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## Works Councils and Organizational Gender Policies in Germany

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**Abstract:** While education and labor force participation of women have been increased, there is still a substantial gender gap in labor market opportunities. This gives rise to the question of what factors lead employers to promote work-family balance and gender equality. We address this question by examining the influence of works councils on the gender policies of establishments in Germany. Using data of the IAB Establishment Panel, we find that the incidence of a works council is associated with an increased likelihood that an establishment provides family-friendly practices and promotes equal opportunities of men and women. This finding also holds in a recursive multivariate probit model that accounts for potential endogeneity of works council incidence.

**JEL Classification:** J13, J16, J52, J53.

**Keywords:** Non-union employee representation, works councils, gender equality, work-family balance, equal opportunities, organizational gender policies.

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## **1. Introduction**

Gender equality is a key topic in the family policy debate in many countries (European Commission 2016, United Nations Human Rights Council 2011, United Nations Office at Geneva 2016 and World Bank 2012). While education and labor force participation of women have increased, there is still a substantial gender gap in labor market opportunities (Blau and Kahn 2017). Women have more employment interruptions and shorter working hours (Albrecht et al. 1999, Cebrián and Moreno 2015, European Foundation for the Improvement of Living and Working Conditions 2013). They work in occupations that are different from those of men (European Commission 2009), receive less employer provided training (OECD 2003), and are underrepresented in leadership positions (Smith et al. 2013). Moreover, there still exists an unexplained gender wage gap. Women get paid less for the same personal and job characteristics (Arulampalam et al. 2007, Blau and Kahn 2003, Christofides et al. 2013).

On the one hand, gender differences in labor market outcomes may reflect women's disproportionate responsibility for family. This does not only imply that women have more family-related employment interruptions, but also that they need more flexibility between work and family when they participate in the labor force (Goldin 2014a, Heywood and Jirjahn 2002). Thus, they sort and are sorted into jobs that allow combining work and family. On the other hand, the gender differences may reflect stereotypes and discrimination (Becker 1957, Goldin 2014b, Goldin and Rouse 2000).<sup>1</sup> Male managers may view it as a threat to their own gender identity if they have female subordinates receiving high wages (Akerlof and Kranton 2000).<sup>2</sup> Hence, they may feel the need to mistreat their female subordinates to rebalance utility.

The gender differences in labor market outcomes give rise to the question of what factors lead employers to provide family-friendly practices and to implement policies promoting equal opportunities of men and women. We address this question by examining the influence of works councils on organizational gender policies (OGPs) in Germany. Works

councils provide a mechanism for codetermination at the establishment level. They are a key institution of nonunion employee representation in many West European countries. Compared to their counterparts in most of the other countries, works councils in Germany have acquired quite extensive powers.

Works councils are mandatory but not automatic. Their creation depends on the initiative of the establishment's workforce. Hence, they are not present in all eligible establishments. This allows us to conduct a within-country study by comparing the OGP of establishments with and without a works council. We use data from the IAB Establishment Panel. The data provide information on whether or not an establishment has implemented measures to promote the advancement of women. These measures can include, for example, mentoring programs or action plans for women. They may help overcome stereotypes and discrimination within the establishment and, thus, can contribute to equal opportunities of women and men.

Moreover, the data provide information on the use of a series of practices that enable employees to combine family and work commitments. Some practices such as support with child care help relieve employees of family responsibilities and, hence, allow them to spend more time at work. Other practices such as flextime or home office enable employees to fulfill their family responsibilities. Women are potentially the main beneficiaries of these practices as they are disproportionately responsible for family.<sup>3</sup>

Our estimates show that establishments with a works council are more likely to provide various family-friendly practices and are more likely to promote the advancement of women. These findings support theoretical considerations suggesting that works councils help overcome organizational failures in the provision of family-friendly and equal opportunity practices. The findings also hold when accounting for the endogeneity of works councils. We estimate a recursive multivariate probit model to address the issue of endogeneity. The

estimated influence of works councils is even stronger when that issue is accounted for. Our estimates suggest a negative correlation of unobserved factors influencing the incidence of a works council and unobserved factors driving the use of OGPs. One interpretation for the negative correlation is that lazy and biased managers are less likely to promote OGPs. At the same time, such poor management may induce employees to protect their interests by implementing a works council. Our results show that the positive influence of works councils on family-friendly and equal opportunity practices is underestimated if the issue of endogeneity is not accounted for.

An increasing number of studies have examined the influence of works councils on outcomes such as wages, productivity, profitability, and innovation (Jirjahn and Smith 2018). The influence of works councils on OGPs has received little attention. One exception is a study by Heywood and Jirjahn (2009). Our examination differs in at least three respects from that study. First and most importantly, we account for the endogeneity of works councils. Second, while Heywood and Jirjahn's study focuses only on family-friendly practices, our study takes a broader set of gender policies into account. Third, while Heywood and Jirjahn consider the year 2002, we provide fresh evidence for the years 2012 and 2016.

## **2. Institutional Framework**

The dual structure of employee representation in Germany involves both works councils and unions (Keller and Kirsch 2015). Collective bargaining agreements are usually negotiated between unions and employers' associations on a broad industrial level. Establishments are covered by a collective bargaining agreement if they are members of an employers' association. The share of establishments covered by firm-level agreements is small.

Works councils provide a highly developed mechanism for establishment-level codetermination. Their rights are defined in the Works Constitution Act (WCA). The WCA

mandates that works councils be elected by the workforce of establishments with five or more employees. However, while works councils are mandatory, they are not automatic. Their creation depends on the initiative of the establishment's workforce. Works councils are designed to increase joint establishment surplus rather than to redistribute the surplus. The WCA does not allow wage negotiations. Works council and employer are obliged by law to cooperate "in a spirit of mutual trust . . . for the good of the employees and of the establishment." The WCA stipulates that they shall collaborate with the serious attempt to reach an agreement and to set aside differences. If council and management fail to reach an agreement, they may appeal to an internal arbitration board or to the labor court. Works councils and employers are not allowed to engage in activities that interfere with the peace within the establishment. Works councils do not have the right to strike and employers are barred from obstructing the activities of works councils.

The powers of works councils are quite broad. They have full codetermination rights on a set of issues, including the introduction of new payment methods, the fixing of job and bonus rates, the allocation of working hours, the introduction and use of technical devices designed to monitor employee performance, and up- and down grading. In these areas management cannot take action without the agreement of the works council. The councils have less strong consultation rights in matters such as changes in equipment and working methods that affect job requirements. Their participation rights in financial and economic matters cover information provision.

Works councils also have rights in gender- and family-related matters. The WCA provides that councils shall promote both gender equality and reconciliation of work and family. Moreover, the WCA specifies a gender quota for works councilors. The gender that is in the minority within the establishment must be represented in the council at least according to its proportion of the workforce. As women, on average, account for a smaller share of

employees than men, this quota seeks to improve the representation of women in works councils.

However, it is important to note that the behavior of works councils is not completely determined by the letter of the law. Thus, their functioning cannot be immediately derived from a reading of legislation. Works councils have scope to set their own agenda and to decide which goals they pursue. Moreover, cooperativeness of the employer can influence the functioning of codetermination (Jirjahn and Smith 2006). Hence, it is an open question whether or not works councils fulfill all of the duties provided by the WCA. In the end, only empirical research can reveal the functioning of codetermination in practice.

### **3. Background Discussion**

Works councils can have an influence on OGPs for several reasons. Codetermination and information rights increase employees' bargaining power and provide opportunities to monitor the employer. This enables employees to push through work-family balance and gender equality against prejudiced employers.

Unprejudiced employers may be to some extent willing to invest in family-friendly and equal opportunity practices in order to reduce personnel turnover and increase productivity. If employees prefer a higher level of work-family balance and gender equality, they may make concessions and, for example, implicitly pay for it through higher effort. However, there can be a series of organizational failures resulting in an underprovision of family-friendly and equal opportunity practices even when the top management of the firm is unprejudiced. Employee representation has the potential to mitigate these failures by playing a collective voice role, solving commitment problems of the employer and reducing supervisor opportunism.

However, the influence of works councils on OGP's can be ambiguous. Works councils will only be positively associated with increased work-family balance and gender equality if they take the interests of female employees into account.

### *3.1 Reducing Employer Discrimination*

The information and consultation rights of the works council increase transparency within the establishment and enable the council to monitor the employer. Increased transparency makes it more difficult for a prejudiced employer to hide discrimination and puts pressure on the employer to adopt practices promoting gender equality. Moreover, the council can use its codetermination rights on social and personnel matters to negotiate equal opportunity and family-friendly practices. The council may even use its codetermination rights to obtain employer concessions on issues where it has no legal powers. If employer and works council fail to reach an agreement on those issues, the council can threaten to be uncooperative in areas where its consent is necessary. Altogether, codetermination rights increase the bargaining power of the works council. This can enable the council to push through family-friendly and equal opportunity practices against a prejudiced employer.

### *3.2 Communicating Employees' Preferences to the Employer*

Even if the employer is not prejudiced against women, organizational failures can result in a suboptimal provision of OGP's. Lack of sufficient information about employees' preferences can be one reason for a suboptimal personnel policy. Works councils may help overcome this problem by serving as a collective voice institution. This collective voice institution aggregates employees' preferences and communicates the aggregated preferences to the employer, helping optimize personnel policy (Askildsen et al. 2006, Doucouliagos et al. 2017, Freeman 1976, Freeman and Medoff 1979). Such optimization of the employer's personnel policy is unlikely



to be achieved through individual voice. If individual voice has positive external effects on other employees and each single employee has to bear the costs of bargaining with the employer, there is the classical free rider problem (i.e., a reduced incentive to exert individual voice).

Aghion and Hermalin (1990) use the example of family-friendly practices to illustrate that individual voice is also not effective in the context of OGPs. Asymmetric information can lead to a pooling equilibrium resulting in an inefficient level of family-friendly practices. Female employees differ in their probabilities of becoming pregnant and so being intensive users of family-friendly benefits, if they were to be provided. In the pooling equilibrium, neither women with low nor high probability of pregnancy express a desire for family-friendly benefits. Women with a low probability of pregnancy place low value on the benefits while women with a high probability anticipate that signaling their higher probability of using these benefits will result in employer sanctions. The sanctions can include reduced career opportunities or outright dismissals.

Such sanctions may be plausible to the extent that the employer underestimates total demand for family-friendly practices from the workforce and fears excessive use by single employees (Heywood and Jirjahn 2009). For example, maternity leave, flexible scheduling, and other practices involving fixed costs in their implementation and administration require a minimum number of employees to be efficiently provided. Assuming other employees do not reveal their preferences, each individual woman has no incentive to signal her own preference. Thus, even given a sufficiently large number of interested employees, coordination and communication problems among employees may limit their ability to jointly express this interest. The resulting inefficient equilibrium within the firm fails to provide family-friendly practices.

This inefficient equilibrium may be remedied with a collective voice institution that serves to increase communication and coordination. Aggregated preferences about family-friendly and equal opportunity practices can be among those communicated to the employer. Collective voice replaces the fear employees might have in revealing their individual preferences. Moreover, the collective voice institution provides the employer a better assessment of the value of these practices. Such better assessment is likely to increase the employer's willingness to implement the practices. Furthermore, improved communication between employees and employer can improve the structuring of the practices so that they better match the employees' needs. This makes their realization and longevity more likely.

### *3.3 Solving Commitment Problems*

The possibility of employer opportunism is a second source of organizational failure. Opportunities for employer opportunism result from incomplete labor contracts. Many of the promises made by the employer to employees are implicit. They are not explicitly spelled out in the labor contract. Thus, employees are at risk that the employer does not keep the promises and reneges on the implicit contract. The consequence of potential employer opportunism is that employees withhold effort and cooperation when the employer cannot credibly commit to take their interests into account. The codetermination rights of works councils can serve to protect employees' interests, thereby solving commitment problems of the employer (Freeman and Lazear 1995, Jirjahn 2009, 2018). Creating credible commitments of the employer increases employees' trust and, hence, fosters their motivation and cooperativeness. This enables the employer to implement a more effective personnel policy. Put differently, establishment-level codetermination provides a mechanism for negotiating human resource management practices that otherwise cannot be implemented because of lack of trust and cooperation.

Lack of trust can also play role in OGP. On the one hand, employees may anticipate that family-friendly and equal opportunity practices are implicitly coupled with an unjustified intensification of work. On the other hand, they may be concerned that the employer does not undertake the necessary investments to make the practices work. For example, there can be distrust in the quality of employer provided childcare (Peus 2006). Similarly, employees may be concerned that the employer will not assign clear responsibilities for a mentoring program and will not conduct systematic evaluation of the program. At the extreme, there is the fear that the program is purely symbolic. As a consequence, the program will have no motivational effects and does not receive support from the employees.

A works council acting as a contract enforcer helps ensure that the employer keeps the promises made about providing work-family balance and gender equality (Heywood and Jirjahn 2009). The council can make sure that family-friendly and equal opportunity practices do not entail an unjustified intensification of work and the employer undertakes the necessary investments to make the practices work. This increases employees' trust in the credibility of the practices so that the practices have stronger effects in motivating the employees. As a consequence, the employer is more interested in implementing the practices when a works council is present.

### *3.4 Reducing Supervisor Opportunism*

So far we have considered the simple employer-employee dichotomy. However, the issue of opportunism goes beyond this dichotomy. Information asymmetries imply that supervisors at various levels of hierarchy within the firm have discretionary power, allowing them to pursue their own goals. Supervisors can use their discretion for favoritism, hoarding authority or extracting private services such as flattery or loyalty to their career from subordinates.

Supervisor opportunism can also play a role in family-friendly and equal opportunity practices. Supervisors may not allow their subordinates to use family-friendly practices (e.g., flexible hours) even when formally offered by the employer (Eaton 2003). Similarly, equal opportunity practices (e.g., mentoring programs) may leave scope for opportunism and discrimination by supervisors. Supervisors may still have discretion in evaluating the performance of male and female subordinates (Castilla 2008, Castilla and Benard 2010). Equal opportunity practices can even have unintended adverse effects. They can give the impression of objectivity hiding biased evaluations of supervisors.

Employee representation through works councils reduces supervisor opportunism as it provides a channel for monitoring supervisors and enables communication between employees and top decision makers that is not filtered by immediate supervisors (Kaufman and Levine 2000, Smith 1991). This increases procedural fairness and employees' trust in organizational gender policies so that these policies are more effective (Heywood and Jirjahn 2009).

### *3.5 Representing Women's Interests*

However, a positive influence of works councils on gender equality requires that councils take the interests of women into account. On the one hand, one might argue that the agenda of a works council rather reflects concerns of dominant groups within the establishment – male, full time, native-born employees. These characteristics traditionally have been viewed as those of the 'universal employee'. This would suggest that women fall more or less outside the scope of works councils.

On the other hand, a works council may foster notions of fairness and solidarity within the workforce to increase cohesiveness (Jirjahn and Kraft 2007, Levine 1991). Increased cohesiveness means that the council obtains the support necessary for strengthening its bargaining power and, hence, for a successful representation of employee interests. Thus,

notions of fairness and solidarity could imply that the works council to some extent accounts for women's interests and promotes work-family balance and gender equality even if it represented mainly the interests of male employees.

Furthermore, it has to be taken into account that the WCA provides a gender quota for works councilors. A gender quota may facilitate strategies of particular interest to women and could result in a gendered bargaining agenda (Dickens 2000, Heery 2006, Kirsch and Blaschke 2014). However, the presence of women among works councilors does not guarantee that the works council promotes gender equality. There is a difference between 'being there' and 'making a difference' (Cockburn 1989, Cunnison and Stageman 1993). Securing access to positions for women does not necessarily alter the rules and culture of industrial relations within the establishment. Men might still hold power within the works council. Experimental evidence suggests that women are less likely to initiate negotiations and are treated differently when they attempt to negotiate (Bertrand 2011). This may reflect that women are less socially accepted when they behave in a stereotypically masculine way.

Altogether, works councils have the potential to promote family-friendly and equal opportunity practices. However, it is an open question whether or not they take the interests of women into account. This brings us to our empirical analysis of the influence of works councils on OGP.

## **4. Data and Variables**

### *4.1 The Data*

We draw data from the IAB Establishment Panel. This is a representative sample of establishments from all sectors in the German economy. The sample is stratified according to establishment size, industry and federal state. Note that we include variables for the stratification characteristics in the estimations so that we do not need to use weighted

regressions (Winship and Radbill 1994).

The IAB is the research institute of the German Federal Employment Agency. The institute contracts with Infratest Sozialforschung, a professional survey and opinion research institute, to conduct the interviews. The data are collected on the basis of a questionnaire and follow-up personal interviews with the owner or top manager of the establishment. Each year since 1993 (1996), the IAB Establishment Panel has surveyed several thousand establishments in Western (Eastern) Germany. Basic information on the establishment and a core set of questions are asked annually. Additional topics are introduced in specific waves.

We pool data from the waves 2012 and 2016. These waves provide detailed information on family-friendly and equal opportunity practices. We exclude non-profit organizations and the public sector. Furthermore, as the WCA only applies to establishments with at least five employees, the analysis is restricted to establishments meeting this minimum size.

#### *4.2 Dependent Variables*

Table 1 provides definitions and descriptive statistics of the dummy dependent variables. Under the heading ‘equal opportunities’, the survey asks if the establishment has implemented measures to promote work-family balance and equal opportunities of men and women.

Directly related to equal opportunities, the survey provides information on whether the establishment has implemented measures to promote the advancement of women. These measures can, for example, include, mentoring programs, training of female employees, action plans for women, and plans to increase the share of female employees. This may help overcome stereotypes and discrimination of women within the establishment.

Moreover, the survey provides information on a series of family-friendly practices, namely support with child care, flexible work schedules for employees with care responsibilities, provision of support to employees with relatives needing care, provision of

support to employees on parental leave, and participation in a network of family-friendly companies. Women are potentially the main beneficiaries of these practices as they are disproportionately responsible for family.

Support with child care can include the provision of on-site child care, cooperation with child care facilities or financial contributions towards child care. Support with child care helps relieve employees of family responsibilities and, hence, allows them to spend more time at work (Heywood et al. 2007). By contrast, flexible work arrangements such as flextime (flexibility with respect to the days of work or with respect to the beginning or end of the work day) or telecommuting and home office (employees can work in facilities away from their job sites) enable employees to fulfill their family responsibilities. Support to employees with relatives needing care includes, for example, cooperation with care homes or advisory services for the employees. Measures to support employees on parental leave may include information provision or training programs. These measures are thought to improve the quality of employees' leave and also increases the chance that they will return to their employer. Finally, participation in a network of family-friendly companies enables information exchange between employers and, thereby, helps improve their family-friendly policies.

#### *4.3 Explanatory Variable*

Definitions and descriptive statistics of the explanatory variables are shown in Table 2. Our key explanatory variable is a dummy equal to 1 if a works council is present in the establishment. As discussed, the creation of a council depends on the initiative of the establishment's workforce. Thus, works councils are not present in all eligible establishments so we can compare establishments with and without a works council.

The dataset allows to control for a variety of other factors potentially having an influence on OGPs. In order to isolate the role of works councils from other industrial relations

factors, we include variables for the coverage by an industry-level and a firm-level collective bargaining agreement. We also include a dummy for establishments that are not formally bound to collective bargaining contracts, but pursue an orientation at those contracts.

Furthermore, we control for the use of alternative forms of nonunion employee representation. Alternative forms of employee representation such as staff spokesmen and round tables are voluntarily implemented by the employer. Similar to works councils, they provide channels for improved communication and information sharing between management and workers. However, they have no legally defined rights and are far less powerful than works councils. Thus, it is an open question whether alternative forms of employee representation can play a role similar to that of works councils.

Employers may to some extent invest in OGP with or without employee representation in order to reduce personnel fluctuation and to improve productivity. The costs and benefits of this investment depend on a series of circumstances. The structure of the workforce is one factor influencing the tradeoff between the costs and benefits of the practices. Specifically, the share of female employees should have a positive influence on the provision of family-friendly and equal opportunity practices. A higher share of female employees means that the establishment has a higher share of employees valuing and desiring these practices.

We also control for the share of part-timers. On the one hand, part-time work already helps employees to balance work and family. Thus, part-time employees may have a lower preference for family-friendly practices (Budd and Mumford 2004). On the other hand, part-time employees may be employees who have especially high responsibilities for family and, hence, value additional family-friendly practices to obtain an even better work-family balance. Part-time work can also be involuntary reflecting the segregation into peripheral jobs (Heywood et al. 2011). This would suggest that part-time employees might even have a stronger demand for equal opportunity practices.



Furthermore, the shares of temporary agency workers, apprentices, and skilled and highly skilled employees are accounted for. Temporary agency workers have a low attachment to the establishment so that the employer may not invest in work-family balance and equal opportunities for these workers. By contrast, the share of apprentices should have a positive influence as family-friendly and equal opportunity practices may help retain those employees after completing their training. A skilled and highly skilled workforce should also increase the employer's incentive to invest in OGP. The well-known income effect suggests that those with larger incomes demand more of all normal goods including these practices.

We also control for the scale of production. Establishment size should be positively associated with the provision of family-friendly and equal opportunity practices. Implementing these practices may involve a fixed cost, and the fixed cost per employee diminishes with the number of employees. This in turn increases the net benefit of the practices. Similarly, the incentive to invest in the practices should be higher if the fixed cost can be spread across the establishments of a multi-establishment firm.

The establishment's hours policy is captured by variables for usual weekly hours, overtime use and shift work. Overtime is a mechanism to adjust hours to short-run fluctuations in demand (Jirjahn 2008). On the one hand, overtime use might indicate a firm-driven hours policy suggesting less support for a family-friendly work environment. On the other hand, the use of overtime might make practices such as child care particularly valuable as it increases employees' willingness to work overtime. Similarly, shift work might make the use of family-friendly practices more likely as working at unusual hours requires that employees can reconcile work and family.

The nature of production is controlled for by the vintage of production technology and the establishment's innovativeness. A production technology of a more recent vintage and innovativeness are associated with flexible production involving speedy responses to changing

market conditions, continuous improvements and, hence, frequently varying tasks (Campaner et al. 2018, Jirjahn and Mohrenweiser 2018). Employees may be more willing to cooperate with these changes if the employer provides work-family balance and ensures fair treatment.

The managerial environment is accounted for by variables for foreign owners and the share of female top managers as a proportion of all top managers. Female managers may be more sensitive to the needs of women and may be more likely to promote work-family balance and gender equality. Finally we include twelve industry dummies, fifteen federal state dummies, three dummies capturing product market competition, a year dummy, and a dummy for foundation of the establishment after the year 1990.

## **5. Results**

### *5.1 Initial Estimates*

Table 3 provides initial estimates. The determinants of family-friendly and equal opportunity practices are estimated by using a multivariate probit model (Capellari and Jenkins 2003). This model is a generalization of the bivariate model (Greene 2003: 931–933). Similar to a bivariate model, the multivariate model allows for correlated error terms between the various probit equations. The estimates show that this is indeed important. All of the fifteen correlations of the error terms are significantly positive. This suggests that unobserved factors influence the provision of the various practices in the same direction.

Many of the controls take significant coefficients of the expected sign. The shares of women, apprentices, skilled employees and university graduates are positive determinants of the various family-friendly and equal opportunity practices. Innovation activities and a modern production technology are also positively associated with the practices. Moreover, the use of shift work and the use of overtime are positive determinants of several policies, while the usual weekly hours turn out to be a negative determinant. Establishment size has a positive influence

on each of the six policies, yet this influence diminishes as size increases. Establishments being part of a multi-establishment firm are also more likely to provide OGPs. Furthermore, the managerial environment plays a role. Foreign ownership is a significantly negative determinant of three OGPs. Female top managers have significantly positive influence on two policies.

Turning to industrial relations, alternative forms of nonunion employee representation have a positive influence on each of the six OGPs. This suggests that also alternative forms of employee representation voluntarily implemented by the employer can help improve the provision of family-friendly and equal opportunity practices. One reason may be that they provide channels for improved communication and information sharing between employees and management.

Collective bargaining coverage and orientation at a collective bargaining contract tend to be positively associated with the provision of equal opportunity and family-friendly practices. However, regarding the provision of support with child care, coverage by an industry-level agreement is a negative determinant.

Most importantly in our context, the incidence of a works council significantly increases the likelihood that each of the six policies is provided. This conforms to the hypothesis that works councils take women's interests into account and promote both work-family balance and gender equality. They may push through OGPs against prejudiced employers or may promote these policies by overcoming organizational failures.

The estimated influences of works councils are not only statistically significant, but also economically meaningful. The incidence of a council increases the probability of flexible work schedules for employees with care responsibilities by 13.9 percentage points. The marginal effects on the other family-friendly practices are 7.6 percentage points for support to employees on parental leave, 6.8 percentage points for support to employees with relatives needing care, 4.0 percentage points for support with childcare, and 3.6 percentage points for

participation in a cross-company network of family-friendly firms. Turning to equal opportunity practices, works council incidence is associated with a 2.3 percentage point higher probability that the establishment has implemented measures to promote the advancement of women. Given that 3.7 percent of the establishments have implemented such measures, this implies an increase in the probability of equal opportunity practices by 62 percent.

### *5.2 Controlling for the Wage Level*

The positive link between works councils and OGPs might simply reflect an income effect. A series of studies have shown that the wage level is higher in establishments with a works council (Jirjahn 2017). Thus, if family-friendly and equal opportunity practices are normal goods, the link between works councils and OGPs might be due to the higher wage level.

In order to test this alternative explanation, we control for the wage per employee. Table 4 shows the results. As the wage variable has a larger number of missing values, sample size is reduced. For the purpose of comparison, we also present estimates with the smaller sample that do not control for the wage level.

The wage level has a significantly positive influence on each of the six OGPs. This conforms to the notion that employees with higher incomes demand more work-family balance and equal opportunities. However, including the wage variable does not change our key results. Works council incidence remains a significant determinant of the six OGPs. Moreover, the magnitudes of the estimated influences decrease only modestly when controlling for wages. Thus, we do not find evidence that the link between works councils and organizational gender policies is simply driven by an income effect. In what follows we do no longer include the wage variable as it reduces the number of observations.

### *5.3 The Issue of Endogeneity*

We recognize that our results may suffer from endogeneity of the works council variable. There may be unobserved factors correlated with both works council incidence and OGP. These unobserved factors could result in an omitted variable bias. From a theoretical viewpoint, this bias could result in an overestimation or underestimation of the influence of works councils.

If there were unobserved factors positively influencing both works council incidence and OGP, the effect of works councils would be overestimated. For example, our variables may only incompletely account for the managerial environment. Supportive managers may encourage employees to implement a works council and may also implement family-friendly and equal opportunity practices. In this case, the estimated coefficient on the works council variable would capture the influence of the supportive managerial environment.

By contrast, if there were unobserved factors positively influencing the incidence of a works council and negatively influencing the provision of OGP, the effect of works councils would be underestimated. For example, lazy or biased managers may be not able to build trustful relationships with the workforce so that employees implement a works council to protect their interests. These managers may also not provide measures to promote work-family balance and gender equality. In that case, the works council variable would capture the influence of the lazy and biased managers.

We examine possible endogeneity of works council incidence by estimating a recursive multivariate probit model (Balía and Jones 2008, Jones 2007). This model is an extension of the recursive bivariate model (Greene 1998). In principle, identification of the recursive probit model is ensured by its inherent nonlinearity (Wilde 2000). However, to avoid that identification relies solely on the functional form, exclusion restrictions are usually imposed to improve identification. Finding convincing exclusion restrictions is always a matter of debate so that attempts to account for endogeneity can be largely viewed as exploratory. Here we use

the share of establishments with works councils calculated for 41 detailed industrial sectors in 16 federal states.<sup>4</sup> We use the share of establishments with works councils in the year 2009 to instrument works council incidence in the individual establishment in the years 2012 and 2016. The share of establishments with works councils reflects the general propensity within a region and narrowly defined industry that works councils are present. Hence, it should have a positive influence on the individual establishment's probability of having a works council.

Researchers have applied similar aggregation identification strategies in other contexts. Jirjahn and Mueller (2014) use the works council share within industries to instrument works council incidence in productivity regressions. Jirjahn and Mohrenweiser (2016) instrument the presence of owner-managers in an establishment by using the share of owner-managed firms within the industry. Machin and Wadhvani (1991) use the unionization rate within industries to instrument unionization at the establishment level. Lee (2004) uses the share of government jobs in a locality to instrument public sector employment by workers. Woessmann and West (2006) use average class size within schools as an instrument for actual class size. Cornelissen et al. (2011) use the share of workers receiving performance pay within industries to instrument the individual worker's chance of receiving performance pay.

Table 5 provides the key results. The determinants of family-friendly and equal opportunity practices are jointly estimated with the determinants of works council incidence. The estimates show that our identifying variable is significantly associated with works council incidence. The share of establishments with works councils in the industry and region is a positive determinant of the individual establishment's probability of having a works council.

The error term of the works council equation is significantly correlated with the error terms of the equations for the family-friendly and equal opportunity practices. Thus, the hypothesis of exogeneity is rejected and the works council variable has to be considered as endogenous. The correlations between the error term of the works council equation and the

error terms of the other equations are negative. This suggests that there are unobserved factors positively influencing the incidence of a council and negatively influencing the provision of OGPs. As discussed, lazy and biased managers may contribute to distrust and adversarial employment relations inducing employees to implement a works council. These managers have also a low propensity to promote work-family balance and equality.

The negative correlation between the error terms implies that the estimated effect of works councils on OGPs is stronger in the recursive model than the in the simple multivariate probit of Table 3. The marginal effect on measures to promote the advancement of women is now 3.4 percentage points. The marginal effects on the family-friendly practices are 18.4 percentage points for flexible work schedules, 9.5 percentage points for support to employees on parental leave, 10.0 percentage points for support to employees with relatives needing care, 6.4 percentage points for support with childcare, and 5.6 percentage points for participation in a cross-company network of family-friendly firms.

Altogether, even when taking the endogeneity of works council incidence into account, the estimates confirm our key finding of a positive influence of works councils on family-friendly and equal opportunity practices. Endogeneity implies that the positive effect of works councils on the provision of these practices is underestimated in the simple multivariate probit regression.

As a check of robustness, we add up the policies listed in Table 1 and use the number of OGPs as the dependent variable. Table 6 provides the results of a two-step instrumental variables regression.<sup>5</sup> In the first step, the determinants of works council incidence are estimated by a linear probability model. In the second step, the predicted value of council incidence is included in the regression explaining the number of OGPs. This approach confirms that the share of establishments with works councils in the industry and region is a positive

determinant of the individual establishment's probability of having a works council. Most, importantly, it confirms a positive influence of works councils on OGPs.

## **6. Conclusions**

Our analysis provides German evidence that establishments are more likely to provide family-friendly and equal opportunity practices when a works council is present. The key pattern of results also holds when taking the endogeneity of works councils into account. Our findings conform to the notion that works councils take women's interests into account and promote both work-family balance and gender equality. They may push through the gender policies against prejudiced employers or may promote these policies by mitigating or overcoming organizational failures within establishments.

Our estimates suggest that alternative forms of nonunion employee representation are also associated with an increased provision of OGPs. However, these forms are less stable (Ellguth 2009) and their creation depends on the discretion of the employer. By contrast, the implementation of a works council depends on the decision of the employees. This provides the opportunity for employees to push through work-family balance and gender equality even when employers do not implement employee representation on their own.

We end with recommendations for future research. First, it would be interesting to extend our analysis for Germany to other countries. Second, now that the role of works councils on the provision of family-friendly and equal opportunity practices has been examined, it would be interesting to analyze if works councils also have an influence on the outcomes of these practices for the economic performance of establishments and the wellbeing of employees.



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**Table 1:** Definitions and Descriptive Statistics of Dependent Variables

<i>Variable</i>	<i>Definition</i>	<i>Mean</i>
Child care	Dummy equals 1 if the establishment provides support with child care (e.g., on-site child care, cooperation with child care facilities, financial contributions towards child care).	0.138
Relatives	Dummy equals 1 if the establishment provides support to employees who have relatives needing care (e.g., cooperation with care homes, information provision, advisory services).	0.087
Flexibility	Dummy equals 1 if the establishment provides flexible work schedules for employees with care responsibilities (e.g., flextime, working time accounts, telecommuting, home office).	0.432
Leave	Dummy equals 1 if the establishment provides support to employees who are on parental leave (e.g., training).	0.172
Advancement	Dummy equals 1 if the establishment has implemented measures to promote the advancement of women (e.g., mentoring programs, specific training of female employees, action plans for women, plans to increase the share of female employees).	0.037
Network	Dummy equals 1 if the establishment participates in a cross-company network of family-friendly firms.	0.030

N = 16391. Use of multiple gender policies is possible.

**Table 2: Definitions and Descriptive Statistics of Explanatory Variables**

<i>Variable</i>	<i>Definition (Mean, Standard Deviation)</i>
Works council	Dummy equals 1 if the establishment has a works council (0.245, 0.430)
Industry-level bargaining	Dummy equals 1 if the establishment is covered by an industry-level collective bargaining agreement (0.331, 0.470)
Firm-level bargaining	Dummy equals 1 if the establishment is covered by a firm-level collective bargaining agreement (0.062, 0.242)
Orientation at collective bargaining	Dummy equals 1 if the establishment is not formally bound to collective bargaining, but pursues an orientation at a collective bargaining agreement (0.297; 0.457)
Alternative representation	Dummy equals 1 if the establishment has implemented alternative forms of employee representation such as staff spokesmen or round tables (0.130, 0.336)
Women	Share of the workforce that is female (0.388, 0.289)
Part-time employees	Share of the workforce that is part-time (0.238, 0.255)
Skilled employees	Share of the workforce with completed apprenticeship training (0.618, 0.266)
University degree	Share of the workforce with a university degree (0.081, 0.160)
Apprentices	Apprentices as a share of the workforce (0.040, 0.067)
Female top managers	Female top managers as a share of all top managers (0.184; 0.339)
Temporary agency	Temporary agency employees as a share of the workforce (0.053, 0.125)
Firm size	Number of employees divided by 1000 (0.130, 0.949)
Founded after 1990	Dummy equals 1 if the establishment was founded after 1990 (0.383; 0.486)
Modern technology	Dummy equals 1 if the establishment uses a modern production technology (0.493, 0.500)
Overtime	Dummy equals 1 if the establishment uses overtime (0.743, 0.437)
Foreign owner	Dummy equals 1 if the establishment has a dominant foreign owner (0.074, 0.263)
Multi-establishment firm	Dummy equals 1 if the establishment is part of a multi-establishment firm (0.250, 0.433)
Minor competition	Dummy equals 1 if the establishment reports minor competitive pressure (0.130, 0.337)
Modest competition	Dummy equals 1 if the establishment reports modest competitive pressure (0.420; 0.494)
Strong competition	Dummy equals 1 if the establishment reports strong competitive pressure (0.395, 0.489)
Shift work	Dummy equals 1 if the establishment uses shift work (0.368, 0.482)
Innovation	Dummy equals 1 if the establishment has introduced new or improved processes, products or services (0.516, 0.500).
Weekly hours	Usual weekly hours for full-time employees in the establishment (39.28, 1.76)
Wave 2016	Dummy equals 1 if the observations is from the year 2016 (0.487, 0.500).
Works council share	Share of establishments with a works council calculated for 41 industrial groups in 16 federal states (0.260, 0.202).
Wage level	Total monthly wage bill per employee divided by 1000 (2.092, 1.134)
Industry dummies	12 industry dummies are included.
Region dummies	15 federal state dummies are included.

N = 16391. For the wage variable the number of observations is equal to 13363. The reference groups for mutually exclusive dummy variables are as follows: Establishments with no competitive pressure (with no collective bargaining coverage and no orientation at collective bargaining) form the reference group of the competition dummies (collective bargaining dummies).

**Table 3: Initial Estimates**

	Advancement	Child care	Flexibility	Relatives	Leave	Network
Works council	0.306 (5.49)*** [0.023]	0.196 (4.79)*** [0.040]	0.408 (11.64)*** [0.139]	0.444 (10.39)*** [0.068]	0.319 (8.74)*** [0.076]	0.589 (9.93)*** [0.036]
Industry-level bargaining	0.289 (4.45)*** [0.021]	-0.120 (2.97)*** [-0.023]	0.078 (2.45)** [0.025]	0.095 (2.07)** [0.013]	0.207 (5.52)*** [0.047]	0.164 (2.36)** [0.009]
Firm-level bargaining	0.321 (3.81)*** [0.027]	-0.083 (1.36) [-0.016]	0.115 (2.22)** [0.038]	0.166 (2.60)*** [0.024]	0.187 (3.38)*** [0.044]	0.244 (2.67)*** [0.016]
Orientation at collective bargaining	0.190 (3.08)*** [0.014]	-0.035 (1.00) [-0.007]	0.155 (5.43)*** [0.051]	0.081 (1.88)* [0.011]	0.190 (5.54)*** [0.043]	0.106 (1.48) [0.006]
Alternative representation	0.308 (5.93)*** [0.025]	0.296 (7.85)*** [0.064]	0.349 (10.70)*** [0.116]	0.361 (8.86)*** [0.057]	0.360 (10.40)*** [0.089]	0.344 (5.79)*** [0.023]
Women	0.481 (4.32)*** [0.047]	0.353 (4.97)*** [0.080]	0.530 (9.25)*** [0.175]	0.271 (3.23)*** [0.043]	0.103 (1.54) [0.024]	0.356 (2.87)*** [0.026]
Part-time employees	0.002 (0.02) [0.000]	-0.142 (1.88)* [-0.026]	0.257 (4.21)*** [0.085]	0.184 (2.04)** [0.028]	-0.056 (0.75) [-0.012]	-0.131 (0.90) [-0.006]
Skilled employees	0.240 (2.37)** [0.020]	0.412 (6.15)*** [0.096]	0.284 (5.62)*** [0.094]	0.332 (4.38)*** [0.054]	0.385 (6.24)*** [0.098]	0.225 (1.98)** [0.015]
University degree	0.946 (6.68)*** [0.128]	1.031 (10.34)*** [0.293]	1.415 (15.76)*** [0.415]	0.837 (7.44)*** [0.176]	1.086 (11.32)*** [0.328]	1.175 (7.63)*** [0.149]
Apprentices	0.898 (2.75)*** [0.118]	1.240 (5.86)*** [0.368]	0.780 (4.49)*** [0.253]	0.528 (2.00)** [0.096]	1.328 (6.69)*** [0.412]	0.932 (2.71)*** [0.101]
Female top managers	0.124 (2.01)** [0.009]	0.031 (0.69) [0.006]	0.005 (0.14) [0.002]	0.001 (0.02) [0.000]	0.129 (3.14)*** [0.030]	0.103 (1.35) [0.006]
Temporary agency	0.135 (0.75) [0.010]	-0.103 (0.88) [-0.019]	-0.053 (0.60) [-0.017]	-0.139 (0.96) [-0.017]	-0.123 (1.15) [-0.026]	0.452 (2.59)*** [0.035]
Size	0.352 (9.11)*** [0.032]	0.590 (8.13)*** [0.147]	0.706 (6.32)*** [0.231]	0.334 (4.99)*** [0.055]	0.135 (3.70)*** [0.032]	0.228 (4.99)*** [0.015]
Size squared	-0.005 (7.35)*** [0.000]	-0.009 (7.94)*** [-0.002]	-0.012 (6.31)*** [-0.004]	-0.005 (5.07)*** [-0.001]	-0.002 (3.24)*** [0.000]	-0.004 (4.75)*** [0.000]
Founded after 1990	-0.028 (0.58) [-0.002]	0.042 (1.27) [0.008]	-0.023 (0.87) [-0.007]	-0.045 (1.21) [-0.006]	0.081 (2.71)*** [0.018]	0.036 (0.67) [0.002]
Modern technology	0.093 (3.62)*** [0.007]	0.051 (3.02)*** [0.010]	-0.002 (0.16) [-0.001]	0.034 (1.77)* [0.005]	0.093 (5.80)*** [0.021]	0.047 (1.70)* [0.003]
Overtime	0.039 (0.75) [0.000]	0.258 (7.15)*** [0.000]	0.352 (12.86)*** [0.000]	0.206 (4.89)*** [0.000]	0.316 (9.27)*** [0.000]	0.038 (0.59) [0.000]



	[0.003]	[0.046]	[0.115]	[0.026]	[0.065]	[0.002]
Foreign owner	-0.005 (0.07) [0.000]	-0.158 (2.84)*** [-0.028]	-0.017 (0.40) [-0.006]	-0.204 (3.50)*** [-0.025]	-0.055 (1.14) [-0.012]	-0.185 (2.34)** [-0.009]
Multi-establishment firm	0.172 (3.81)*** [0.012]	0.026 (0.74) [0.005]	0.080 (2.73)*** [0.026]	0.178 (4.88)*** [0.025]	0.136 (4.31)*** [0.031]	0.143 (2.71)*** [0.008]
Minor competition	0.018 (0.18) [0.001]	0.022 (0.34) [0.004]	0.110 (2.01)** [0.036]	0.031 (0.41) [0.004]	0.063 (0.97) [0.014]	-0.106 (0.93) [-0.005]
Modest competition	-0.038 (0.42) [-0.003]	-0.075 (1.25) [-0.014]	0.079 (1.56) [0.026]	-0.027 (0.39) [-0.004]	0.029 (0.48) [0.006]	-0.068 (0.69) [-0.004]
Strong competition	0.069 (0.75) [0.005]	-0.061 (0.99) [-0.012]	0.113 (2.19)** [0.037]	0.019 (0.28) [0.003]	0.087 (1.44) [0.019]	-0.034 (0.34) [-0.002]
Shift work	0.190 (3.90)*** [0.013]	0.157 (4.69)*** [0.031]	0.260 (9.52)*** [0.087]	0.210 (5.68)*** [0.029]	0.248 (8.04)*** [0.056]	0.321 (5.56)*** [0.018]
Innovation	0.173 (3.86)*** [0.011]	0.184 (6.32)*** [0.035]	0.311 (13.23)*** [0.104]	0.219 (6.49)*** [0.029]	0.238 (8.66)*** [0.053]	0.277 (5.23)*** [0.014]
Weekly hours	-0.018 (1.38) [-0.001]	-0.009 (1.03) [-0.002]	-0.018 (2.62)*** [-0.006]	-0.023 (2.39)** [-0.003]	-0.015 (1.86)* [-0.003]	-0.046 (3.36)*** [-0.002]
Wave 2016	0.024 (0.62) [0.002]	0.183 (7.80)*** [0.035]	0.213 (10.61)*** [0.070]	0.198 (6.89)*** 0.027	0.180 (7.64)*** [0.040]	0.045 (1.09) [0.002]
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-28078.4					
Correlation of error terms						
Child Care	0.287 (11.73)***	---	---	---	---	---
Flexibility	0.291 (12.63)***	0.340 (21.63)***	---	---	---	---
Relatives	0.344 (13.17)***	0.516 (30.16)***	0.418 (23.82)***	---	---	---
Leave	0.329 (14.31)***	0.318 (18.68)***	0.426 (30.12)***	0.364 (20.76)***	---	---
Network	0.370 (11.65)***	0.433 (16.74)***	0.357 (12.56)***	0.461 (18.18)***	0.341 (12.98)***	---
N	16391					

Method: Multivariate Probit. The table shows the estimated coefficients. Z-statistics in parentheses are based on standard errors clustered at the establishment level. Marginal effects are in square brackets. \*\*\* Statistically significant at the 1% level; \*\* 5% level; \* 10% level.

**Table 4: Controlling for the Wage Level**

	Advancement	Child care	Flexibility	Relatives	Leave	Network
Works council	0.278 [0.019] (4.33)***	0.206 [0.043] (4.52)***	0.408 [0.139] (10.30)***	0.416 [0.062] (8.59)***	0.317 [0.075] (7.64)***	0.604 [0.037] (9.07)***
Wage level	---	---	---	---	---	---
Log likelihood	-22684.1					
Correlation of error terms						
Child care	0.279 (9.98)***	---	---	---	---	---
Flexibility	0.270 (10.04)***	0.342 (19.63)***	---	---	---	---
Relatives	0.328 (10.41)***	0.515 (27.09)***	0.424 (20.95)***	---	---	---
Leave	0.303 (11.09)***	0.311 (16.26)***	0.409 (25.71)***	0.376 (19.29)***	---	---
Network	0.389 (10.10)***	0.407 (13.05)***	0.340 (10.74)***	0.454 (15.56)***	0.322 (10.60)***	---
N	13363					
	Advancement	Child care	Flexibility	Relatives	Leave	Network
Works council	0.235 [0.016] (3.57)***	0.165 [0.034] (3.57)***	0.355 [0.120] (8.88)***	0.374 [0.054] (7.61)***	0.293 [0.068] (6.91)***	0.590 [0.036] (8.58)***
Wage level	0.097 [0.006] (3.49)***	0.095 [0.019] (4.66)***	0.126 [0.041] (7.55)***	0.098 [0.014] (4.41)***	0.055 [0.012] (2.96)***	0.031 [0.002] (0.95)***
Log likelihood	-22640.1					
Correlation of error terms						
Child care	0.278 (9.86)***	---	---	---	---	---
Flexibility	0.265 (9.81)***	0.338 (19.38)***	---	---	---	---
Relatives	0.324 (10.27)***	0.513 (26.90)***	0.421 (20.77)***	---	---	---
Leave	0.302 (11.06)***	0.309 (16.18)***	0.407 (25.47)***	0.374 (19.20)***	---	---
Network	0.389 (10.07)***	0.407 (13.07)***	0.339 (10.72)***	0.454 (15.59)***	0.320 (10.56)***	---
N	13363					

Method: Multivariate Probit. The table shows the estimated coefficients. Z-statistics in parentheses are based on standard errors clustered at the establishment level. Marginal effects are in square brackets. \*\*\* Statistically significant at the 1% level. Control variables are included, but are suppressed to save space.

**Table 5: The Issue of Endogeneity**

	Works council	Advancement	Child care	Flexibility	Relatives	Leave	Network
Works council	---	0.436 [0.034] (4.11)***	0.309 [0.064] (3.87)***	0.536 [0.184] (8.32)***	0.624 [0.100] (6.67)***	0.397 [0.095] (5.76)***	0.834 [0.056] (7.88)***
Works council share	2.795 [0.500] (22.24)***	---	---	---	---	---	---
Log likelihood	-32064.8						
Correlation of error terms							
Advancement	-0.117 (1.95)*	---	---	---	---	---	---
Child care	-0.116 (2.41)**	0.296 (11.32)***	---	---	---	---	---
Flexibility	-0.127 (3.24)***	0.297 (12.22)***	0.341 (21.18)***	---	---	---	---
Relatives	-0.164 (2.86)***	0.356 (12.89)***	0.523 (30.38)***	0.424 (23.85)***	---	---	---
Leave	-0.115 (2.76)***	0.337 (14.39)***	0.304 (17.52)***	0.430 (30.05)***	0.370 (20.81)***	---	---
Network	-0.243 (4.13)***	0.390 (11.85)***	0.436 (16.64)***	0.377 (12.56)***	0.456 (16.99)***	0.343 (12.90)***	---
N	16391						

Method: Recursive Multivariate Probit. The table shows the estimated coefficients. Z-statistics in parentheses are based on standard errors clustered at the establishment level. Marginal effects are in square brackets. \*\*\* Statistically significant at the 1% level; \*\* 5% level; \* 10% level. Control variables are included, but are suppressed to save space.

**Table 6:** Determinants of the Number of Gender Policies

	Works Council	Number of Gender Policies
Works council	---	0.691 (6.55)***
Works council share	0.591 (29.80)***	---
N	16391	16391
F-test	273.94***	---
R squared	0.4689	0.284

Method: 2SLS. The table shows the estimated coefficients. T-statistics in parentheses are based on standard errors clustered at the establishment level. \*\*\* Statistically significant at the 1% level. Control variables are included, but are suppressed to save space

## Endnotes

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<sup>1</sup> As emphasized by Bertrand et al. (2005), discrimination can occur explicitly or implicitly. Explicit discrimination means that individuals consciously discriminate based on their preferences and beliefs. By contrast, implicit discrimination is unintentional and outside of the discriminator's awareness. Such implicit discrimination is based on unconscious mental associations leading people to think, feel and behave in ways that oppose their explicitly expressed views.

<sup>2</sup> Rudman (1998) and 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.

<sup>3</sup> Ross and Mirowsky (1988) show that difficulty in arranging child care dramatically reduces the psychological well-being of working mothers but has no effect on husbands. Relatedly, Coverman and Sheley (1986) find that fathers spend little time with their children regardless of the mother's labor force participation.

<sup>4</sup> Note that we can still include the 12 broadly defined industry dummies and the 15 region dummies.

<sup>5</sup> Endogeneity might be partially also addressed by estimating a fixed effects model. However, a fixed effects approach relying on within establishment variation of works council incidence is not suitable to analyze the effects of works councils. There are only few establishments changing their works council status. Moreover, a fixed effects approach only addresses endogeneity caused by time-invariant influences, but not endogeneity due to unobserved time-varying factors.