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THE GENDER COMPOSITION OF ESTABLISHMENTS' WORKFORCES AND GENDER GAPS IN WAGES AND LEADERSHIP POSITIONS*

by

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Linked employer–employee data from the German Federal Statistical Office are used to estimate differences in gender wage gaps and gender gaps in holding leadership positions between establishments with male- and female-dominated workforces. Main findings are: (i) the gender wage gap for workers in non-leadership positions is smaller in establishments with male- and female-dominated workforces than in establishments with a more equal gender composition of the workforce, (ii) the gender wage gap for workers in leadership positions is smallest in male- and largest in female-dominated establishments, and (iii) the gender position gap is smallest in male- and largest in female-dominated establishments.

1 INTRODUCTION

An emerging number of empirical studies has recently used linked employer–employee data to analyze the gender wage gap (see, for example, Bayard *et al.* (2003) for the USA, Meng and Meurs (2004) for France and Australia, Daly *et al.* (2006) for Australia, France, Japan and Britain, Cardoso and Winter-Ebmer (2010) for Portugal, Drolet and Mumford (2012) for Canada and Britain, Mumford and Smith (2007) and Mumford and Smith (2009) for Britain, and Hinz and Gartner (2005), Gartner and Hinz (2009), Heinze (2009) and Heinze and Wolf (2010) for Germany). One finding is that the gender wage gap is reduced by including establishment dummies but that a sizable within-establishment gender wage gap remains. Further, the gender wage gap varies between establishments and can be partly explained by differences in institutional arrangements (e.g. works councils and collective contracts), product market competition, and other establishment characteristics. An establishment characteristic, which is often included in these studies but not often systematically analyzed and discussed, is the female share of an establishment's workforce. This variable has also a political dimension, as it can be associated with the question of whether disadvantages of women with respect to wages and careers can be reduced by simply increasing their employment share. More equal employment shares might however not necessarily go hand in hand with more equal wages and career opportunities so

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that additional policies such as equal pay and anti-discrimination legislation would be needed.

Cardoso and Winter-Ebmer (2010) find for Portugal that men and women earn lower wages if the female share of an establishment's workforce is larger. This negative effect is larger for men than for women, which should result into a smaller gender wage gap. The main focus of Cardoso and Winter-Ebmer (2010) is, however, on female-led establishments and the interaction with the female share of the workforce. Mumford and Smith (2009) find for Britain that a larger female share is related to lower wages for men and women and a larger gender wage gap. Using the linked employer–employee data set of the German Federal Employment Agency (LIAB), Heinze and Wolf (2010) find that establishments with a larger share of women have a larger gender wage gap. The estimated effects are only weak or not significant. Heinze (2009) finds with the same data that men and women earn significantly lower wages in establishments with a larger share of women.

In this short paper, I use a large linked employer–employee data set sponsored by the German Federal Statistical Office, namely the German Structure of Earnings Survey 2006 (hereafter GSES 2006). It has information on more than one million employees who work for about 19,000 establishments in 2006. Instead of specifying the share of women in the establishment's workforce, I account for potential asymmetric effects by comparing gender gaps between the following three types of establishment, namely those with male-dominated workforces, those with female-dominated workforces, and the rest. In addition to estimating the within-establishment gender wage gaps in male- and female-dominated workforces, I estimate the within-establishment gender gaps in the probability of working in a leadership position, which has not been studied with linked employer–employee data so far. Such leadership positions are defined as upper positions in an establishment's hierarchy, in which a worker has a job with supervisory and disposition authority and carries out autonomously tasks.

From a theoretical perspective, there are different arguments for the effects of the gender composition of the workforce on wages and leadership positions (e.g. Groshen, 1991; Hinz and Gartner, 2005; Heinze, 2009). If women are crowded in establishments with lower wages and worse career prospects (e.g. historically grown occupational segregation, low productivity jobs, no internal labor markets), we would expect negative correlations between the female share and wages and leadership positions. But this effect should not differ between men and women and, consequently, should not have any effect on the gender gaps within establishments. If women, however, self-select into establishments with lower wages and worse career prospects for certain reasons, they might accept lower wages and worse career prospects in return. This compensating (equalizing) differential argument should not apply for men, if they do not have strong preferences for such working conditions. From this it follows that the gender wage gap should be larger

(smaller) and men should have a larger (smaller) hierarchical position advantage over women in female (male)-dominated establishments. For example, more women than men should have preferences for family friendly working time and might have lower career orientation due to family responsibilities (e.g. care for children or older family members), which are still more prevalent for women. As such work arrangements are often associated with fixed costs and imposed on a set of workers (e.g. working time schedules), they cannot always be individually agreed. Hence, establishments with a higher female share should be more likely to provide family friendly work practices (Heywood and Jirjahn, 2009). If family friendly working time increases women's utility more than men's utility, women should accept lower wages and positions but men should not, which should result into larger gender gaps in establishments with female-dominated workforces. If family friendly working time would be less likely in establishments with a male-dominated workforce, women should however obtain a compensating differential (e.g. in order to buy care for family members on the market) so that gender gaps should be smaller in these establishments.

Related to the aforementioned compensating arguments are the preference (taste) based discrimination theories (Becker, 1971). Customer discrimination assumes that customers' willingness to pay and therefore workers' value of marginal product depend on workers' gender. In case of customer discrimination against women, establishments would prefer to employ men or pay women lower wages than men in order to compensate for the lower marginal product. Thus, customer discrimination should lead to more male-dominated workforces and larger gender gaps within establishments. Discrimination by an employer, who dislikes women, is also likely to result into a male-dominated workforce and larger disadvantages for women, because the employer needs to be compensated for the disutility by paying lower wages to women. Concerning co-worker discrimination, male workers need to get paid a compensating wage differential or to get offered better positions in female-dominated work environments and vice versa, if they dislike working with the opposite gender. But it seems questionable why a worker would sort into such an environment she or he strongly dislikes and why an establishment would pay her or him higher wages. If establishments are faced with a shortage of female labor supply, they need to recruit also men, whom they have to pay a compensating differential in order to make them accept a job in a female-dominated workforce. Consequently, co-worker discrimination could lead to larger (smaller) gender gaps in female (male)-dominated establishments, whereas customer and employer discrimination rather predict larger (smaller) gender gaps in male (female)-dominated establishments.

Another form of discrimination can occur by supervisors and their special mentoring of own gender groups. If only few men (women) hold supervisor positions in female (male)-dominated establishments, the minority might form cartels ('boys/girls networks') in order to promote the other few male (female)

workers in the establishment. Due to such supervisor discrimination, the gender gaps in hierarchical positions and wages might even be larger (smaller) in female (male)-dominated establishments. Discrimination can further be a result of expectations that are formed on the basis of group statistics (e.g. Aigner and Cain, 1977). Establishments might statistically discriminate against women in terms of wages and careers, if women have on average lower productivity or higher labor cost than men or if uncertainty about female outcomes is larger than for men. One common example is that women are on average more likely to have employment interruptions than men due to childbearing and family responsibilities. Establishments with a female-dominated workforce might deal better with such gender-specific issues than male-dominated establishments, either because they have more experience with it or because they have already adapted adequate work practices (e.g. family friendly working time). Consequently, statistical discrimination against women should be less likely in female- than in male-dominated establishments so that the gender gaps should be larger (smaller) in male (female)-dominated establishments.

In sum, theory predicts different effects of the gender composition of the workforce on gender gaps in wages and in holding a leadership position, which highlights the importance of empirical research in this area. On the one hand, the theory of compensating differentials, co-worker and supervisor discrimination rather predict smaller gender gaps in male-dominated establishments and larger gender gaps in female-dominated establishments. On the other hand, customer, employer and statistical discrimination rather predict larger gender gaps in male-dominated establishments and smaller gender gaps in female-dominated establishments. Note however that this paper focuses on estimating the gender gaps and cannot explicitly identify the different theoretical channels due to data limitation.

The remainder of the paper is structured as follows. The next section informs about the GSES, sample restrictions, variables and the estimation strategy. Section 3 presents the results of the regression analysis for gender gaps in wages and leadership positions. The paper concludes with a short summary in Section 4.

2 DATA AND ESTIMATION STRATEGY

The data we analyze in this paper are a linked employer–employee data set from the GSES 2006, sponsored by the German Federal Statistical Office (Hafner and Lenz, 2008).¹ The data comprise information on about three

¹For detailed information about the data set see the homepage of the Research Data Centre of the German Federal Statistical Office (<http://www.forschungsdatenzentrum.de/en/>). Previous waves of the subsample for Lower-Saxony have been analyzed before with a focus on collective contracts (e.g. Stephan and Gerlach, 2005).

million workers employed in about 34,000 establishments sampled from all industries and federal states. All the establishments employ at least 10 workers, i.e. as the physical place of work. Because information for establishments from the education sector (NACE M) is obtained from personnel statistics and partly approximated, these establishments are not considered in the analysis.² Establishments from other industries are randomly selected and the sample is stratified by region, industry and establishment size. The response of the questionnaires is mandatory for the selected establishments. For establishments with less than 50 workers, information is recorded for the complete workforce, whereas a random sample of workers is drawn for larger establishments. The estimation sample is further restricted to workers aged between 18 and 65 years, who are not apprentices, marginal workers, civil servants, or in partial retirement. Moreover, only establishments and their workers remain in the analysis if the establishment employs at least 10 workers in the sample, of whom at least two are male employees and at least two are female employees. This restriction is applied to make comparisons between men and women meaningful at the establishment level and because establishment fixed effects are included in the regressions. A potential issue that cannot be addressed with the data at hand is gender self-selection into establishments. The final number of observations in the estimation sample is 1,159,298 workers employed in 19,063 establishments.

In order to analyze differences in wages between men and women, log-linear earnings functions are estimated using ordinary least squares regressions. An advantage of the GSES is that it contains uncensored information about gross monthly earnings and monthly working hours so that hourly wages can be computed accurately. Thus, the dependent variable is the log of the gross hourly wage. In order to estimate the conditional gender wage gaps in male- and female-dominated establishments, dummy variables for being female, working in a male-dominated workforce or in a female-dominated workforce, and their interaction terms are included. Reference group are establishments with more equal employment shares of men and women. As the focus of this paper is on segregated workforces, we define an establishment to have a male-dominated workforce when its female share of the workforce is less than 20 per cent and similarly a female-dominated workforce is when the female share is more than 80 per cent.³ It is important to note that the gender composition of the workforce has been computed by using establishments' total female share reported by the survey and has not

²For example, wages are not the individual wages as they are simply estimated on the basis of collective contracts. Note also that the data set contains the entire population of establishments and workers (1.8 million) from the education sector due to this procedure. Consequently, the number of observations in the sample is enormously reduced when excluding the education sector.

³The findings discussed in the next section hold however also for less segregated boundaries. The results can be requested from the author.

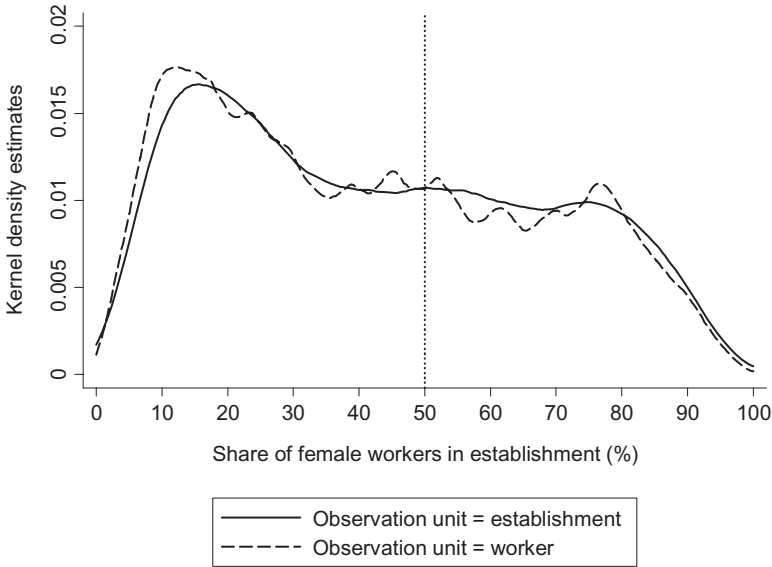


FIG. 1. Distribution of Establishments' Share of Female Workers

TABLE I
VARIABLE DEFINITIONS AND MEANS

<i>Variable definition</i>	<i>Complete sample Mean</i>	<i>Male sample Mean</i>	<i>Female sample Mean</i>
Logarithm of gross hourly wages in October 2006 (log of Euros)	2.7311	2.8273	2.5940
Employed in a leadership position, i.e. in a job with supervisory and disposition authority and autonomously carried out tasks (dummy)	0.0814	0.1065	0.0457
Female worker (dummy)	0.4125	0	1
Male-dominated workforce: female share <20% (dummy)	0.2637	0.3954	0.0761
Equal gender composition (reference): female share 20–80% (dummy)	0.6510	0.5817	0.7498
Female-dominated workforce: female share >80% (dummy)	0.0853	0.0230	0.1740

Source: GSES 2006.

Notes: Number of observations is 1,159,298 workers (681,118 men and 478,180 women) in 19,063 establishments.

been computed only on the basis of the workers in the sample. In order to get an impression of the distribution of the total female share, Fig. 1 plots kernel density estimates for establishments and for workers as observational units. Definitions and descriptive statistics of the variables of interest are presented in Table 1 for the complete sample and separately for men and women.

The regressions control additionally for differences in worker characteristics, which include dummy variables for working in a leadership position

and in a fixed-term contract, working hours, tenure in years, age in years, and seven schooling categories (none/unknown (reference), low/medium schooling without apprenticeship, low/medium schooling with apprenticeship, high schooling without apprenticeship, high schooling with apprenticeship, degree from university of applied science, degree from university). Since the gender composition of an establishment's workforce is likely to be correlated with other establishment characteristics, dummies for being located in East Germany, five establishment size categories (number of workers <100 (reference), 100–499, 500–999, 1000–4999, ≥5000), and 28 industry dummies are also included. Although the regressions control for some important establishment characteristics that can be observed in the data, unobserved establishment heterogeneity might lead to an omitted variable bias. Therefore, I estimate establishment fixed effects regressions, in which the establishment characteristics are dropped and replaced with establishment-specific fixed effects that also control for unobserved establishment characteristics such as regional differences and monopsony power (Hirsch *et al.*, 2009). Note that the gender composition of the workforce is an establishment characteristic that is also dropped but can still be interacted with the female dummy in establishment fixed effects regressions.

The GSES also includes occupation and ISCO (International Standard Classification of Occupations) codes. The main focus of my estimation strategy is however on within-establishment gender comparisons and an extension to within establishment-occupation cells makes identification of within-establishment gender gaps problematic. Groshen (1991, p. 468) has already argued that 'occupations are either mostly male or female, and within establishments, occupations are almost totally segregated'. As discussed previously, the GSES contains only a subsample of an establishment's workforce which makes this identification problem even more severe. In other data sets such as the linked employer–employee data set of the LIAB, the entire workforce can be observed in the data so that gender differences within establishment-occupation cells can properly be identified (e.g. Hinz and Gartner, 2005; Gartner and Hinz, 2009). Despite this limitation, I have run the establishment fixed effects regressions with additional controls for 56 different occupations and nine aggregated ISCO codes respectively. While the basic findings, which will be discussed in the next section, hold in these regressions, the estimated effects of male- and female-dominated workforces on gender gaps are smaller.⁴

Because wage discrimination can be accomplished indirectly by discrimination in job assignment and upper positions in an establishment's hierarchy might have value in itself (e.g. working conditions, autonomy, status), I further analyze gender differences in the probability of being employed in a leadership position. A leadership position is defined as a binary variable that

⁴The results can be requested from the author.

takes the value one, if a worker has a job with supervisory and disposition authority and carries out autonomously tasks. Although the dependent variable is binary, which would usually call for a probit or logit model, I apply a linear probability model with ordinary least squares for two reasons. First, due to my focus on interaction terms, results of non-linear maximum likelihood models such as probit and logit cannot be interpreted straightforward (Ai and Norton, 2003). Second, establishment fixed effects probit and logit models are problematic to estimate due to the large number of dummy variables (19,063 establishments).

3 REGRESSION RESULTS

In what follows, we define an establishment to have a male-dominated workforce when its female share of the workforce is less than 20 per cent and similarly a female-dominated workforce is when the female share is more than 80 per cent. Table 2 reports our estimates of the gender wage gaps. Although we do not report estimates for all the control variables, we note that the estimates are in line with almost all studies using linked employer–employee data. For example, workers in leadership positions earn significantly higher wages, whereas workers with a fixed-term contract earn on average significantly lower wages. Tenure and age have a positive concave impact on wages with a maximum at around 35 years of tenure and at an age around the mid-40s. Moreover, schooling affects wages positively. Establishments in East Germany pay lower wages and larger establishments pay significantly higher wages. These results do not differ noteworthy between the regressions without and with establishment fixed effects.

The mean hourly wage in the estimation sample is 17.23 Euros or 2.7311 log points and the unconditional gender wage gap is -0.2332 log points or $(e^{-0.2332} - 1) = -20.8$ per cent (see Table 1 for descriptive statistics). The conditional gender wage gaps (GWG) in establishments with different gender compositions can be computed using the coefficients of the female dummy and its interaction terms with a male- or female-dominated workforce. Although the results between specification (1), which includes establishment characteristics, and specification (2), which includes establishment-specific effects, do not differ much, the subsequent quantitative discussion focuses on the establishment fixed effects estimates because they additionally control for unobserved establishment heterogeneity. The gender wage gap in establishments with a more equal composition of the workforce is $GWG^{EQ} = \beta_F = -0.1328$ log points. The gender wage gaps in establishments with male-dominated workforces are $GWG^{MDW} = \beta_F + \beta_F^{MDW} = -0.1328 + 0.0374 = -0.0954$ log points and in establishments with female-dominated workforces $GWG^{FDW} = \beta_F + \beta_F^{FDW} = -0.1328 + 0.0113 = -0.1215$ log points. The differences in the gender wage gaps between the three establishment types are highly significant. On average, women earn lower wages than men in all three types of

TABLE 2
COMPLETE ESTIMATION OUTPUT FOR MALE- AND FEMALE-DOMINATED WORKFORCES

	(1) Log wages	(2) Log wages	(3) Leadership position	(4) Leadership position
Female (β_f)	-0.1541*** (0.00248)	-0.1328*** (0.00162)	-0.0537*** (0.00143)	-0.0565*** (0.00129)
Male-dominated workforce (female share <20%)	0.0156** (0.00535)		-0.0301*** (0.00316)	
Female × male-dominated workforce (β_f^{MDW})	0.0428*** (0.00420)	0.0374*** (0.00289)	0.0309*** (0.00253)	0.0335*** (0.00252)
Female-dominated workforce (female share >80%)	-0.0440*** (0.00890)		0.0124 (0.00665)	
Female × female-dominated workforce (β_f^{FDW})	0.0335*** (0.00757)	0.0113* (0.00462)	-0.0124* (0.00617)	-0.0093* (0.00471)
Leadership position	0.4454*** (0.00580)	0.4560*** (0.00428)		
Fixed-term contract	-0.1767*** (0.00533)	-0.1393*** (0.00324)	0.0158*** (0.00305)	0.0124*** (0.00250)
Working hours	0.0046*** (0.00025)	-0.0005* (0.00022)	0.0003*** (0.00009)	-0.0003** (0.00010)
Working hours squared/100	-0.0018*** (0.00009)	0.0003*** (0.00009)	-0.0000 (0.00004)	0.0003*** (0.00004)
Tenure in years	0.0129*** (0.00039)	0.0104*** (0.00020)	0.0021*** (0.00022)	0.0023*** (0.00017)
Tenure squared/100	-0.0178*** (0.00100)	-0.0151*** (0.00050)	-0.0026*** (0.00058)	-0.0029*** (0.00043)
Age in years	0.0359*** (0.00055)	0.0305*** (0.00040)	0.0034*** (0.00028)	0.0042*** (0.00024)
Age squared/100	-0.0401*** (0.00063)	-0.0322*** (0.00045)	-0.0016*** (0.00035)	-0.0025*** (0.00029)
Schooling degrees (reference: none/unknown)				
Low/medium schooling without apprenticeship	-0.1119*** (0.00618)	-0.0820*** (0.00348)	-0.0460*** (0.00203)	-0.0474*** (0.00228)
Low/medium schooling with apprenticeship	0.0603*** (0.00550)	0.0677*** (0.00309)	-0.0191*** (0.00191)	-0.0227*** (0.00209)
High schooling without apprenticeship	0.0626*** (0.01267)	-0.0111 (0.00820)	0.0371*** (0.00572)	0.0269*** (0.00452)
High schooling with apprenticeship	0.2247*** (0.00625)	0.1626*** (0.00372)	0.0620*** (0.00316)	0.0543*** (0.00297)
University of applied science	0.3219*** (0.00678)	0.2527*** (0.00390)	0.1636*** (0.00554)	0.1579*** (0.00428)
University	0.3834*** (0.00746)	0.3057*** (0.00426)	0.3456*** (0.00775)	0.3319*** (0.00729)
East Germany	-0.2826*** (0.00558)		-0.0126*** (0.00259)	
Establishment size categories (reference: < 100 workers)				
Establishment size 100–499	0.0534*** (0.00364)		0.0032 (0.00181)	
Establishment size 500–999	0.0968*** (0.00752)		0.0099* (0.00391)	
Establishment size 1000–4999	0.1321*** (0.01010)		0.0239*** (0.00570)	
Establishment size ≥5000	0.1610*** (0.02552)		0.0526* (0.02276)	
Industry dummies (28)	Yes	No	Yes	No
Establishment fixed effects (19063)	No	Yes	No	Yes
Constant	1.6667*** (0.03091)	1.9429*** (0.01568)	-0.0871*** (0.01673)	-0.0805*** (0.00775)
R ²	0.5404	0.7214	0.1827	0.3218

Source: GSES 2006.

Notes: Ordinary least squares regressions. Number of observations is 1,159,298 workers in 19,063 establishments. Robust standard errors clustered at establishment level in parentheses. Coefficients are significant at * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

establishments. But the gender wage gap is significantly smaller in male-dominated establishments than in the two other types, which indicates that women do not suffer to a larger degree from wage discrimination in male-dominated establishments. Even though the difference between establishments with female-dominated and equal-gender-composition workforces is not that large, women seem also to benefit slightly when working in the former.

The regression results for holding a leadership position are also presented in Table 2. Specifications (3) and (4) reveal again no large differences in the estimated parameters between regressions with and without establishment fixed effects. At first, let us turn to the control variables. It can be seen that being employed in a leadership position and being employed in a fixed-term contract are positively correlated. Tenure and age have positive concave impact on holding a leadership position. Schooling and establishment size are significantly positively correlated with the probability of working in a leadership position, whereas the probability is lower in East German establishments.

The mean unconditional probability of working in a leadership position is 8.14 per cent and the unconditional gender position gap is -6.08 percentage points (see Table 1 for descriptive statistics). Using the results from specification (4) with establishment fixed effects, the gender position gaps (GPG) are $GPG^{EQ} = \beta_F = -5.65$ percentage points in establishments with a more equal composition of the workforce, $GPG^{MDW} = \beta_F + \beta_F^{MDW} = -0.0565 + 0.0335 = -2.30$ percentage points in establishments with male-dominated workforces, and $GPG^{FDW} = \beta_F + \beta_F^{FDW} = -0.0565 - 0.0093 = -6.58$ percentage points in establishments with female-dominated workforces. The differences in the gender position gaps between the three establishment types are statistically significant. Although women have lower probabilities to be in a leadership position than men in all three establishment types, this disadvantage is lower in male-dominated establishments and slightly larger in female-dominated establishments than in establishments with a more equal gender composition. Thus, women seem to have even worse career prospects than men if the female share of the workforce is larger.

From the above results, we have learned that the gender gap in holding leadership positions is larger in establishments with a larger female share of the workforce. Since career-orientated women might lose from working in female-dominated establishments and benefit from working in male-dominated establishments, the establishment fixed effects wage regressions have been performed separately for workers in non-leadership positions (1,064,911 observations of whom 42.9 per cent are female) and workers in leadership positions (94,387 observations of whom 23.1 per cent are female). The results in Table 3 reveal noteworthy differences between the two groups. Whereas the gender wage gap among workers in non-leadership positions is significantly smaller in male- and female-dominated establishments than in establishments with more equal gender compositions, the gender wage gap

TABLE 3
WAGE REGRESSIONS FOR WORKERS IN NON-LEADERSHIP AND LEADERSHIP POSITIONS

	<i>In non-leadership position (n = 1064911)</i>	<i>In leadership position (n = 94387)</i>
Female (β_F)	-0.1267*** (0.00166)	-0.1208*** (0.00462)
Female \times male-dominated workforce (β_F^{MDW})	0.0288*** (0.00283)	0.0165 (0.01052)
Female \times female-dominated workforce (β_F^{FDW})	0.0246*** (0.00446)	-0.0218 (0.01332)

Source: GSES 2006.

Notes: Ordinary least squares wage regressions with establishment fixed effects for workers in non-leadership and leadership positions. Control variables included as in Table 2. Robust standard errors clustered at establishment level in parentheses. Coefficients are significant at * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

among workers in leadership positions is smaller in male-dominated establishments and larger in female-dominated establishments than in establishments with more equal gender compositions. This finding points again to benefits for career-orientated women in establishments with male-dominated workforces and to monetary losses in establishments with female-dominated workforces.

4 CONCLUSION

The main results of the econometric analysis are that (i) the gender wage gap for workers in non-leadership positions is smaller in establishments with male- and female-dominated workforces than in establishments with a more equal gender composition of the workforce, (ii) the gender wage gap for workers in leadership positions is smallest in male-dominated establishments and largest in female-dominated establishments, and (iii) the gender gap in holding leadership positions is smallest in male-dominated establishments and largest in female-dominated establishments. Especially noteworthy is that career-orientated women seem to benefit from working in male-dominated establishments rather than being additionally discriminated. As far as I know, Mumford and Smith (2009) and Heinze and Wolf (2010) are the only studies that explicitly estimate the impact of the female share on the within-establishment gender wage gap. Mumford and Smith (2009) report evidence from the British Workplace Employee Relations Survey 2004 that men and women earn lower wages in establishments with a higher female share. Interestingly the negative effect is larger for women than men so that the gender wage gap is larger in establishments with a higher female share. Using the linked employer–employee data set of the LIAB, Heinze and Wolf (2010) also find that establishments with a larger share of women have a larger gender (daily) wage gap. Although their estimated effects are only weak or not significant, they are in principal consis-

tent with my finding that the gender wage gap is smaller in male-dominated establishments than in establishments with female-dominated or equal-gender-composition workforces.

A caveat of my empirical analysis is that the findings for the gender gaps cannot be directly linked to the potential theoretical explanations which have been discussed in the introduction, because the used data do not comprise the necessary information to identify the different channels. Although effects with different directions are in play and only a mean effect is estimated, it can nevertheless be argued—without too much speculations—which theories are more in line with the empirical findings. Overall, the findings are not very compatible with customer, employer and statistical discrimination, because these theories predict larger gender gaps in male-dominated establishments and smaller gender gaps in female-dominated establishments. But the findings are consistent with the theory of compensating (equalizing) differentials, co-worker and supervisor discrimination that predict smaller gender gaps in male-dominated establishments and larger gender gaps in female-dominated establishments, which I have indeed found for wages among workers in leadership positions and for holding a leadership position. The results for the gender wage gap among workers in non-leadership positions is however not so clear cut, as they reveal that the gender wage gap for workers in non-leadership positions is smaller in establishments with male- and female-dominated workforces than in establishments with a more equal gender composition of the workforce and differences between male- and female-dominated establishments are small. A potential explanation for this hump shape relationship might be that customer, employer and statistical discrimination might have more relevance for the group of workers in non-leadership positions, as workers in leadership positions might have already overcome prejudices and proven to be of high quality.

From a policy perspective, the findings raise doubts whether increasing the female share of the workforce by the introduction of female quotas would automatically help to reduce gender gaps in wages and in holding a leadership position. In order to give a reliable answer to such an important question, more research is needed in order to explore the causal effects and the theoretical explanations with more precision. Promising identification strategies include the use of linked employer–employee panel data with information about working conditions (e.g. sorting, worker switches between establishments, changes of female share and working conditions over time) and natural experiments (e.g. changes in institutional arrangements such as female quotas and family friendly working conditions in collective contracts).

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