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Firm Leadership and the Gender Pay Gap: Do Active Owners Discriminate more than Hired Managers?

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Firm Leadership and the Gender Pay Gap:

Do Active Owners Discriminate more than Hired Managers?*

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Abstract: Using a large linked employer–employee data set for Germany, we investigate differences in the unexplained gender pay gap between owner-run and manager-run firms. We hypothesise that owner-run firms have higher pay gaps because active owners are less inhibited to live out profit-reducing discriminatory preferences against women than hired managers. We indeed find that the pay gaps are significantly higher in owner-run plants, both statistically and economically. Yet, scrutinising these results by restricting our analysis to plants that only differ in leadership regime, this substantial difference disappears. Therefore, our findings do not support that active owners are more discriminatory *per se*.

Zusammenfassung: Auf Grundlage eines großen kombinierten Firmen-Beschäftigten-Datensatzes untersuchen wir Unterschiede im unerklärten geschlechtsspezifischen Lohndifferential zwischen eigentümer- und managergeführten Betrieben für Deutschland. Wir stellen die Hypothese auf, dass eigentümergeführte Betriebe höhere Lohndifferentiale aufweisen sollten, da diskriminierende aktive Eigentümer im Vergleich zu diskriminierenden angestellten Managern in der Auslebung ihrer gewinnsenkenden diskriminatorischen Präferenzen weniger eingeschränkt sein dürften. Empirisch finden wir statistisch wie ökonomisch signifikant höhere Lohndifferentiale in eigentümergeführten Betrieben. Eine gründlichere Untersuchung dieser Ergebnisse durch Beschränkung der Stichproben auf hinreichend ähnliche eigentümer- und managergeführte Betriebe lässt diese markanten Lohndifferentiale jedoch verschwinden. Unsere Ergebnisse deuten daher nicht darauf hin, dass aktive Eigentümer per se mehr diskriminieren.

Keywords: gender pay gap, firm leadership, Germany

New JEL-Classification: J31, J16, J71

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1 Introduction

One of the most notable stylised facts in labour economics is that women earn substantially less than men. For example, the European Commission (2010) reports an average gender gap in gross hourly earnings of about 17.6 per cent for the EU-27 countries in 2007 and 23.0 per cent for Germany. Though part of this pay differential can be attributed to gender differences in education, occupation, or work experience, a considerable part of the gender pay gap remains unexplained (see, e.g., the large meta-analysis of Weichselbaumer and Winter-Ebmer (2005) comprising more than 260 international studies between the 1960s and the 1990s). While part of this unexplained gender pay gap may simply reflect differences in human capital or occupational segregation not controlled for, part of it may also reflect discrimination against women.

Theoretical attempts of explaining this sort of wage discrimination typically take up Becker's (1971) concept of employer discrimination due to distaste. In this framework, discriminatory employers are prejudiced against women and offer lower wages to women compared to equally productive men, giving rise to an unexplained gender pay gap in the sense given above. Since non-discriminatory employers may poach women at wages below their productivity, discriminating employers forego profits and discrimination comes at a competitive disadvantage. Discriminatory employers thus pay for discrimination.

Up to now, there is only little empirical research on how the characteristics of firm leaders influence the gender pay gap, though they are likely to reflect firm owners' possible discriminatory preferences and thus their discriminatory behaviour. While there has been some research on the effect of the sex of firm leaders (e.g., Cohen and Huffman, 2007; Cardoso and Winter-Ebmer, 2010), there exists – to the best of our knowledge – no piece of evidence on differences in the gender pay gap between owner-run and manager-run firms. This comes at a surprise because, as we shall argue later on, owners can be expected to live out their costly discriminatory preferences to a greater extent than hired managers whose incentives are more likely to be directed on profit maximisation to satisfy their principals. Using linked employer–employee data for Germany, this paper investigates for the first time whether the unexplained gender pay gap in owner-run firms is indeed higher than in manager-run firms, which we should expect if costly discriminatory preferences are present and owners have more discretion in trading off firms' profits and their taste for discrimination.

The remainder of this paper is organised as follows: Section 2 develops our hypothesis in more detail and reviews some related empirical literature. Section 3 describes our data set. Section 4 presents and discusses our results, and Section 5 concludes.

2 Theoretical Considerations and Review of Some Related Literature

The standard approach to gender discrimination in the labour market originates in the pathbreaking work by Becker (1971). According to Becker, discrimination stems from personal prejudices which constitute tastes for discrimination among employers, coworkers, or costumers. As a case in point, male employers may possess discriminatory preferences against female workers constituting a disutility from the employment of women. Since female workers are therefore less than perfect substitutes to male workers, discriminatory employers offer lower wages to equally productive women than to their male counterparts.

Obviously, personal characteristics of the firm leader are driving forces of his or her possible discriminatory preferences. But up to now only the impact of the sex of the firm leader or workers' supervisor on the gender pay gap has been investigated empirically. Arguing on base of homophily, the expectation is that prejudices against women should be lower when a larger fraction of managers are females themselves or if the firm owner is a woman.[1] While there is some evidence that a higher share of female managers reduces the gender pay gap (see Hultin and Szulkin, 1999; 2003; Cohen and Huffman, 2007; Cardoso and Winter-Ebmer, 2010), there is no evidence that the sex of the firm owner *per se* affects it (cf. Penner and Toro-Tulla, 2010), though his or her sex seems to strongly influence the gender composition of the firm's workforce (see Carrington and Troske, 1995).[2]

It is of prime importance, however, to note that discrimination comes at a cost in this framework. Non-discriminating employers may gain a competitive advantage over their discriminating competitors by hiring women at wages below their productivity. Put differently, discriminating employers trade off their profits with their taste for discrimination and decide to pay for discrimination. In the short run, they should therefore incur lower profits than their non-discriminating competitors, while they should grow at lower pace and find it harder to survive in the long run.

There have been some attempts to test these profitability predictions of Becker's model: While there is empirical evidence showing that discriminatory employers make lower profits in the short run, the evidence on the long-run implications of slower growth and lower survival is rather mixed (cf. Hellerstein *et al.*, 2002; Kawaguchi, 2007; Weber and Zulehner, 2009). Related to these findings, there exists also evidence that gender wage discrimination is less prevalent in more competitive

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1 For an extensive overview of homophily in social networks, see McPherson *et al.* (2001).

2 Related to this, there is also evidence that managers and their subordinates tend to be of the same sex (cf. Carrington and Troske, 1998).

industries (see, e.g., Winter-Ebmer, 1995; Belfield and Heywood, 2006; Jirjahn and Stephan, 2006).

While competition actually seems to constrain employers' ability to discriminate against women, there are other factors likely to impact the firm leaders' ability to live out their possible discriminatory preferences. And these constraining factors may, in turn, be associated with the firm leaders' characteristics. As discrimination due to distaste comes at a cost, we expect owner-run firms to discriminate against women to a greater extent than manager-run firms. If they own the firm, firm leaders should have more discretion in actually paying for gender discrimination by foregoing profits than hired managers. Other than owner-leaders, hired managers should have stronger incentives to maximise profits to please their principals – and to increase their own payments which are often related to firm performance. Whereas the firm owners employing these managers may have discriminatory preferences themselves, they should arguably bear more interest in profits than seeing women discriminated at the remote workplace they barely take note of. We thus conjecture the unexplained gender pay gap to be more pronounced in owner-run as opposed to manager-run firms if taste-based discrimination is present. In the following, we shall investigate this hypothesis using a large linked employer–employee data set for Germany, which we shall describe next.

3 Data

The data set utilised in the subsequent empirical analysis is the German LIAB, i.e. the Linked Employer–Employee Data Set of the Institute for Employment Research (*Institut für Arbeitsmarkt- und Berufsforschung*, IAB) of the German Federal Employment Agency (*Bundesagentur für Arbeit*). The LIAB is created by linking the administrative person-specific data of the IAB with the IAB Establishment Panel (cf. Alda *et al.*, 2005). Using the LIAB, we are therefore able to control both for worker and establishment characteristics.

The employee history used for constructing the LIAB is based on the integrated notification procedure for the health, pension, and unemployment insurances.[3] This procedure requires all employers to report all information of their employees if covered by the social security system, where misreporting is legally prohibited. Notifications are compulsory at the beginning and the end of employment. Additionally, an annual report must be provided for each employee employed on the 31st December of the year. As a consequence, only those workers, salaried employees, and trainees who are covered by social security are included. Thus, among others, civil servants, self-employed, those in marginal employment, students enrolled in

[3] Details are given by Alda *et al.* (2005) and Bender *et al.* (2000).

higher education, and family workers are not included. All in all, approximately 80 per cent of all people employed in Germany are part of the employee history.

The data include, among others things, information for every employee on the daily gross wage, censored at the social security contribution ceiling, on the employee's occupation and occupational status, and on industry. Furthermore, individual characteristics, such as age, schooling, training, sex, and nationality are contained.[4] Finally, an establishment number is included which is used to link the employee history and the IAB Establishment Panel.

The employer side of our data set is given by the IAB Establishment Panel, a random sample of establishments (not companies) which employ at least one employee covered by social security at the 30th June of a year.[5] Every year since 1993 (1996) the IAB Establishment Panel has surveyed the same plants from all industries in West (East) Germany. Response rates of units which have been interviewed repeatedly exceed 80 per cent. Questions deal, among other things, with the number of employees, the establishment's commitment to collective agreements, the existence of a works council, the plant's performance and export share, and its technological status. What is more, for the first time in 2007 the survey included a question concerning plant leadership, i.e. whether the establishment is entirely manager-run, entirely owner-run, or run both by hired managers and owners, thus allowing us to investigate whether the unexplained gender gap differs across plants with different leadership regimes.

Linking both the IAB Establishment Panel and the employee history gives the LIAB. We will use the 2007 wave of the LIAB cross-sectional model, which contains both information on individuals and IAB Panel establishments matched as of the 30th of June this year. This enables us to investigate differences in the unexplained gender pay gap between owner-run and manager-run plants controlling for a large variety of individual and establishment characteristics.[6] Since we have no detailed information on the number of hours worked but just a qualitative variable distinguishing between full-time and two sorts of part-time work, we restrict our analysis to full-time employees. We further exclude workers working for establishments in the public sector where the distinction between owner-run

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[4] Due to notifications made in the case of changes in the employment status that are relevant according to benefit entitlement rules, there is also information on the employee's marital status and the number of children at the time the change takes place. However, these variables contain much measurement error and are very fragmentary, so that we will not be able to use them.

[5] Details about the IAB Establishment Panel are given by Kölling (2000).

[6] In the following, we shall not discuss results for establishments run both by hired managers and owners because we do not know the relative influence of either groups in the plant's management. Note, however, that in general the results for these plants are in between those gained for entirely owner-run and entirely manager-run establishments, which is in line with our expectation that they should constitute an intermediate case between these two extremes.

and manger-run is not applicable. This leaves us – after dropping observations with missing values of the subsequently included regressors – with observations for 274,399 (66,249) men and 68,280 (28,249) women working for 3,620 (2,633) West (East) German establishments, 2,411 (1,955) of which are owner-run and 1,179 (678) manager-run. Descriptive statistics of our West and East German samples are presented in Table 1.

A serious shortcoming of the LIAB is that daily gross wages are censored at the social security contribution ceiling, viz. €172.60 in West Germany and €149.59 in East Germany in 2007. This affects 23.7 per cent of West German and 7.6 per cent of East German observations. Obviously, using the wage data without any correction would result in misleading estimates. To deal with the problem of censored wages, we impute wages above these thresholds. Assuming that daily gross wages follow a log-normal distribution, which seems to be a plausible approximation (cf., e.g., Gartner, 2005), first four Tobit models separately by gender and leadership regime both for West and East Germany are estimated, where the dependent variable is the log daily gross wage and the regressors are those included in the further analysis. Then for every censored observation a random value is drawn from a normal distribution left-truncated at the social security contribution ceiling with predicted log wage as mean and standard deviation as estimated from the Tobit models (details are given by Gartner, 2005).[7]

4 Results

As a starting point, we present some descriptive evidence for our West and East German samples. First of all, in West Germany daily gross wages are 26.6 log points lower for women than for men. Interestingly, this raw gender differential amounts to 31.3 log points in owner-run, but just 24.3 log points in manager-run plants. Though the raw gap is markedly lower in East Germany independently of the leadership regime, the difference between owner-run and manager-run plants is rather similar to the one in West Germany: In East Germany, we find an overall raw differential of 14.6 log points, which is again markedly higher in owner-run (20.8 log points) as opposed to manager-run plants (13.1 log points).[8] Thus, we find supportive descriptive evidence for our hypothesis.

Empirically, however, these raw gender pay differentials are of limited information

[7] Note that all our following results also show up when restricting the West and East German samples to uncensored wage observations or young low-skilled and medium-skilled workers, for whom censoring does not play any role. Given this robustness of our findings, we conclude that they are not driven by our imputation mechanism.

[8] The lower pay gap for East Germany compared to West Germany is a finding familiar from the relevant literature (cf., e.g., Maier, 2007).

as they neglect individual and establishment heterogeneity, such as gender differences in human capital endowments and differences in the gender composition of the workforce or the establishment size between owner-run and manager-run plants. In order to deal with observed heterogeneity, we will in the following apply the standard Oaxaca–Blinder (OB) decomposition to estimate the unexplained gender pay gaps. Based on separate earnings functions for female and male workers including several control variables for individual and plant characteristics, this method decomposes the observed average pay gap into an 'explained' part due to differences in average characteristics/endowments and an 'unexplained' part due to differences in coefficients, typically referred to as 'discrimination'. Hence,

$$\overline{\ln w}_m - \overline{\ln w}_f = (\overline{\boldsymbol{x}}_m - \overline{\boldsymbol{x}}_f)^\top \boldsymbol{\beta}_m + (\boldsymbol{\beta}_m - \boldsymbol{\beta}_f)^\top \overline{\boldsymbol{x}}_f \tag{1}$$

with the log wage $\ln w$, the characteristics included in the earnings functions $\boldsymbol{x}$, and their coefficients $\boldsymbol{\beta}$, where the indices f and m denote female and male, respectively, and the bars group averages.[9]

We will carry out OB decompositions as given in equation (1) separately for manager-run and owner-run plants in our West and East German samples. We will then compare the unexplained gender pay gaps in owner-run and manager-run plants and check whether their confidence intervals overlap. As control variables we first of all include standard individual characteristics, i.e. age (linearly and squared), tenure (linearly and squared), a dummy for non-German nationality, a group of six education dummies,[10] and a group of nine occupation dummies.[11] Next, we

[9] Note that the way of decomposing the gender pay gap given in equation (1) assumes men to have the non-discriminatory wage structure by calculating the explained gender pay based on male workers' coefficients. While this seems intuitively appealing (since we think primarily as women being underpaid relative to men rather than men being overpaid relative to women), the way how the OB decomposition is carried out comes at some arbitrariness. For instance, rather than choosing men as reference category one could use women instead, yielding

$$\overline{\ln w}_m - \overline{\ln w}_f = (\overline{\boldsymbol{x}}_m - \overline{\boldsymbol{x}}_f)^\top \boldsymbol{\beta}_f + (\boldsymbol{\beta}_m - \boldsymbol{\beta}_f)^\top \overline{\boldsymbol{x}}_m, \tag{2}$$

or use a weighted average of men's and women's coefficients to calculate the explained gap (see, e.g., the discussion in Oaxaca and Ransom, 1994). Unfortunately, different decompositions generally give different results, so that one has to carefully compare the results obtained for different reference categories. Although we will in the following only report results for the OB decomposition with male workers as reference category (and their wage structure as the non-discriminatory reference point) as given in equation (1), the reader should be aware that we will only take those results at face value that also show up when applying the OB decomposition with female workers as reference category as given in equation (2). Above that, we will make clear when results hinge on using men as reference group.

[10] We distinguish seven different groups of workers: (1) workers with neither apprenticeship nor *Abitur* (which is the German equivalent to A-levels or graduation from high school), (2) those with only apprenticeship, (3) those with only *Abitur*, (4) those with both, (5) workers with a technical college degree, (6) workers with a university degree, and (7) workers with unknown education.

[11] We distinguish ten groups of occupations: (1) basic and (2) qualified manual occupations,

include several plant characteristics: the log of establishment size, a dummy for works council existence, two dummies for the presence of a collective agreement either at the sector or the firm level, dummies for exporting activity, foreign ownership, plant location in a rural area, and new production technology, both the shares of women and qualified workers in the plant's workforce, and eight sectoral dummies.[12] Controlling for these individual and plant characteristics is meant to account for productivity differences, segregation effects, and institutional as well as organisational factors likely to influence the gender pay gap. In particular, accounting for differences in establishment characteristics is crucial because manager-run and owner-run plants obviously differ in more dimensions than just the leadership regime (see Table 2, which presents descriptive statistics for the plants in our sample by leadership regime). Not controlling for these differences may easily result in a spurious correlation between the gender pay gap and leadership regime driven by other plant characteristics.

The unexplained gender pay gaps in manager-run and owner-run plants following from decomposing the gender pay gap according to equation (1) are reported in Table 3. While they turn out to be substantially lower than the raw gaps in West Germany, they are even slightly larger than the raw gaps in East Germany. But interestingly, the differences in the unexplained gaps between manager-run and owner-run plants are even more pronounced than those found descriptively. In West Germany, the unexplained gender pay gap is 28.9 log points in owner-run, but only 16.7 log points in manager-run establishments, resulting in a marked difference of 12.2 log points. While the unexplained gender pay gaps are (at least slightly) lower in East Germany – 24.5 log points in owner-run and 14.4 log points in manager-run establishments –, the leadership difference (10.1 log points) is similar to the one found in West Germany. In both cases, the 95 per cent confidence intervals of the unexplained pay gaps do not overlap, so that we conclude that the difference is not only relevant from an economic point of view, but also statistically significant.[13]

This marked difference is consistent with the reasoning given above: Since at least part of the unexplained gender pay gap should represent wage discrimination against females, the more pronounced unexplained gap in owner-run plants may mirror

(3) engineers/technicians, (4) basic and (5) qualified service occupations, (6) semi-professionals and (7) professionals, (8) basic and (9) qualified business occupations, and (10) managers.

[12] Sectors are (1) agriculture, hunting, and forestry (including fishing), (2) mining, quarrying, electricity, gas, and water supply, (3) manufacturing, (4) trade and repair, (5) construction, (6) transport, storage, and communication, (7) financial intermediation, (8) business activities, and (9) other activities.

[13] We should, however, emphasise that the difference in East Germany is reduced to just 3.6 log points when carrying out OB decompositions with women as reference group rather than men, whilst the difference in West Germany still amounts to 12.1 log points in this case. Hence, the difference in East Germany is neither economically nor statistically significant when changing the reference group.

owners' greater discretion in living out their possible discriminatory preferences compared to hired managers. Yet, just comparing unexplained gender gaps between manager-run and owner-run plants may be misleading, even when controlling for other observed plant characteristics, for at least three reasons: Firstly, there are likely to be differences in unobserved plant characteristics that may themselves affect the extent of wage discrimination independently of the leadership regime. Just to give two examples, the number of female supervisors may influence unexplained gender pay gaps as well as the sex of the plant leader (rather than whether he or she is the plant owner or a hired manager). Not accounting for these unobserved plant characteristics may therefore introduce a spurious correlation between leadership regime and the unexplained gender pay gap if these omitted variables are systematically related to plant leadership. Secondly, there may exist self-selection of workers with different unobserved characteristics, like motivation, career outlook, or mobility, into plants with different observed characteristics, such as larger establishments with more elaborate hierarchies and thus improved career opportunities. This sort of self-selection would invalidate the comparison of unexplained pay gaps across owner-run and manager-run plants unless one accounts for these self-selection effects. And, thirdly, self-selection of workers with different unobserved characteristics may also be present due to different plant characteristics observed by the worker but unobserved in our data set, like firm culture.

Together these three arguments cast some doubt on whether the differences in unexplained gender gaps between manager-run and owner-run plants found above should be really attributed to different leadership regimes or rather to other factors – or, put differently, whether just comparing all owner-run plants in our samples with all manager-run runs the risk of comparing apples and oranges. In a next step, we therefore restrict our samples to those workers working for sufficiently similar manager-run and owner-run plants, in the sense that these plants show undistinguishable observed characteristics. This should sidestep the problem of self-selection of workers due to observed plant characteristics. Furthermore, this should also mitigate the problems of different unobserved establishment characteristics, likely to be correlated with the plants' observed characteristics, and self-selection of workers due to these unobserved characteristics.[14]

To arrive at samples of workers working for plants that only differ with respect to their leadership regime but not with respect to other observed characteristics, we construct a sample of similar owner-run and manager-run establishments. This is

[14] Ideally, we would like to get rid of self-selection biases by comparing unexplained pay gaps in owner-run and manager-run plants that are indistinguishable to a potential worker. By matching on observed establishment characteristics we hope to come as close as possible to this comparison, although we are aware that unobserved differences across both types of plants may still exist.

achieved via radius propensity score matching using only the nearest neighbour without replacement: That is, for every owner-run plant we look for a single statistical twin among manager-run plants that does not differ significantly in those observable characteristics included in the following analysis. The propensity score is obtained from a probit model for the probability that a plant is owner-run including all the plant characteristics that entered the OB decompositions as regressors. After applying this procedure, we are left with a sample of 30,442 (13,648) employees working for 505 (382) owner-run plants and 33,135 (15,365) employees working for the same number of manager-run plants in West (East) Germany. Note that these plants indeed show no significant differences in observable characteristics, as can be seen from the descriptive statistics presented in Table 4.

The unexplained gender pay gaps for workers working in the manager-run and owner-run establishments included in our matched samples are reported in Table 5. While the difference is reduced markedly to just 3.7 log points in West Germany, it even changes sign in East Germany.[15] Furthermore, both differences are now statistically insignificant as confidence intervals clearly overlap.

Overall, we conclude that there are no differences in unexplained gaps across plants that *only* differ in their leadership regimes but have otherwise similar characteristics. While we found clear evidence that unexplained pay gaps are markedly lower in manager-run than in owner-run plants, a more detailed look at sufficiently similar establishments casts serious doubt on this being actually due to plants' different leadership regimes. Rather, our evidence suggests that self-selection of workers with different unobserved characteristics into manager-run and owner-run establishments and/or different unobserved characteristics across those establishments drive our findings. Hence, it would be unjustified to attribute the marked differences found in the full samples to the leadership regime, and our results are out of tune with the hypothesis that women face more wage discrimination in owner-run plants due to owners' higher discretion in living out discriminatory preferences compared to hired managers.

5 Conclusions

In this paper, we have investigated whether the gender pay gap is larger in owner-run as opposed to manager-run firms. Theoretically, we followed Becker's (1971) classic argument that personal prejudices may constitute a taste for discrimination against women. Since discrimination comes at a cost in this framework, we then argued that firm leaders who own the firm should find it easier to live out their costly

[15] Interestingly, in the matched samples raw pay differentials are even higher in manager-run compared to owner-run firms both in East and West Germany.

discriminatory preferences compared to hired managers. We therefore expected larger gender pay gaps in owner-run than in manager-run firms.

Using a large linked employer–employee data set for Germany, we indeed found that raw pay differentials as well as unexplained gender pay gaps obtained from Oaxaca–Blinder decompositions controlling for a large variety of worker and plant characteristics are markedly larger in owner-run than in manager-run plants in both West and East Germany. Yet, noting the marked differences in characteristics between manager-run and owner-run establishments we then argued that these differences in the pay gaps may not be driven by the different leadership regime *per se* but by unobserved plant characteristics and self-selection of workers into establishments with different observed and/or unobserved characteristics. In order to meet these concerns – at least to some extent –, we then repeated our analysis using samples of manager-run and owner-run establishments that do not differ in observed characteristics. In these matched samples for West and East Germany, no differences in unexplained pay gaps between manager-run and owner-run plants showed up. From these results, we conclude that the significant and large differences in the unexplained gender pay gap between owner-run and manager-run plants found are not driven by the plants' leadership regime. They do not seem to reflect differences in wage discrimination following from leadership regime, but merely unobserved plant characteristics and compositional differences in the workforces across these two groups of plants caused by self-selection of workers due to observed and unobserved differences in plants' characteristics. Though the hypothesis that firm leaders owning the firm have more discretion in living out their costly discriminatory preferences and that therefore owner-run firms should discriminate against women to a greater extent has intuitive and economic appeal, we find no evidence in line with it.

There may be several possible reasons for this lack of differences: Firstly, competition on both labour and goods markets may be strong enough to prevent both types of leaders from discriminating against women to a large extent, so that the unexplained gender pay gaps found primarily reflect other factors, such as unobserved productivity differences between men and women. While we cannot rule out that most of the unexplained gender pay gaps found may not represent discrimination, we find it hard to believe that discrimination is completely absent in our samples given that large unexplained within-job pay gaps have been documented for the data set used in our analysis (see, e.g., Achatz *et al.*, 2005; Gartner and Hinz, 2009).

Secondly, our conjecture that managers have less discretion to forego profits and discriminate against women than owners may be irrelevant due to severe agency problems or because the principals want their agents to discriminate against women because they have discriminatory preferences themselves. Obviously, we have no

possibility of checking this, though we regard this latter point as not very plausible. We follow Becker's (1971, pp. 49/50) argument that '[a]n employer's taste for discrimination might depend considerably on his "contact" with employees; for example, he might discriminate only slightly against those he seldom saw.' Since owners who decide not to lead the firm they own should have far less contact to their workers than active owners, we expect the former to be less interested in wage discrimination against women in their firm.

Eventually, both owners and managers may not have any discriminatory preferences at all, and wage discrimination may exist due to other reasons, such as those presented by statistical or monopsonistic discrimination. *Nota bene*, both statistical and monopsonistic discrimination – originating in the seminal work of Phelps (1972) and Robinson (1969), respectively – yield gains in profits rather than being costly to the employers and are thus fostered by market forces.[16] Hence, the trade-off between discrimination and profits vanishes, as does the reason to expect differences in the gender pay gap between manager-run and owner-run firms.

While we have no way of discriminating between these three possible explanations for our results, we conclude that the marked differences in the unexplained gender pay gaps between owner-run and manager-run plants are unlikely to be explained by different discriminatory practices. Rather, our results suggest that they are driven by unobserved plant characteristics and/or self-selection of workers with different unobserved characteristics. In our eyes, it would be interesting to investigate the mechanisms behind this heterogeneity in the gender pay gap further.

[16] For an extensive review of monopsonistic discrimination, which has been nearly neglected until just recently, we refer to Hirsch (2010).

Table 1: Descriptive statistics (means)

Variable	West Germany			East Germany		
	all	men	women	all	men	women
Log wage (including imputed values)	4.856	4.909	4.643	4.359	4.402	4.256
Censored wage observation (dummy)	0.237	0.270	0.102	0.076	0.090	0.045
Female (dummy)	0.199	0.000	1.000	0.299	0.000	1.000
Age (years)	41.868	42.534	39.190	42.627	42.704	42.447
Tenure (years)	12.306	12.886	9.974	8.441	8.351	8.654
Non-German (dummy)	0.049	0.051	0.039	0.009	0.010	0.007
No apprenticeship, no Abitur (dummy)	0.040	0.036	0.032	0.014	0.014	0.010
Apprenticeship, no Abitur (dummy)	0.631	0.634	0.617	0.738	0.752	0.707
No apprenticeship, with Abitur (dummy)	0.013	0.011	0.021	0.004	0.004	0.004
Apprenticeship and Abitur (dummy)	0.067	0.052	0.128	0.033	0.028	0.046
Technical college degree (dummy)	0.079	0.088	0.044	0.066	0.058	0.085
University degree (dummy)	0.118	0.124	0.092	0.086	0.088	0.081
Education unknown (dummy)	0.051	0.053	0.043	0.058	0.055	0.065
Basic manual occupation (dummy)	0.119	0.142	0.028	0.239	0.283	0.138
Qualified manual occupation (dummy)	0.211	0.258	0.024	0.228	0.305	0.048
Engineer or technician (dummy)	0.215	0.248	0.085	0.115	0.132	0.076
Basic service occupation (dummy)	0.040	0.044	0.027	0.086	0.104	0.044
Qualified service occupation (dummy)	0.016	0.010	0.039	0.031	0.016	0.068
Semi-professional (dummy)	0.028	0.013	0.087	0.063	0.016	0.171
Professional (dummy)	0.018	0.015	0.031	0.021	0.016	0.030
Basic business occupation (dummy)	0.047	0.027	0.129	0.038	0.019	0.082
Qualified business occupation (dummy)	0.249	0.183	0.516	0.145	0.074	0.311
Manager (dummy)	0.055	0.061	0.033	0.034	0.035	0.033
Plant run by owner(s) (dummy)	0.153	0.147	0.178	0.314	0.320	0.301
Log establishment size	7.456	7.591	6.910	5.610	5.618	5.591
Collective agreement at sector level (dummy)	0.689	0.696	0.663	0.464	0.482	0.421
Collective agreement at firm level (dummy)	0.194	0.203	0.157	0.193	0.181	0.221
Works council (dummy)	0.893	0.905	0.842	0.700	0.695	0.712
Exporter (dummy)	0.699	0.741	0.530	0.507	0.569	0.361
Foreign ownership (dummy)	0.152	0.163	0.106	0.146	0.153	0.129
New production technology (dummy)	0.772	0.767	0.795	0.772	0.777	0.760
Proportion of female workers	0.250	0.211	0.407	0.311	0.227	0.505
Proportion of qualified workers	0.844	0.846	0.838	0.911	0.917	0.895
Plant located in rural area (dummy)	0.131	0.129	0.138	0.340	0.356	0.300
Agriculture, hunting, forestry (dummy)	0.001	0.001	0.002	0.010	0.010	0.009
Mining, quarrying, electricity, gas, water (dummy)	0.035	0.039	0.020	0.049	0.045	0.057
Manufacturing (dummy)	0.675	0.731	0.452	0.559	0.628	0.396
Trade and repair (dummy)	0.063	0.049	0.120	0.051	0.048	0.057
Construction (dummy)	0.018	0.020	0.009	0.048	0.063	0.012
Transport, storage, communication (dummy)	0.033	0.031	0.037	0.057	0.068	0.030
Financial intermediation (dummy)	0.058	0.043	0.120	0.007	0.004	0.012
Business activities (dummy)	0.064	0.059	0.084	0.086	0.076	0.111
Other activities (dummy)	0.053	0.027	0.156	0.135	0.057	0.316
Number of workers	342,679	274,399	68,280	94,498	66,249	28,249

Notes: The data set used is the LIAB cross-sectional model for the year 2007.

Table 2: Plant characteristics by leadership (whole sample, means)

Variable	West Germany			East Germany		
	owner-run	manager-run		owner-run	manager-run	
Establishment size	54.689	510.110	[0.000]	31.621	167.610	[0.000]
Collective agreement at sector level (dummy)	0.418	0.588	[0.000]	0.195	0.403	[0.000]
Collective agreement at firm level (dummy)	0.030	0.118	[0.000]	0.049	0.177	[0.000]
Works council (dummy)	0.107	0.692	[0.000]	0.057	0.545	[0.000]
Exporter (dummy)	0.232	0.400	[0.000]	0.186	0.334	[0.000]
Foreign ownership (dummy)	0.008	0.177	[0.000]	0.007	0.116	[0.000]
New production technology (dummy)	0.692	0.734	[0.010]	0.685	0.718	[0.111]
Proportion of female workers	0.392	0.358	[0.001]	0.359	0.362	[0.829]
Proportion of qualified workers	0.777	0.776	[0.932]	0.895	0.881	[0.133]
Plant located in rural area (dummy)	0.211	0.175	[0.011]	0.469	0.395	[0.001]
Agriculture, hunting, forestry (dummy)	0.022	0.005	[0.000]	0.028	0.025	[0.688]
Mining, quarrying, electricity, gas, water (dummy)	0.007	0.052	[0.000]	0.005	0.036	[0.000]
Manufacturing (dummy)	0.251	0.349	[0.000]	0.404	0.416	[0.596]
Trade and repair (dummy)	0.215	0.185	[0.041]	0.147	0.119	[0.074]
Construction (dummy)	0.146	0.019	[0.000]	0.138	0.046	[0.000]
Transport, storage, communication (dummy)	0.040	0.070	[0.000]	0.036	0.055	[0.031]
Financial intermediation (dummy)	0.007	0.040	[0.000]	0.007	0.013	[0.137]
Business activities (dummy)	0.159	0.145	[0.268]	0.105	0.138	[0.020]
Other activities (dummy)	0.154	0.135	[0.131]	0.130	0.152	[0.152]
Number of plants	2,431	1,176		1,951	673	

Notes: The data set used is the LIAB cross-sectional model for the year 2007. The p-values for t-tests of the hypothesis that there are no group differences are reported in squared brackets.

Table 3: Unexplained gender pay gaps obtained from Oaxaca–Blinder decompositions for manager-run and owner-run plants (whole sample)

	overall	owner-run	manager-run
West Germany	0.193	0.289	0.167
	(0.011)	(0.013)	(0.011)
	[0.172 , 0.214]	[0.263 , 0.314]	[0.147 , 0.188]
East Germany	0.180	0.245	0.144
	(0.012)	(0.019)	(0.013)
	[0.156 , 0.203]	[0.206 , 0.283]	[0.119 , 0.168]

Notes: The data set used is the LIAB cross-sectional model for the year 2007. Standard errors clustered at the plant level are given in parentheses followed from 95 per cent confidence intervals. Control variables included are: age, age squared, tenure, tenure squared, six education dummies, nine occupation dummies, a dummy for non-German nationality, log establishment size, dummies for works council existence, a collective agreement at firm (sector) level, exporting activity, foreign ownership, plant location in a rural area, new production technology, the shares of women and qualified workers in the plant's workplace, and eight sector dummies.

Table 4: Plant characteristics by leadership (matched sample, means)

Variable	West Germany			East Germany		
	owner-run	manager-run		owner-run	manager-run	
Establishment size	142.200	149.810	[0.698]	74.319	79.984	[0.574]
Collective agreement at sector level (dummy)	0.491	0.471	[0.529]	0.301	0.301	[1.000]
Collective agreement at firm level (dummy)	0.059	0.071	[0.445]	0.128	0.105	[0.311]
Works council (dummy)	0.422	0.384	[0.223]	0.262	0.275	[0.684]
Exporter (dummy)	0.360	0.329	[0.290]	0.322	0.275	[0.155]
Foreign ownership (dummy)	0.036	0.034	[0.864]	0.031	0.034	[0.839]
New production technology (dummy)	0.721	0.705	[0.578]	0.696	0.709	[0.693]
Proportion of female workers	0.370	0.392	[0.204]	0.365	0.365	[0.973]
Proportion of qualified workers	0.740	0.755	[0.396]	0.862	0.872	[0.565]
Plant located in rural area (dummy)	0.196	0.202	[0.813]	0.427	0.421	[0.884]
Agriculture, hunting, forestry (dummy)	0.014	0.010	[0.562]	0.045	0.042	[0.859]
Mining, quarrying, electricity, gas, water (dummy)	0.018	0.026	[0.389]	0.021	0.018	[0.795]
Manufacturing (dummy)	0.315	0.277	[0.191]	0.369	0.374	[0.881]
Trade and repair (dummy)	0.196	0.224	[0.280]	0.131	0.141	[0.674]
Construction (dummy)	0.032	0.034	[0.860]	0.060	0.068	[0.658]
Transport, storage, communication (dummy)	0.065	0.050	[0.280]	0.047	0.052	[0.740]
Financial intermediation (dummy)	0.016	0.016	[1.000]	0.005	0.013	[0.255]
Business activities (dummy)	0.117	0.118	[0.685]	0.160	0.141	[0.479]
Other activities (dummy)	0.166	0.176	[0.677]	0.162	0.149	[0.618]
Number of plants	505	505		382	382	

Notes: The data set used is the LIAB cross-sectional model for the year 2007. The p-values for t-tests of the hypothesis that there are no group differences are reported in squared brackets.

Table 5: Unexplained gender pay gaps obtained from Oaxaca–Blinder decompositions for manager- and owner-run plants (matched sample)

	overall	owner-run	manager-run
West Germany	0.234	0.251	0.214
	(0.012)	(0.016)	(0.014)
	[0.211 , 0.257]	[0.219 , 0.284]	[0.184 , 0.241]
East Germany	0.216	0.196	0.203
	(0.017)	(0.036)	(0.017)
	[0.181 , 0.250]	[0.125 , 0.266]	[0.170 , 0.236]

Notes: The data set used is the LIAB cross-sectional model for the year 2007. Standard errors clustered at the plant level are given in parentheses followed from 95 per cent confidence intervals. Control variables included are those reported in the notes of Table 3.

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