedures lead to a very similar classifications of firms. Nonetheless it is more plausible that a worker reported as manager will take the crucial decisions in the company — including setting the pay scales — as compared to a specialized worker whose wage may be very high due to market constraints.[12] Indeed, it is a standard procedure in the literature to identify the firm leadership by looking at the top executive jobs (Bell, 2005) (Smith et al, 2005) (Melero, 2004). We have therefore progressed in the analysis using the first procedure described, but results using the second procedure are very similar.

[12] In firms that have top managers, wages higher than his(hers) occur for occupations such as accountants, professionals of intermediate level in financial and commercial services, and salespersons.