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Gender, Worker Representation and the Profitability of Firms in Germany

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Abstract: Recent research has shown that the unexplained gender wage gap is smaller in establishments where a works council is present. The finding raises the question of whether establishment-level codetermination reduces gender wage discrimination or whether it reduces a wage differential that reflects productivity differences between men and women. This study addresses the question by examining the association between the share of female employees and profitability. Using data from manufacturing establishments, the empirical analysis suggests that there is a positive association between the share of women and profitability in establishments without a works council while there is no association in establishments with a works council. These results support the hypothesis that establishment-level codetermination reduces gender-specific wage discrimination.

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1. Introduction

Education and labor force participation of women have been increasing in Germany (Legewie and DiPrete 2009, Eichhorst and Thode 2010). However, there is still a substantial unexplained gender wage gap. While the gap varies from study to study, there appears to be little doubt that it exists. For example, Holst and Busch (2008) estimate for the year 2006 an unexplained gender pay gap of 17 percent among full-time employees.[1] Recent research shows that the gap differs between employers. This fits Groshen's (1991) general hypothesis that employers often have discretion in setting wages and, hence, pursue their own remuneration policy. Importantly, there is evidence that establishment-level codetermination plays a role. The unexplained gender pay gap is substantially smaller in establishments where a works council is present (Gartner and Stephan 2004, Addison et al. 2010, Heinze and Wolf 2010). This finding fits the notion that works councils reduce intra-establishment wage inequality to increase solidarity within the workforce and, hence, to strengthen workers' bargaining power.

The question at issue is whether the reduction in the gender pay gap can be seen as a decrease in wage discrimination or whether it can be viewed as a decrease in a wage differential that reflects productivity differences. Based on data from manufacturing establishments, this study makes a first attempt to answer this question by examining the determinants of profitability. The basic idea is that the two points of view have different implications for the link between the share of female employees and the establishment's profitability.

If the unexplained gender wage gap solely reflects differences in unobserved productivity characteristics of men and women, the proportion of female employees should have no influence on profitability. This should hold specifically for establishments without works councils as those establishments face less restriction in downward adjusting women's wages to women's lower productivity. By contrast, there should be a negative relationship between the share of female employees and profitability in establishments with works councils. Reducing a productivity-related gender pay gap means that works councils increase women's wage beyond women's productivity. Hence, if a codetermined establishment employs a high share of women, it has a high share of employees who receive wages above their productivity.

Yet, if the unexplained gender pay gap also reflects discrimination, women receive wages below their productivity. Establishments employing a high share of female employees should earn higher profits as they have a high share of workers who are paid below their productivity. This should hold particularly for establishments where no works council is present. Those establishments are subject to less regulation and, hence, have more opportunities for wage discrimination. By contrast, opportunities for discrimination are more limited in establishments with works councils. To the extent works councils reduce the discriminatory gender pay gap, the labor cost of women will rise. Hence, we should observe that the positive link between the proportion of female employees and profitability is attenuated in codetermined establishments.

The empirical results of this study provide support for view that works councils reduce wage discrimination. The estimates show a positive link between the share of women and profitability in establishments without a works council but no significant

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[1] See also the studies by Black et al. (1999), Brookes et al. (2001) and Hubler (2005).

link in establishments with a works council. Moreover, the estimates confirm that works councils themselves are positively associated with profitability. This finding conforms to theoretical analyses suggesting that works councils contribute to increased performance by creating trustful industrial relations. Altogether the empirical results of our study fit the notion that establishment-level codetermination decreases profits that are due to discrimination while it increases profits that are due to cooperative employer employee relations.[2] Reducing discriminatory wage inequality is likely to contribute to increased cohesiveness among workers. This in turn strengthens the power of a works council to build trustful and cooperative industrial relations within the establishment.

Finally, the results show that the method of pay plays a role in the association between the share women and the profitability of the establishment. The association is attenuated if the establishment uses piece rates to provide incentives for workers. This result complements evidence of a smaller gender pay gap for workers receiving piece rates (Jirjahn and Stephan 2004). Piece rates are based on a relatively objective measurement of worker performance. As workers are rewarded for the units of produced output, superiors have little discretion in performance measurement. Thus, piece rates provide less scope for favoritism and discrimination.

The rest of the article is organized as follows. Section 2 provides the background discussion. Section 3 describes the data and the variables. Section 4 presents the results. Section 5 concludes.

2. Background Discussion
2.1 Works Councils in Germany
German industrial relations are characterized by a dual structure of employee representation with both works councils and unions (Hubler and Jirjahn 2003). While unions negotiate over wage rates and general aspects of employment contracts on a broad industrial level, works councils provide a highly developed mechanism for establishment-level participation.[3] Their rights are defined in the Works Constitution Act (WCA), which was introduced in 1952 and amended in 1972, 1989 and 2001. Workers in any establishment with five or more employees may elect council members but the creation of the council depends on the initiative of the establishment's employees. Hence, councils are not present in all eligible establishments. Works councils negotiate over a bundle of interrelated establishment policies. On some issues they have the right to information and consultation, on others a veto power over management initiatives and on still others the right to coequal participation in the design and implementation of policy. Works councils are institutionalized bodies of worker representation that have functions that are distinct from those of unions. They do not have the right to strike. If council and management fail to reach an agreement, they may appeal to an internal

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[2] This examination is the first study that uses profitability estimates to analyze the role establishment-level codetermination plays in the reduction of gender-specific discrimination. Several studies examined the link between works councils and profitability (Jirjahn 1998, Addison et al. 2001, Dilger 2002, Mohrenweiser and Zwick 2009, Mueller 2011). However, those studies didn't consider the interaction effect of works councils and the share of women on profitability. Hence, they didn't take into account that works councils can have different effects on different types of profitability (profits due to discrimination versus profits due to cooperation).

[3] Note that collective agreements define minimum standards. Covered firms are free to pay higher wages.

arbitration board or to the labor court. Moreover, the WCA does not allow wage negotiations. The aim is to restrict distributional conflicts on the establishment level. Rather works councils are designed to increase joint establishment surplus. Council representatives are required by law to cooperate with management "in a spirit of mutual trust . . . for the good of the employees and of the establishment."

There are two major explanations as to why works councils may play the intended role in building cooperative and trustful industrial relations within establishments. First, works councils as a collective voice institution can potentially aggregate worker preferences and solve free-rider problems in the case of workplace public goods (Freeman 1976). They can communicate aggregated worker preferences to management, helping to optimize the provision of workplace public goods and to establish an effective personnel management that in turn motivates workers. Second, works councils can foster cooperation and motivation by solving commitment problems (Smith 1991, Freeman and Lazear 1995, Kaufman and Levine 2000, Hogan 2001, Osterloh and Frey 2006). Employees may refuse cooperation when an employer cannot credibly commit to take into account their interests. Providing works councils with codetermination rights is one way to protect the interests of the workforce and to cooperatively realize mutual gains for the employees and the owners of the establishment. Indeed, recent empirical studies confirm that works councils can increase productivity and reduce personnel turnover (Addison et al. 2001, Frick and Moeller 2003, Smith 2006, Jirjahn et al. 2011).[4]

However, there is also evidence that works councils have an influence on the level and the structure of wages. Though wage negotiations between council and management are not authorized by law, the presence of a works council is associated with a higher average wage level per employee (Addison et al. 2001) and a reduced intra-establishment wage differential between skilled and unskilled workers (Hubler and Meyer 2001, Jirjahn and Kraft 2010). On the one hand, this may reflect rent-seeking activities. The council may use its codetermination rights on social or personnel matters to obtain employer concessions on issues where it has no legal powers. If the employer and the works council fail to reach an agreement in informal wage negotiations, the council can threaten to be uncooperative in areas where its consent is necessary. On the other hand, the available evidence does not support the view that rent seeking plays the dominant role in the functioning of establishment-level codetermination (Frick 2008). Recent research suggests that works councils do not inhibit investment (Hubler 2003, Addison et al. 2007). Quite the contrary, recent studies provide evidence that works councils are associated with increased innovativeness (Askildsen et al. 2006, Jirjahn and Kraft 2011) and higher profitability (Mueller 2011).[5] Moreover, findings by Jirjahn and Kraft (2007) indicate that a reduction in wage inequality is important for the performance-enhancing role of works councils. The positive effect of works councils on productivity appears to

[4] Jirjahn (2011) provides a survey on the research in this area.
[5] Earlier studies on works councils and profitability used subjective profitability evaluations of managers as dependent variable (e.g., Jirjahn 1998, Addison et al. 2001, Dilger 2002). Those studies usually found a negative link between works councils and profitability. Mueller (2011) shows that regressions based on subjective profitability variables yield several implausible results. Using an objective profitability variable, he finds a positive association between works councils and profitability. Mohrenweiser and Zwick (2009) also obtain a positive link.

be stronger if the intra-establishment wage differential between skilled and unskilled workers is smaller. This fits the notion that works council reduce wage inequality to increase cohesiveness and solidarity among workers. This in turn can lead to a more successful worker representation and, hence, strengthens the power of works councils to build trustful and cooperative industrial relations.

2.2 Works Councils and the Gender Pay Gap
Most importantly in our context, recent studies show that works councils have an influence on the intra-establishment gender pay gap (Gartner and Stephan 2004, Addison et al. 2010, Heinze and Wolf 2010). Using linked employer-employee data, the studies find that establishments with a works council have a smaller unexplained gender wage gap than those without a council. This means that works councils disproportionately raise the wages of women. While reducing gender wage inequality may help to increase solidarity within the workforce, there remains the issue of interpreting the negative link between codetermination and the gender wage gap in more detail. The interpretation crucially depends on the nature of the gap. One view is that the unexplained gender wage gap is due to unobserved productivity differences between men and women. According to this view, lower wages of female workers reflect women's lower productivity. Hence, holding differences in unobserved productivity characteristics constant, a reduction in the gender pay gap through codetermination would imply an increase in women's wages beyond their productivity. An alternative view is that discrimination also plays a role in the unexplained gender wage gap. According to this view, women are paid wages below their productivity. Hence, narrowing the gender pay gap through codetermination would reflect a decrease in the gap between women's wages and their productivity.

Returning to the first view point, there are several potentially relevant differences between men and women that are often not fully accounted for in examinations on the gender wage gap. Ichino and Moretti (2009) present evidence on biological gender differences. Their study suggests that women have higher rates of absenteeism due to menstruation. Higher absenteeism in turn results in lower wages. Furthermore, there are differences in psychological attributes between men and women (Bertrand 2011).[6] Women appear to be more risk averse than men (Dohmen et al. 2011). To the extent risk-averse workers receive lower wages, gender differences in risk aversion may partially explain the gender wage gap (Anh et al. 2011). Women also seem to have less a taste for competition even when controlling for risk attitudes (Niederle and Vesterlund 2007). While men increase their performance in competitive environments, the reverse holds true for women (Gneezy and Rustichini 2004, Paserman 2007). Finally, women's disproportionate responsibility for family appears to negatively affect their productivity. Although both parents are eligible for parental leave in Germany, 98 percent of those on leave are women. Child-related employment breaks are associated with a depreciation of human capital and are likely to be interpreted as a signal for low labor force attachment. As a consequence, those breaks are associated with a substantial wage loss (Beblo et al. 2009). Yet, even when both spouses work, women remain disproportionately

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[6] Gneezy et al. (2008) and Booth and Nolen (2009a, 2009b) provide evidence that socialization processes play an important role in these differences.

responsible for household production and, hence, require more flexibility between work and home (Heywood and Jirjahn 2002, 2009, Cornelissen et al. 2008). For example, they are more likely to take time off for illness of a child. While employer-provided family friendly practices may improve the work-family balance, women have to pay for costly practices through lower wages (Heywood et al. 2007).

However, there is also evidence of gender discrimination in the labor market. Building on Becker's (1957) theory of preference-based discrimination, one can argue that discrimination is due to prejudices of male owners or superiors against female employees. Relatedly, Akerlof and Kranton's (2000) approach of gender identity can be applied. Male managers may view it as a threat to their own gender identity if they employ women and pay them high wages. Hence, they may feel the need to mistreat female subordinates to rebalance utility. Empirical research confirms that gender identity can play a role. Rudman and Fairchild (2004) find that women who self-promote in a stereotypically masculine way are perceived to be socially less competent. Bowles et al. (2007) show that men are more willing to work with women who simply accept wage offers than with women who attempt to negotiate for higher wages. If women start negotiations, this may be viewed as a violation of norms of politeness that socially less powerful employees have to abide by.[7]

A simple way to avoid the threat to men's gender identity would be to avoid hiring women. Goldin and Rouse (2000) provide evidence of gender discrimination in the hiring process. They examine the recruitment of musicians for orchestras. Goldin and Rouse show that blind auditions that conceal the candidate's identity from the jury foster the impartiality in hiring and increase the proportion of women in symphony orchestras. This suggests that there is a gender bias if the jury knows the identity of the candidates. Of course, labor market discrimination can occur in a variety of ways, not only via discriminatory hiring decisions but also via discriminatory treatment of women within establishments.

Performance evaluation can be one channel of discrimination within establishments. Incentive schemes such as promotions, merit pay, and piece rates are based on different performance measures. Performance measures can be divided into objective and subjective measures (Baker et al. 1988). Objective measures such as the quantity of produced output involve a relatively low degree of discretion and can be easily verified. Hence, there is little scope for discrimination. Indeed, Jirjahn and Stephan (2004) provide German evidence that the unexplained gender pay is reduced when workers are paid piece rates. Subjective performance measures, such as performance appraisals by superiors (e.g. evaluations of a worker's cooperativeness) entail a substantial degree of discretion that opens the door for favoritism and discrimination (Laffont 1990, Prendergast and Topel 1996). Maas and Torres-Gonzalez (2011) provide experimental evidence that women expect a less favorable outcome of a subjective

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[7] Lalive and Stutzer (2010) provide evidence of a link between gender identity and the gender wage gap in Switzerland. They consider communities that differ in how they voted in a national referendum on an equal rights amendment to the Constitution. Lalive and Stutzer argue that traditional gender roles are more pronounced in communities where a low share of people agreed with the proposition "women and men shall have the right for equal pay for work of equal value." Their results indeed show that the gender pay gap is higher in communities where only a small share of people supported the equal rights amendment.

evaluation process when the evaluator is a man.[8] They don't expect that the outcome of an objective evaluation process depends on the evaluator's gender.

Job evaluation provides a further channel for intra-establishment wage discrimination (Lazear 1995: p. 102). Workers' wages depend on the jobs they hold as jobs differ in the contribution to the output of the establishment. The goal of job evaluation is to determine the importance of the various jobs for production. However, there is evidence of a gender bias in job evaluation. Even if female-dominated and male-dominated jobs require the same skill and responsibility, they are often not ranked identically by evaluators. Male-dominated jobs are often ranked more highly than female-dominated jobs (Hornsby et al. 1987, Rynes et al. 1989, Alksnis et al. 2008).

Altogether, there is a whole bundle of potential reasons for the gender wage gap. As a consequence, works councils can potentially reduce the gap in several ways. A works council may use its bargaining power to negotiate disproportionately higher wages for women. Alternatively the council may influence the process of performance evaluation or the process of job evaluation in such a way that the gender pay gap is reduced. The basic question is now whether the narrowing of the gap primarily reflects the decrease in a discriminatory wage differential or whether it primarily reflects the decrease in a wage differential that is due to differences in productivity. In what follows, I build on an idea by Hellerstein et al. (2002) to answer this question. Evidence on the role of wage discrimination can be obtained by examining the association between the share of female employees and the establishment's profitability. The evidence obtained from this approach can be more informative than what we can learn from analyzing wage regressions. Individual-level data sets used to estimate wage differentials between male and female employees contain only proxies for workers' productivity. Hence, we never can be sure if a residual gender-wage gap reflects discrimination or unobserved productivity differences.

2.3 Implications for the Profitability of Establishments

Let us first consider the situation that gender differences in unobserved productivity characteristics solely play a role. If no works council is present, the employer can downward adjust women's wage to women's lower productivity so that the unexplained gender wage gap reflects gender differences in productivity. As a consequence, we should observe no relationship between the gender composition of the workforce and the profitability of the establishment. Employing a high share of male workers would mean that the establishment has both higher productivity and higher labor cost. Employing a low share of female workers would mean that the establishment has both lower productivity and lower labor cost. By contrast, we should observe a negative relationship between the share of women and profitability if a works council is present in the establishment. As the works council reduces the gender wage gap by increasing women's wages beyond their productivity, employing a high share of female workers would mean that the establishment employs a high share of workers whose labor cost is not offset by their productivity.

Let us now consider the situation that gender discrimination also plays a role.

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[8] Elvira and Town (2001) provide evidence of a race bias in performance evaluations. White supervisors rate black subordinates lower, while black superiors rate white subordinates lower.

This situation has implications different from those following from the previous situation. If no works council is present, the employer is subject to less regulation and, hence, has more opportunities for discrimination. This implies a gap between women's wages and women's productivity. Hence, employing a high share of women would mean that the employer has a high share of employees whose productivity exceeds their labor cost. As a consequence, we should observe a positive relationship between the share of female employees and the establishment's profitability. Yet, if a works council is present, opportunities for wage discrimination are more limited. The works council may contribute to more objective performance and job evaluations. Moreover, it may specifically help women if they don't have to negotiate individually over wages and, hence, don't have to violate gender-specific norms of politeness. Reducing the discriminatory gender pay gap implies that women's wages are closer to their productivity. Hence, there should be a less strong or even no relationship between the share of female workers and the establishment's profitability.

Of course, we may imagine a third situation characterized by some kind of overshooting. If no works council is present, there would be again a positive link between the share of women and profitability due to wage discrimination. However, if a works council is present, the council may increase women's wages to such an extent that they exceed women's productivity. Hence, we would observe a negative association between the share of women and profitability for establishments with works councils.

3. Data and Variables
3.1 The Data Set
The empirical analysis uses data from the Hanover Panel (Gerlach et al. 2003). This is a four-wave panel with data from manufacturing establishments in the federal state of Lower Saxony. The population of the survey consists of all manufacturing establishments with five or more employees. The Hanover Panel was financed by the Volkswagen Foundation. Interviews were conducted by Infratest Sozialforschung, a professional survey and opinion institute. The data were collected on the basis of a questionnaire in personal interviews with the owner, top manager or head of the personnel department. In the first wave (fall 1994), 51 percent of the establishments in the sample agreed to participate. In spite of this non-response rate the data are representative of the manufacturing establishments in Lower Saxony in 1994 and in the subsequent years. Apart from basic information on the establishment additional topics were covered in successive waves.

In this study, I examine the determinants of profitability for the year 1994. This is the only year for which all relevant variables are available. The second wave of interviews provides retrospective information on profitability for 1994. Information on the explanatory variables in 1994 is taken from the first wave.

3.2 Variables and Empirical Strategy
Table 1 shows the definitions and descriptive statistics of the variables used. Building on Hellerstein et al. (2002), I define profitability as operating income (sales – labor costs –

material costs) divided by sales.[9] This proxy of profitability can be interpreted as a price cost-margin. The regression equation is

$$\ln y_i = \alpha_0 + \alpha_1 \text{Works Council}_i + \alpha_2 \text{Women}_i + \alpha_3 \text{Women}_i * \text{Works Council}_i + \boldsymbol{\beta}' \boldsymbol{x}_i + u_i, \quad (1)$$

where y_i is establishment i's profitability, Works Council_i a dummy for the presence of a council, Women_i the share of female employees, $\text{Women}_i * \text{Works Council}_i$ the interaction of gender composition and codetermination, $\boldsymbol{x}_i$ the vector of control variables and u_i the error term. The vector of control variables includes variables for establishment size, establishment age, industry affiliation, presence of active owners, collective bargaining coverage, use of piece rates, use of overtime, and market strategy. It also includes variables for the proportions of apprentices, skilled blue-collar workers, university graduates, temporary workers and part-time employees. As a further robustness check I also present regressions that account for possible interactions between the share of women and specific control variables.

The coefficients α_2 and α_3 are the coefficients of primary interest. If productivity differences between men and women play the only role in the unexplained gender wage gap, coefficient α_2 should be zero while coefficient α_3 should be negative. There would be no relationship between the share of women and profitability in establishments without a works council and a negative relationship in establishments with a works council. Yet, if discrimination also plays a role in the unexplained gender wage gap, α_2 should be positive and α_3 should be negative. If no works council is present, this implies a positive association between the share of women and profitability. If a works council is present, the association is reduced.

4. Empirical Results
4.1 Basic Estimates
Table 2 presents the regression results. The initial estimates shown in column (1) do not take into account interaction effects. The variables for the share of apprentices and the share of university graduates take statistically significant coefficients. A higher share of apprentices is associated with reduced profitability while a higher share of university graduates is associated with increased profitability. All of the other explanatory variables do not emerge with statistically significant coefficients. However, the pattern of influences may remain obscured until interaction effects have been considered.

Regression (2) accounts for possible interactions of gender composition with industrial relations. While the regression provides no evidence of an interaction with collective bargaining coverage, it reveals that the share of female employees interacts negatively with the presence of a works council. Moreover, the positive coefficient on the share of female employees is now statistically significant. The results imply a positive link between the share of women and profitability if no works council is present. In this case, a 10 percentage point higher proportion of women is associated with an increase in profitability by about 4 percent. This conforms to the hypothesis that there is gender-

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[9] However, the Hannover Panel provides no information on inventory accumulation.

specific wage discrimination in establishments without a works council. In contrast, the pattern of results provides no evidence that the gender composition of the workforce is associated with profitability in codetermined establishments. The coefficient on the share of women is positive and the coefficient on the interaction of gender composition with works council incidence is negative. An F test cannot reject the null hypothesis that the sum of the two coefficients is equal to zero. This result fits the hypothesis that works councils reduce discrimination to increase solidarity within the workforce and, hence, to increase workers' bargaining power.

Interestingly, the dummy variable for the presence of a works council takes a significantly positive coefficient. This does not support the view that rent seeking activities of works councils play the dominant role. Quite the contrary, the result conforms to the hypothesis that works councils contribute to increased performance by creating cooperative industrial relations within establishments. Altogether, the findings suggest that works councils reduce profits that are due to discrimination and increase profits that are due to cooperative employer employee relations. As the profits that are due to discrimination are increasing in the share of female employees, the total effect of establishment-level codetermination on profitability depends on that proportion. Let us consider an establishment where the share of women is equal to zero. In this establishment, the presence of a works council is associated with an increase in profitability by about 21 percent (0.2074 – 0 x 0.7326 = 0.2074). Next, let us consider an establishment with 30 percent of female employees. This is roughly the average share of women in our sample. In this case, the presence of a council is associated with a modest increase in profitability by about 1 percent (0.2074 – 0.3 x 0.7326 = 0.01238). Finally, let us consider an establishment where 50 percent of all employees are women. In this establishment the total effect would be negative and would imply a decrease in profitability by about 16 percent (0.2074 – 0.5 x 0.7326 = –0.1589).

In regression (3), we add a variable for the interaction of gender composition with the use of piece rates. Previous research has shown that piece rates are associated with a reduced gender wage gap (Jirjahn and Stephan 2004). Piece rates may limit discrimination as they are based on a relative objective measurement of worker performance. The estimates provide support for this hypothesis as they show that the link between gender composition of the workforce and profitability attenuates in establishments using piece rates. Most importantly, accounting for the interaction of gender composition and piece rates does not change the pattern of results on our key variables.

Finally, further interaction variables are taken into account. Women are disproportionately employed in part-time jobs. Against this background, a dummy variable for a possible interaction of works councils with the share of part-time employees is included. This allows examining if works councils reduce gender-specific discrimination in general or if there is a specific influence on part-time employees. Furthermore, it is often argued that product market competition may have an influence on the degree of discrimination. While there are different modes of competition, market shares usually play an important role for competing firms. Thus, in order to examine the influence of competition, the share of female employees is interacted with the variable measuring an expansive market strategy of the establishment. As shown in column (4), the two additional interaction variables do not emerge with significant coefficients. Most

importantly, even the inclusion of these interaction variables does not change the pattern of our key results.

4.2 Potential Endogeneity of Works Council Incidence

If there are unobserved factors influencing both the incidence of a works council and the profitability of the establishment, the estimates would suffer from an omitted variable bias. The endogeneity of works council incidence would also result in biased estimates of the interaction of works councils with the share of women. Recent studies find that works councils are more likely to be adopted in establishments with a poor sales situation or poor employment growth (Kraft and Lang 2008, Jirjahn 2009, Addison et al. 2009, Mohrenweiser et al. 2011). If the establishment faces a financial crisis, a council may help workers to protect the quasi rents they have created by their efforts or human capital investments. Similarly, workers may be more interested in a council when there are inefficiencies due to poor management (FitzRoy and Kraft 1987). Hence, if the economic or managerial situation of the establishment is not fully accounted for in a simple OLS regression, the performance-enhancing effect of works councils is underestimated as the coefficient on the works council variable partially reflects poor economic conditions or incompetent management. Productivity estimates by Mueller (2009) and employment growth estimates by Jirjahn (2010) provide evidence of such downward bias. In their studies, the estimated effects of works councils on productivity and growth are larger if the endogeneity of works council incidence is accounted for. However, Mueller (2011) finds no evidence of an endogeneity problem in his examination on works councils and profitability.

In this study, I run an endogenous switching regression model to investigate the potential issue of omitted variable bias. Applying a switching model has the further advantage that we can analyze if the link between female employees and profitability differs between establishments with and without works councils. This provides an alternative way to examine the interaction of establishment-level codetermination and gender composition of the workforce. Table 3 shows the results. The determinants of works council incidence and the determinants of profitability in establishments with and without councils are jointly estimated using full information maximum likelihood (FIML).[10] In principle, identification of the endogenous switching model is ensured by the inherent nonlinearity of the model. As additional identifiers, I use the variables that are no significant determinants in the regressions of Table 2. Of course, finding convincing exclusion restrictions is always a matter of debate. Hence, I view the estimates rather as an exploratory analysis. Nonetheless the analysis yields two interesting insights. First, the likelihood ratio (LR) test of independent equations does not reject the hypothesis of exogeneity. Hence, this model provides no evidence of an omitted variable bias in the profitability estimates. This finding accords with the study by Mueller (2011). Second, the switching regression confirms the key result. In establishments without works councils, there is a positive link between the share of women and profitability. No significant link can be found in establishments with works councils.

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[10] I use a program written by Lokshin and Sajaia (2004).

5. Conclusions

In a survey article on new perspectives on gender, Bertrand (2011) stresses that over the last ten years new classes of explanations have been developed to explain gender differences in labor market outcomes. Specifically, there appears to be a rising popularity of psychological explanations. Against this background, it might seem that considering discrimination is a thing of the past. However, this study suggests that discrimination can play an important role in the labor market outcomes of women. Moreover, it provides evidence that labor market institutions have an influence on the extent of discrimination. The study is motivated by recent research showing that the residual gender wage gap is smaller in codetermined establishments. Building on an idea by Hellerstein et al. (2002), it examines the relationship between the share of women and the profitability of establishments to obtain further insights into the nature of the gender wage gap. The estimates show that there is a positive relationship in establishments without codetermination but not in establishments with codetermination. This suggests that the narrowing of the gender wage gap through works councils reflects a reduction in gender-specific wage discrimination.

Finally, I recognize the need for continued research within this theme. First, the focus of this study is on manufacturing establishments in the federal state of Lower Saxony. The analysis could be fruitfully extended to other industries and federal states. This would allow one to examine whether the effects of gender and codetermination also depend on regional influences and the type of industry. Second, it would be interesting to extend the analysis to the period after the 2001 amendment of the Works Constitution Act. This would allow investigation of whether the amendment had an influence on the role works councils play in the reduction of gender wage discrimination. Third, it would be interesting to distinguish between women with different levels of qualification. One could examine whether works councils reduce discrimination of women in general or whether they only reduce discrimination of specific groups of women. Fourth, future research should consider women in different layers of hierarchy. This would allow one to examine if works councils have an influence on the glass ceiling within establishments.

Table 1: Descriptive Statistics of the Explanatory Variables

Variable	*Definition (Mean, Std.dev.)*
Ln Profitability	Log [(sales – material costs – wage bill)/sales] (-1.306, .6524).
Women	Women as a proportion of total employees (.2874, .2290).
Works council	Dummy variable equal to 1 if a works council is present in the establishment (.6075, .4887).
Collective bargaining	Dummy variable equal to 1 if the establishment is covered by a collective bargaining agreement (.6810, .4665).
Part-time employees	Part-time employees as a share of total employees (.0817, .1126).
Skilled blue-collar workers	Skilled blue-collar workers as a proportion of total employees (.4091, .2612).
Temporary workers	Temporary workers as a proportion of total employees (.0232, .0651).
Apprentices	Apprentices as a proportion of total employees (.0458, .0641).
University graduates	University graduates as a proportion of total employees (.0344, .0516).
Establishment size	Number of total employees in the establishment (181.0, 701.2).
Establishment size squared	Number of total employees squared.
Establishment age	Dummy variable equal to 1 if the establishment was created before 1960 (.6613, .4761).
Expansion plan	Dummy variable equal to 1 if management plans to increase the market share of the establishment (.5376, .4990).
Overtime	Dummy variable equal to 1 if blue-collar workers do overtime (.7097, .4543).
Active owner	Dummy variable equal to 1 if active owners are present in the establishment (.6541, .4761).
Piece rates	Dummy variable equal to 1 if the establishment uses piece rates in its production departments based on individual performance (.1272, .3335).
Industry dummies	Three broad dummy variables for primary and producer good industries, investment goods industries and consumer goods industries. The reference group comprises food, beverages and tobacco industries.

N = 558

Table 2: Determinants of Profitability

Explanatory Variable	(1)	(2)	(3)	(4)
Constant	-1.336 (.1224)***	-1.380 (.1356)***	-1.384 (.1351)***	-1.405 (.1377)***
Part-time employees	.1508 (.3051)	.0417 (.3065)	.0263 (.3054)	-.0157 (.3719)
Skilled blue-collar workers	.1348 (.1157)	.1185 (.1155)	.1168 (.1151)	.1039 (.1161)
Temporary workers	-.6004 (.4475)	-.5520 (.4462)	-.5581 (.4446)	-.5465 (.4485)
Apprentices	-1.016 (.4436)**	-.9932 (.4417)**	-.9755 (.4401)**	-.9761 (.4407)**
University graduates	1.375 (.5666)**	1.304 (.5647)**	1.257 (.5630)**	1.250 (.5637)**
Establishment size	-.00005 (.0001)	-.00005 (.0001)	-.00005 (.0001)	-.00005 (.0001)
Establishment size squared	$4 \cdot 10^{-9}$ $(8 \cdot 10^{-9})$	$4 \cdot 10^{-9}$ $(9 \cdot 10^{-9})$	$4 \cdot 10^{-9}$ $(9 \cdot 10^{-9})$	$4 \cdot 10^{-9}$ $(9 \cdot 10^{-9})$
Establishment age	-.0256 (.0609)	-.0329 (.0607)	-.0466 (.0608)	-.0456 (.0609)
Expansion plan	.0474 (.0557)	.0448 (.0556)	.0394 (.0554)	.1000 (.0889)
Overtime	.0827 (.0622)	.0882 (.0619)	.0825 (.0617)	.0868 (.0621)
Active Owner	.0078 (.0638)	-.0048 (.0637)	-.0078 (.0635)	-.0047 (.0638)
Piece rates	-.0026 (.0842)	.0104 (.0840)	.2366 (.1314)*	.2356 (.1317)*
Collective bargaining	.0283 (.0682)	-.0475 (.1056)	-.0427 (.1052)	-.0466 (.1055)
Works council	.0118 (.0707)	.2074 (.1020)**	.1782 (.1024)*	.1725 (.1031)*
Women	.2113 (.1590)	.4196 (.2264)*	.4888 (.2277)**	.5809 (.2558)**
Women x works council		-.7326 (.2770)***	-.5953 (.2827)**	-.6087 (.3207)*
Women x collective bargaining		.3115 (.2832)	.3043 (.2822)	.3290 (.2842)
Women x piece rates			-.7977 (.3570)**	-.8017 (.3595)**
Women x expansive strategy				-.2135 (.2441)
Works council x part-time employees				.0712 (.6378)
Industry dummies	Yes	Yes	Yes	Yes
R²	.0619	.0740	.0826	.0839
N	558	558	558	558

Dependent variable: LnProfitability. Method: OLS. Standard errors are in parentheses. *Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

Table 3: Endogenous Switching Regression

Explanatory Variable	Determinants of Works Council Incidence	Determinants of Profitability	
		Works Council = 0	Works Council = 1
Constant	-1.868 (.4734)***	-1.598 (.1957)***	-1.373 (.1346)***
Women	-.0886 (.4554)	.5305 (.2285)**	-.1871 (.1678)
Apprentices	-1.767 (1.216)	-1.224 (.6000)**	.0419 (.6975)
University graduates	1.753 (1.656)	1.661 (.9772)*	.9092 (.6447)
Piece rates	.5952 (.2632)**	-.0709 (.2386)	.0146 (.0820)
Part-time employees	-2.360 (.8797)***		
Skilled blue-collar workers	-.3524 (.3091)		
Temporary workers	.0600 (1.312)		
Establishment size	.0123 (.0014)***		
Establishment size squared	$-7.82 \cdot 10^{-7}$ $(1.01 \cdot 10^{-7})$***		
Establishment age	.4412 (.1554)***		
Expansion plan	-.0771 (.1553)		
Overtime	.1380 (.1658)		
Active Owner	-.5895 (.1766)***		
Collective bargaining	1.081 (.1631)***		
Industry dummies	Yes	Yes	Yes
N	558	219	339
Log likelihood	-715.59		
LR test of independent equations	$\chi^2 = 1.71$		

Method: FIML. Standard errors are in parentheses. *Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

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