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The role of employer, job and employee characteristics for flexible working time

An empirical analysis of overtime work and flexible working hours' arrangements

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Abstract

Modern working societies face the challenge to combine the establishments' with the employees' needs for working-time flexibility. The authors investigate the determinants of overtime and different working hours' arrangements using the German Linked Employer-Employee Study of the Socio-Economic Panel (SOEP-LEE) and logistic regression models. The results show that employer and job characteristics are most important for determining overtime and the different working hours' arrangements, underlining the power of employers with regard to working-time flexibility. Employee characteristics play the least important role, although employees can flexibly organize their working times and can benefit from certain arrangements, such as self-determined working hours and flexitime within a working hours account. The study provides evidence that working-time flexibility in Germany is mainly employer-oriented. However, through demographic changes and a possible lack of qualified personnel, employee-friendly arrangements are likely to gain importance.

Zusammenfassung

Moderne Arbeitsgesellschaften stehen vor der Herausforderung die betrieblichen Bedürfnisse nach Arbeitszeitflexibilität mit den individuellen Bedürfnissen der Beschäftigten in Einklang zu bringen. Wir untersuchen die Determinanten von Überstunden und verschiedenen Arbeitszeitarrangements. Dabei nutzen wir die Daten der Linked Employer-Employee Studie des Sozio-ökonomischen Panels (SOEP-LEE) für Deutschland und schätzen logistische Regressionsmodelle. Die Ergebnisse zeigen, dass Arbeitgebermerkmale und Jobmerkmale die wichtigsten Bestimmungsfaktoren von Überstunden und den verschiedenen Arbeitszeitarrangements sind. Dies weist auf die Macht von Arbeitgebern bei der Flexibilität von Arbeitszeiten hin. Arbeitnehmermerkmale sind die am wenigsten wichtigen Bestimmungsfaktoren, obwohl Beschäftigte ihre Arbeitszeiten durch bestimmte Arrangements, wie selbstbestimmte Arbeitszeiten und Gleitzeit mit Arbeitszeitkonto, flexibilisieren und dadurch profitieren können. Die vorliegende Studie zeigt, dass Arbeitszeitflexibilität in Deutschland überwiegend arbeitgeberorientiert ist. Jedoch ist anzunehmen, dass arbeitnehmerfreundliche Arbeitszeitarrangements aufgrund von demographischen Veränderungen und einem möglichen Fachkräftemangel zukünftig an Bedeutung gewinnen werden.

1 Introduction

During the last three decades a wide variety of working-time arrangements spread throughout developed economies aiming to increase working-time flexibility (Berg/Bosch/Charest 2014). However, modern working societies face the challenge to combine the establishments' needs with the employees' needs for working-time flexibility. Employers require working-time flexibility to deal with and to respond quickly to fluctuations in demand and thus to save costs (Houseman 2001; Kalleberg et al. 2003), to realize shorter delivery times and to meet customer needs (Reilly 2001), to increase performance and productivity (Hill et al. 2001; Lott/Chung 2016) and to foster innovation performance (Godart/Görg/Hanley 2014). Employees require working-time flexibility above all to balance work and private life responsibilities (Berg et al. 2004; Hill et al. 2001; Reilly 1998). But also changing lifestyle and workstyle preferences and the increasing need for life-long learning require more flexible working hours (Berg/Bosch/Charest 2014; Chung 2009). Due to the contrary requirements for working-time flexibility, conflicts between employers' and employees' needs can arise.

For Germany, Chung and Tijdens (2013) show a high degree of employer-oriented working-time flexibility (as e.g. overtime, unusual hours), but only a medium degree of employee-oriented working-time flexibility (as e.g. flexible working hours, part-time). Employer-oriented working-time flexibility is a key instrument for Germany's economy to succeed, as it is characterized by a large number of export-oriented establishments with strong pressure to compete internationally. During the Great Recession those export-oriented establishments temporarily reduced working hours and work intensity so that massive employment losses could be prevented (Möller 2010; Weber 2015). But increasing participation rates of women at the German labour market also stress the need to combine work and family and to provide more employee-oriented working-time flexibility.

The purpose of our study is to examine the employer-, job- and employee-sided driving factors of working-time flexibility using Germany as a role model. For this purpose, we consider overtime and four different working hours' arrangements as two measures for working-time flexibility. In Germany, overtime work is widespread and working hours' arrangements can be quite different depending on the negotiations between employers and employees' representatives, such as works councils. Whereas overtime hours are a measurement for the actual flexibility in the short run, the different working hours' arrangements can be regarded as the fundamental regulatory framework in which flexibility occurs. Following Chung and Tijdens (2013), we use overtime as an example for working-time flexibility for employers. Two of the working hours' arrangements provide examples for working-time flexibility mainly for employers and two of them provide examples for working-time flexibility mainly for employees.

We assume that working-time flexibility for employers is mainly driven by employer characteristics, whereas working-time flexibility for employees is mainly driven by employee characteristics. Accordingly, we examine the determinants of overtime and

four different working hours' arrangements considering the employers' and employees' side simultaneously. Previous studies analysing the determinants of overtime either focus on the employers' side (as e.g. Gold 2002; Kölling 1997; Schank/Schnabel 2004a; Zapf 2016 for Germany) or the employees' side (as e.g. Anger 2005b; Bauer/Zimmermann 1999; Pannenberg/Wagner 2000, 2001; Zapf 2016 for Germany). So far, an empirical analysis is missing combining both sides. We do so by using a unique linked employer-employee data set for Germany. This data set combines information on individual work contexts and working conditions of employees with workplace-related and establishment-specific information of their employers. It provides crucial information about employees and employers characteristics and, furthermore, about job characteristics having an intermediate position. Using this data set, we empirically address the determinants of overtime and four different working hours' arrangements among employees considering employers, jobs and employees characteristics simultaneously. To the best of our knowledge, the underlying study is the first analysing the determinants of overtime and different working hours' arrangements considering these characteristics simultaneously, thus providing a new comprehensive picture.

The paper is organized as follows. Section 2 provides the theoretical framework including the hypotheses and a literature review. Section 3 describes the data, variables and the method used in the analyses. Section 4 shows the results of the distribution of paid and unpaid overtime hours as well as the different working hours' arrangements among employees. Furthermore, we point out the determinants of paid and unpaid overtime hours as well as different working hours' arrangements considering the employers and employees side. Section 5 provides a short summary.

2 Theoretical framework

2.1 Employer- and employee-oriented working-time flexibility

Although the terminology in the literature varies greatly, most theoretical studies regarding working-time flexibility distinguish between working-time flexibility serving employers' needs and working-time flexibility serving employees' needs (e.g. Fagan 2004; Gareis/Korte 2002; Reilly 2001; Rubery/Grimshaw 2003; Visser 2003; Wilthagen 1998). Within those dimensions overtime is ascribed as employer-oriented working-time flexibility, whereas flexible working hours arrangements can be both employer- and employee-oriented (Chung/Tijdens 2013), depending on the actual organisation of the working hours.

2.1.1 Working-time flexibility through overtime

Employees exceeding their contractually agreed regular working hours perform overtime hours (Anger 2006a; Bellmann/Gewiese 2003; Gold 2002), which can be either

paid or unpaid.[1] Working paid overtime hours, employees receive a monetary, i.e. financial compensation (Bauer et al. 2004; Bundesmann-Jansen/Groß/Munz 2000). In addition to the contractually defined hourly rates, this compensation can also include a premium as many collective agreements in Germany contain overtime pay provisions (Anger 2006a). However, working unpaid overtime employees neither receive a financial compensation nor can temporarily work shorter at a later point in time.

Whereas employees mainly supply paid overtime hours to receive an additional remuneration, they supply unpaid overtime hours for several reasons. Employees perform unpaid overtime hours to increase their performance and thus to obtain positive returns in the future, such as higher salaries (Anger 2005a; Lazear 1979), higher bonuses or promotions to better paid positions (Anger 2005a; Lazear/Rosen 1981; Prendergast 1999). Here, unpaid overtime hours serve as a signal to show effort, commitment, loyalty or motivation to the employer (Anger 2006a, 2008; Spence 1973). Employees also perform unpaid overtime hours in case of existing employment risks, uncertainty about the time required to complete job tasks, a lower productivity or in case of absent employees (Anger 2006a; Bell/Hart 1999a; Bell et al. 2000). Furthermore, employees perform unpaid overtime hours as part of a gift exchange to receive remuneration above the market-clearing wage (Akerlof 1982, 1984; Bell/Hart 1999a; Bell et al. 2000).

Employers demand paid and unpaid overtime hours to adjust the amount of labour input to demand fluctuations without changing the number of employees and thus to avoid costs, such as hiring or firing costs (Gerlach/Hübler 1987). Due to the extension of working hours establishments react quickly to customer wishes and realize shorter delivery times. Furthermore, by demanding overtime hours employers extend the use of machineries and plants in the production sector and extend operating hours (Gold 2004). According to the Works Constitution Act (*Betriebsverfassungsgesetz, BetrVG*) employers have the right to determine paid overtime work. Works councils have the right of co-determination and have to agree to overtime work (BetrVG § 87). However, for unpaid overtime hours the situation is not that clear. Employers might desire unpaid overtime work and might put employees under pressure, whereas also employees might be willing to work unpaid overtime hours. We therefore assume that paid overtime is mainly driven by employer and job characteristics (Hypothesis 1a). In contrast, we assume that unpaid overtime is driven by employer, job and employee characteristics (Hypothesis 1b).

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[1] Another type of overtime hours are the so called transitory overtime hours. Transitory overtime hours are additional hours worked that can be used up later, i.e. employees can take time off in lieu of overtime. They only change the distribution of the working hours over a certain period of time, while the number of working hours remains the same over the reference period (Bauer et al. 2004; Bundesmann-Jansen/Groß/Munz 2000). Thus, transitory overtime hours are no overtime hours in the proper sense and are not further considered here.

2.1.2 Working-time flexibility through working hours' arrangements

The legal regulations of the Working Hours Act (*Arbeitszeitgesetz, ArbZG*) in Germany are only set the framework conditions for the working hours of employees. Considering the legal regulations, employers' associations and trade unions negotiate working hours at the industry level and management and works councils negotiate working hours at the establishment level. Further agreements can exist in individual contracts between employer and employee. Depending on the negotiation power of employers and employees on the one side and the establishments' environment on the other side, the working hours' arrangements can be quite different. On the one extreme, employers can totally fix the employees' working hours to control the amount of labour input and to avoid staff absences. In this case, employees have the classic five-day, 9 to 5 and 40-hour workweek. However, this working-time arrangement does not allow any working-time flexibility. Due to demand fluctuations employers often vary working hours to quickly adapt the workforce and thus to save costs. Furthermore, establishments can improve quality and service and meet customer needs. Employers also avoid understaffing when they vary the working hours according to their own needs. Those working time arrangements comprise e.g. changing shift work, night shift or weekend work.

On the other extreme, employers can completely give up their control over working hours and then employees are free to adapt the working hours according to their own needs. Those flexible and self-managed working hours are the so called "trust-based working hours" (Godart/Görg/Hanley 2016: 2). In this case, employers do not control the working hours of employees anymore, but they control their output. Another form of flexible working hours' arrangements is the so called "flexitime" (Godart/Görg/Hanley 2016: 2). With flexitime, employers give up a certain amount of control over working hours and allow their employees to vary starting and finishing times according to their own needs (Godart/Görg/Hanley 2016; Hill et al. 2001; Reilly 2001). Flexitime is often organised with working-time accounts aiming to organise and regulate variable distributions of hours worked (Herzog-Stein/Zapf 2014). We therefore assume that fixed daily working hours and working hours varied by employers are mainly driven by employer and job characteristics (Hypothesis 2a). In contrast, we assume that self-determined working hours and flexitime are mainly driven by employee and job characteristics (Hypothesis 2b).

2.2 Literature review

Studies analysing the determinants of overtime work are either based on employee data or on employer data, thus analysing the employees' or employers' side only separately.[2] Studies using employee data show that overtime first rises with the age of

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[2] Zapf (2016) provides an overview of the different studies analysing the determinants of overtime.

the employee, but then declines again (Anger 2006b; Bauer/Zimmermann 1999; Bell/Hart 1999b; Gerlach/Hübler 1987). The qualification level is positively correlated with the probability (and the amount) of unpaid overtime and overtime work in general (Anger 2005b; Bauer/Zimmermann 1999). Studies also find an association with the occupational status of employees. Blue-collar workers mainly work paid overtime, while white-collar workers mainly work unpaid overtime (Anger 2005a; Pannenberg/Wagner 2000, 2001). Finally, the establishment size and the sector of industry also play a role. The bigger the establishment, the more decreases the probability for paid and unpaid overtime (Bell et al. 2000; Gerlach/Hübler 1987; Pannenberg/Wagner 2000). Employees in the industry sector work more paid overtime hours, whereas employees in the service sector work more unpaid overtime hours (Brautzsch/Drechsel/Schultz 2012).

Studies using employer data mostly consider only paid overtime hours or refer to overtime work in general as employers can hardly give information about amount and distribution of unpaid overtime hours leading to a limitation of available data. Those studies on the employers' side also show that with increasing establishment size the proportion of establishments using overtime increases (Bellmann/Gewiese 2003; Schank/Schnabel 2004a). Establishment size, payroll and the existence of a works council is positively associated with the incidence of overtime and the amount of paid overtime hours, whereas the proportion of women is negatively associated (Kölling 1997; Trejo 1993). Hourly rates, the proportion of qualified employees, sales, a (very) good profit situation and an increasing establishment size are positively associated with the incidence of paid overtime, whereas the proportion of women and part-time workers are negatively associated (Schank/Schnabel 2004a). Furthermore, there is a positive association of further training, employee turnover and a lack of qualified employees with overtime and a negative association of the proportion of women and short-time work with overtime (Gold 2002, 2004). Whereas Trejo (1993) finds a negative association between the existence of a trade union and overtime, Haskel/Kersley/Martin (1997) find a positive association.

Studies considering flexible work arrangements often focus on the outcomes of those arrangements (e.g. Banyard 2010; Burchell et al. 2007; Gallie et al. 2012; Gregory/Milner 2009; Hill et al. 2001; Hofäcker/König 2012; Lott 2015; Russell/O'Connell/McGinnity 2009; White et al. 2003), whereas determinants of flexible working arrangements are rather scarce, especially for Germany. Presser (1995) analyses nonstandard hours (evening, night or rotating hours) and weekend work. Those flexible working arrangements are widespread in service occupations and in personal service industries in the US economy. He finds that a marriage reduces women's, but not men's likelihood of having nonstandard hours, whereas a marriage reduces for both women and men the likelihood of weekend work and variable work days.

Golden (2001) shows that the employees' probability to alter their daily starting and finishing time of work increases for married employees, for self-employed persons, with a college degree, working in part-time, working 50 hours or more and in certain

occupations and industries. The probability decreases for women, non-white and less educated employees and employees working a standard day shift or having a 40-hour workweek. Employees with longer tenure in the organization, with supervising responsibilities and with other co-workers in their working group using flexible work arrangements are more likely to use flextime and compressed work-weeks (Lambert et al. 2008). Family responsibilities also play a role for employees' flextime use (Shockley/Allen 2010).

Lewis (2003) states that large organizations are more likely to provide formal flexible working arrangements and public sector organizations are more likely to develop initiatives. Furthermore, organizations with a relatively large share of women managers seem to provide work-family arrangements more often. Organizations with rather progressive employment policies and philosophies may also be likely to develop flexible working arrangements. Flexible working arrangements (as e.g. telecommuting, flextime) are more likely in establishments with a works council, whereas collective bargaining is not relevant (Heywood/Jirjahn 2009). However, Kelly and Kalev (2006) show that most US organizations have formalised flexible work arrangements with written policies, but they are only available to valued workers if and when managers choose to allow them.

3 Empirical strategy

3.1 Data

To analyse the determinants of overtime and different working hours' arrangements considering employer, job and employee characteristics simultaneously, we need rich information from both the employers' and employees' side. The Linked Employer-Employee Study of the Socio-Economic Panel (SOEP-LEE) provides such rich information. The SOEP-LEE is made available by the German Institute for Economic Research (DIW).3 In a two-year running project a linked employer-employee (LEE) data set for the German Socio-Economic Panel study (SOEP) was produced (Weinhardt et al. 2016). The SOEP is an annual representative survey in private households and their members. It exists since 1984 in West Germany and since 1990 in East Germany. Central topics are the current life situation, employment, income, health and illness issues, as well as the family situation (Göbel et al. 2008; Wagner/Frick/Schupp 2007;).

The SOEP-LEE project has been implemented by asking all dependent employees in the SOEP survey in 2012 to provide local contact information of their employer in 2011. The employer contact data was the basis for a standardized employer survey

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3   The establishment data and the SOEP-LEE data are available at the research data centers of the SOEP at DIW Berlin and at the Data Service Center for Business and Organizational Data (DSC-BO) at Bielefeld University (DOI:10.7478/s0549.1.v1) (see Weinhardt et al. 2016).

conducted in 2012/13. The population of interest consists of all establishments in Germany with at least five employees. Employers throughout Germany across all types of businesses were successfully interviewed (N=1,708). The employer survey considers general information on the establishment, the economic situation, human resources policy, the personnel structure, career opportunities and income as well as information on the work organisation (Liebig/Schupp 2014; Weinhardt et al. 2016;). The SOEP-LEE data (N=1,834) expand the information on individual work contexts and working conditions in the SOEP data by collecting workplace related and establishment specific information. So far, the SOEP-LEE data is restricted to the year 2011.

3.2 Variables

3.2.1 Dependent variables

To measure working-time flexibility we consider overtime work and four different working hours' arrangements as dependent variables. We use overtime as an example for employer-oriented working-time flexibility. Two of the working hours' arrangements provide examples for mainly employer-oriented working-time flexibility and two of them provide examples for mainly employee-oriented working-time flexibility.

With regard to overtime we differentiate between paid and unpaid overtime work as the employees' reasons to work paid and unpaid overtime hours can be quite different (see Section 2.1.1). The dependent variables paid and unpaid overtime were operationalized with the following survey questions: (1) "If you do work overtime, is the work paid, compensated with time-off, or not compensated at all?" and (2) "How was your situation with regards to overtime last month? Did you work overtime? If yes, how many hours?" On the basis of these questions we create two dummy variables. Paid Overtime takes the value of one if overtime work is usually paid and if in the month preceding the survey, overtime work was actually done. Unpaid Overtime takes the value of one if overtime work is usually not compensated at all and if overtime work was actually done. The dependent variables take the value of zero if employees do not work overtime at all or did not work paid or unpaid overtime hours, respectively, during the last month.

The four different working hours' arrangements are operationalized with the survey question: "Nowadays, there are a number of different types of working hours available. Which of the following possibilities is most applicable to your work?" The items are (1)=fixed daily working hours, (2)=working hours fixed by employer, which may vary from day to day, (3)=no normally fixed working hours, decide my own working hours and (4)=flexitime within a working hours account and a certain degree of self-determination of daily working hours within this account. The first two items stand for employer-oriented working-time flexibility, the last two items stand for employee-oriented working-time flexibility. For each of these items we create a dummy variable each taking the value of one if the employee chose the item and zero otherwise.

3.2.2 Independent variables

The explanatory variables are grouped as employer, job and employee characteristics and stem from the individual data and the establishment data. From the individual data we include as employee characteristics gender, the working hours and the information whether the employee has a fixed-term contract or a temporary employment contract (a detailed overview is given in Table 9, Appendix). We consider the number of years working in the establishment, job-related burdens due to a job at risk and the current health status. We also include the family status, the information whether children under 16 years live in the household and the information about German nationality. Furthermore, we include the educational level, the current occupational status and the age of the employee. As job characteristics we consider the autonomy in occupational status, leadership position and occupational activity.

As employer characteristics we consider the information whether the products or services are mainly offered outside Germany and whether problems due to competitive pressure exist. We consider the development of demand as compared to the previous year and the development of the business volume. We include a variable on the existence of an industry-wide or company agreement and of a works council in the establishment. We also consider the employment structure with the proportion of workers in marginal employment, the proportion of part-time workers, the proportion of workers with a fixed-term contract, the proportion of workers with a higher education degree and the proportion of female workers. We further include the proportion of female workers in a leadership position and the information whether there are workers with a temporary contract. We also consider the establishment size, the economic sectors and the region.

3.3 Method

In the multivariate analyses, we estimate binary logistic regression models for each of the dependent variables. We prefer binary logistic models over multinomial logit models as we are interested in whether employees work (un-)paid overtime or not and whether one of the different working hours' arrangements is applicable or not. Additionally, the interpretation of binary logistic regression models is less complex.

The basic equation for modelling probabilities in the logistic regression reads

$$\Pr(y = 1 | x_1, x_2, \dots, x_k) = \frac{\exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k)}{1 + \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k)}$$

with $\Pr(y = 1 | x_1, x_2, \dots, x_k)$ as the probability that (un-)paid overtime work and one of the four different working hours' arrangements, respectively, occurs (see e.g. Greene 2008; Wooldridge 2013). The β-coefficients give the direction and significance of the association. We additionally compute the average partial effects (APE) to facilitate the interpretation of the results. The APE show how much the probability of a positive outcome changes if the independent variable changes by one unit.
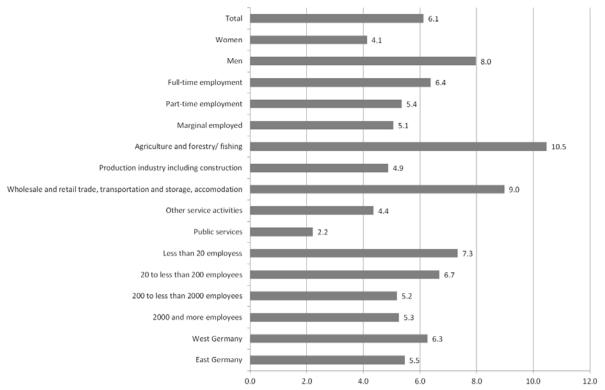
4 Results

4.1 Paid overtime

4.1.1 Distribution of paid overtime

Around six per cent of the employees worked paid overtime hours during the last month (Figure 1). Paid overtime hours are more widespread among men than women and among full-time employees as compared to part-time employees or employees in marginal employment. Paid overtime hours are most commonly worked in agriculture and forestry/fishing, in smaller establishments with less than 20 employees and in West Germany.

Figure 1
Proportion of employees working paid overtime

Source: SOEP 2011, weighted results, own calculations.

As paid overtime hours normally need to be ordered by employers they can control the distribution and extent of paid overtime hours. However, paid overtime hours can also be controlled by employees in two ways. First, employees work paid overtime hours due to career and income opportunities. Second, employees do not work paid overtime hours or refuse to accept them as personal interests are opposed to paid overtime hours, such as a good work-life balance.

4.1.2 Results of logistic regressions

Table 1 shows the results of the logistic regression model for paid overtime. In general, men, employees with a fixed-term or temporary employment contract, employees in a lower leadership position and with lower autonomy, employees with a very heavy burden due to a job at risk as well as service and sales workers have a higher

probability of working paid overtime hours. Regarding establishment characteristics, employees in agriculture and forestry/fishing and in the service sector, employees in establishments with a higher proportion of marginally employed persons and part-time workers as well as employees in establishments with problems due to competitive pressure perform paid overtime hours more frequently.

Regarding the employee characteristics in more detail, the results show that women have on average an about 5.7 percentage points lower probability of working paid overtime hours as compared to men. We can assume that women defend against paid overtime hours. For them it is more difficult to extend the working hours through overtime due to manifold obligations outside the job and the need to combine work and family. Women more frequently undertake household duties or take care for elderly relatives leading to time conflicts affecting the work-life balance. Also voluntary activities can lead to time conflicts and thus are opposed to an extension of working hours. Employees with a fixed-term or temporary employment contract perform paid overtime hours more frequently than the reference group. Employees with a fixed-term contract have on average an about 9.3 percentage points higher probability to work paid overtime hours. They may perform paid overtime hours to signal commitment, motivation and loyalty to their employer. Employers can honour the employees' willingness for additional working hours by offering a permanent employment contract. Employees experiencing a very heavy burden due to a job at risk work paid overtime hours more frequently. Those employees might be willing to work more hoping they can safe their workplace. In contrast, 25 to 34 years old employees have a lower probability to work paid overtime hours as compared to younger as well as older employees. We assume that employees in this age group are more likely to perform unpaid overtime hours as compared to older employees to signal high commitment, motivation and loyalty to move forward in their career (see Table 2).

Considering the job characteristics the results show that employees in another leadership position have a higher probability of working paid overtime hours as compared to employees without leadership position and employees in top/ middle or lower management or in a highly qualified specialist position. As the position of employees in another leadership position is not clearly specified we assume a low or an informal leadership position of qualified specialists. Establishments are interested in those employees working paid overtime hours as they have a certain amount of establishment-specific human capital. Establishments can use this specific human capital more efficiently by extending the working hours through overtime work. Employees with a high autonomy have on average an about 2.7 percentage points lower probability of working paid overtime hours as compared to employees with a low or medium autonomy. We expect that employees with a high autonomy have a higher position in the establishment. For those employees the additional hours worked are often already compensated by a higher salary and not by an additional payment. Employees with a high autonomy also more often work in trust-based working hours and thus overtime hours are not recorded to be additionally paid for. Service and sales workers also work paid overtime hours more frequently. As service and sales workers are in direct contact to

customers, establishments order paid overtime hours to react quickly to customer wishes and to adapt to demand fluctuations.

Table 1
Logistic regression model for paid overtime hours

Independent variables	Dependent variable: Paid overtime		
	APE		Std. Err.
Female	-0.057	***	0.013
Fixed-term contract	0.093	**	0.041
Temporary employment contract	0.072		0.055
Job-related burden, which does very heavily burden	0.093		0.060
Satisfactory health status	-0.021	*	0.012
25-34 years	-0.041	***	0.009
High level of autonomy	-0.027	**	0.012
In another leadership position	0.087		0.073
Service and sales workers	0.051		0.032
Products or services mainly offered outside Germany	0.025		0.018
Big problems due to competitive pressure	0.033		0.023
Small problems due to competitive pressure	0.034	*	0.020
Proportion of workers in marginal employment	0.001	**	0.000
Proportion of workers in part-time	0.001	*	0.000
Proportion of female workers	0.000		0.000
Proportion of women in leading positions	-0.001	**	0.000
Workers with a temporary employment contract	0.019		0.015
Agriculture and forestry/fishing	0.082		0.070
Wholesale and retail trade	0.041	*	0.024
Other service activities	0.051		0.035
Public services	0.045		0.030
Number of observations	950		
Pseudo R²	0.30		

*p<0.1, **p<0.05, ***p<0.01
Source: SOEP-LEE 2011, own calculations.

Taking the employer characteristics into account, the results reveal that the higher the proportion of women in leadership positions the less likely it is for employees to work paid overtime. A one percentage points increase in the proportion of women in leading positions reduces the probability of paid overtime hours by about 0.1 percentage points. We assume that women in leadership positions are more sensitized for combining work and family and thus want to avoid paid overtime as far as possible. The higher the proportion of marginally employed persons or part-time workers the more likely it is for employees to work paid overtime in those establishments. By varying the proportion of marginally employed persons and part-time workers establishments are able to respond to demand fluctuations to extend operating or opening hours. Operating procedures and workflow are more flexible and establishments can compensate a temporary lack of employees. However, among the marginally employed and part-time workers are mostly women working a reduced number of hours. As these employment groups are often not able to increase their working hours due to

e.g. household duties, employers order paid overtime hours for other groups in the establishment to react to changes in demand.

In establishments having big or small problems with competitive pressure employees are more likely to work paid overtime hours compared to employees in establishments having no problems with competitive pressure or where competitive pressure does not at all exist. Establishments use flexible working hours to successfully deal with competitive pressure. Through flexible working hours and extended working hours establishments pass the competitive pressure on to their employees to quickly react to customer wishes and demand fluctuations. Employees working in establishments of the agricultural sector and the service sector perform paid overtime hours more often. As compared to the industrial sector establishments in those branches can less produce in stock. Establishments need other instruments to adjust to demand fluctuations. In case of an increasing demand establishments order paid overtime hours. They also use paid overtime when recruitments are not intended or cannot be implemented in the short run as well as due to an insufficient personnel planning, as it might occur e.g. in the public sector.

4.2 Unpaid overtime

4.2.1 Distribution of unpaid overtime

Figure 2 shows that unpaid overtime is more widespread as compared to paid overtime. Around 11 per cent of the employees performed unpaid overtime hours. Again, men more often work unpaid overtime hours than women. They are also more widespread among full-time employees. According to the different economic sectors unpaid overtime hours are more widespread in agriculture, forestry/fishing and in other service activities. They also more often appear in middle sized establishments (20 to less than 200 employees) and in establishments in West Germany.

Figure 2
Proportion of employees working unpaid overtime

Total	11.3
Women	9.0
Men	13.6
Full-time employment	13.3
Part-time employment	5.0
Marginal employed	6.2
Agriculture and forestry/ fishing	17.3
Production industry including construction	10.9
Wholesale and retail trade, transportation and storage, accomodation	12.6
Other service activities	17.2
Public services	7.7
Less than 20 employess	10.7
20 to less than 200 employees	13.1
200 to less than 2000 employees	10.5
2000 and more employees	10.9
West Germany	11.6
East Germany	10.3

Source: SOEP 2011, weighted results, own calculations.

4.2.2 Results of logistic regressions

Table 2 shows the results of the logistic regression model for unpaid overtime. Giving a brief overview, employees with a satisfactory, but also a poor health status as well as employees with a higher educational level and in a higher management position have a higher probability of working unpaid overtime hours. Also managers, professionals, technicians and associate professionals as well as clerical support workers are more likely to work unpaid overtime hours. In contrast, women with children under 16 years, part-time employees and older employees have a lower probability of working unpaid overtime hours. In export-dependent establishments, establishments with problems due to competitive pressure and an increasing business volume as well as in the trade sector the probability of unpaid overtime hours increases. By the same token, the probability of unpaid overtime hours also increases with the proportion of workers with higher education, but it decreases with establishment size.

A closer look at the employee characteristics reveals that women with children under 16 years are less likely to work unpaid overtime hours. Women with children need to combine work and family and often time conflicts arise affecting the work-life balance. Due to time conflicts and time restrictions outside the job they are not able to offer unpaid overtime hours to their employer. Part-time employees have on average an about 4.7 percentage points lower probability to perform unpaid overtime hours as compared to full-time employees and marginally employed workers. We assume that employees in regular part-time are less inclined to perform unpaid overtime hours when part-time employment is voluntary, that is, desired by the employee and not by

the employer. Voluntary part-time employees are often women, but also men in partial retirement.[4] Those employees already have utility-maximising working hours and thus do not want to extend their working hours. As voluntary part-time employees do not wish a full-time employment we assume that they do not have an incentive to signal motivation, commitment and loyalty to their employer to receive a full-time position in return. Additional investments in human capital through unpaid overtime hours are not worthwhile for voluntary part-time employees. But even employees working part-time involuntarily can be less inclined to work unpaid overtime hours. This applies when establishments do not provide full-time jobs for their employees. Consequently, investments in human capital or a higher engagement through unpaid overtime are not worthwhile.

Employees at a higher age group are less likely to work unpaid overtime hours as compared to employees aged 18 to 24. Employees in the oldest age groups have on average an about 11.6 and 11.0, respectively, percentage points lower probability of working unpaid overtime hours. Employees being 25 to 44 years old also have a lower probability as compared to the youngest employees, but they have a higher probability as compared to the older ones. With unpaid overtime hours younger employees can signal their commitment, motivation and loyalty to receive a higher position and to remain in the establishment. Remaining in the establishment they can obtain positive returns in the future such as a higher salary through seniority remuneration systems. Younger employees are also more inclined to perform unpaid overtime hours as an additional investment in human capital. These additional investments can also lead to positive returns in the future.

Employees with a satisfactory or poor current health status have a higher probability of unpaid overtime hours as compared to employees with a bad health status. A bad health status prevents employees to offer unpaid overtime hours, whereas employees with a slightly better ("poor") health status are more capable to do unpaid overtime hours. Employees with a higher educational level, such as intermediate school and upper secondary school, are more likely to work unpaid overtime hours. Employees with an upper secondary school degree have on average an about 10.4 percentage points higher probability to work unpaid overtime hours. Establishments offer those employees higher wages for a given, contractually agreed working time. In return, employees work additional hours, which are often already compensated with higher wages, such that hourly wages are in fact lower. Higher educated employees also offer unpaid overtime hours to achieve target agreements which cannot be achieved during the contractually agreed working hours. Those employees internalize the given goals, and they have an intrinsic motivation to extend the working hours. Results-

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[4]   Here, voluntary part-time employment of women means that women decide to work part-time and part-time is not stipulated by the employer. However, the decision of women to work part-time can be attributed to the classical division of labour between men and women.

oriented or performance-oriented pay, as e.g. bonuses or profit participation, offer direct monetary incentives to increase performance working unpaid overtime hours.

Considering the job characteristics the results reveal that employees in a (top,) middle and lower management position have a higher probability of working unpaid overtime hours as compared to employees in a highly qualified specialist position, another leadership or no leadership position. Employees in a middle management position have on average an about 18.9 percentage points higher probability to work unpaid overtime hours. Establishments offer those employees remuneration above the market-clearing wage at a given contractually agreed working time. Due to the higher wages employees are willing to work unpaid overtime hours. Employees in a middle management position also have an incentive to offer unpaid overtime hours to achieve higher bonuses or rewards, as e.g. future promotions to better paid positions. In this sense, unpaid overtime hours serve as a signal to the employer. As for higher educated employees results-oriented or performance-oriented pay provide monetary incentives to increase the working hours.

According to the classification of occupations, managers, professionals, technicians and associate professionals and clerical support workers are more likely to work unpaid overtime hours. For example, professionals have on average an about 11.2 percentage points higher probability of working unpaid overtime hours and for clerical support workers it is 16.5 percentage points as compared to employees in elementary occupations, service and sales workers, skilled agricultural, forestry and fishery workers, craft and related trade workers and plant and machine operators and assemblers. Employees in the above mentioned occupations work unpaid overtime hours if the length of the time required to complete job tasks is uncertain and a mismatch between the contractual hours and the hours actually worked arises. This mismatch usually occurs for employees with complex tasks and a far-reaching authority to decide, as e.g. managers or professionals. Managers extend their working hours through unpaid overtime to increase team performance and the reputation of their team. As mentioned above, results-oriented or performance-oriented pay set monetary incentives. Establishments also offer remuneration above the market-clearing wage at a given contractually agreed working time. For managers and professionals also an intrinsic motivation to perform unpaid overtime hours can play a role.

Table 2
Logistic regression models for unpaid overtime

Dependent variable: Unpaid overtime			
Independent variables	APE		Std. Err.
Female	0.017		0.023
Part-time	-0.047	**	0.024
Job-related burdens which does heavily burden	-0.087	***	0.032
Satisfactory health status	0.039	*	0.022
Poor health status	0.090	**	0.041
Living together	0.042	*	0.021
Women with children under 16 years living in household	-0.062	**	0.027
Men with children under 16 years living in household	-0.015		0.031
Intermediate school	0.060		0.037
Upper secondary school	0.104	**	0.045
25-34 years	-0.096	***	0.030
35-44 years	-0.097	**	0.038
45-54 years	-0.116	***	0.044
55-65 years	-0.110	***	0.036
High level of autonomy	0.050		0.032
In top management	0.091		0.083
In middle management	0.189	***	0.057
In lower management	0.068	*	0.036
Managers	0.124		0.093
Professionals	0.112	**	0.053
Technicians and associate professionals	0.074	**	0.040
Clerical support workers	0.165	***	0.057
Products or services mainly offered outside Germany	0.050	*	0.029
Big problems due to competitive pressure	0.061		0.042
Small problems due to competitive pressure	0.057		0.035
No problems due to competitive pressure	0.069	*	0.041
Increasing business volume as compared to previous year	0.034	*	0.019
Proportion of workers with a higher education	0.001	**	0.000
Establishment size	-0.014	**	0.007
Wholesale and retail trade	0.117	***	0.043
Number of observations	891		
Pseudo R²	0.26		

*p<0.1, **p<0.05, ***p<0.01

Source: SOEP-LEE 2011, own calculations.

Regarding the employer characteristics the results show that the higher the proportion of employees with a higher education degree the more likely unpaid overtime hours are worked by employees in the establishment. In those establishments unpaid overtime hours can be considered as normal due to the specific corporate culture. An increasing pressure from colleagues can lead to longer working hours and unpaid overtime hours if employees have similar tasks. With similar tasks the performance of employees is more comparable. Thus, also the direct environment of employees in the establishment can establish unpaid overtime hours. With an increasing establishment size it is less likely for employees to work unpaid overtime hours. In larger establishments modern instruments of time recording, as e.g. working-time accounts,

are more widespread. With working-time accounts unpaid overtime hours can be avoided or at least reduced. Larger establishments more often have formal working time regulations, whereas in smaller establishments they are more informal. These informal regulations can favour unpaid overtime hours.

Employees in export-dependent establishments have on average an about 5 percentage points higher probability to work unpaid overtime hours as compared to employees in non-dependent establishments. Export-dependent establishments are affected by the volatilities of international markets and need to be highly flexible. Those establishments can face high international competitive pressure and have to quickly respond to changes in their environment. But they also have to act cost-efficiently to succeed in the international market. In those establishments unpaid overtime hours allow to quickly adjust to changes and to gain cost advantages. In establishments with problems due to competitive pressure employees have a higher probability of working unpaid overtime hours. Those establishments are also more affected by market volatilities and they have to react quickly and cost-efficiently to changes in their environment. Employees are more likely to perform unpaid overtime hours if the establishment has an increasing business volume as compared to the previous year. An increasing business volume indicates an increasing demand. Establishments react to an increasing demand by extending the working hours of employees. Employees working in the trade sector have on average an about 11.7 percentage points higher probability to work unpaid overtime hours. In this sector storage is not possible and establishments have to use other instruments to adjust to demand fluctuations. In case of an increasing demand employees have to work unpaid overtime hours. These latter results give clear hints that working time flexibility is governed by the business situation of employers.

4.3 Working hours' arrangements

Among employees fixed daily working hours are most widespread (Table 3). However, for 6 out of 10 employees working hours can vary. Almost one quarter of all employees have flexitime within a working hours account and a certain degree of self-determination of their daily working hours within this account. A similar proportion of employees has working hours that are fixed by the employer and that may vary from day to day. The fewest employees have no normally fixed working hours and can decide their working hours on their own.

Table 3
Distribution of working hours' arrangements

	Fixed daily working hours	Working hours fixed by employer which may vary	Working hours determined by employee	Flexitime within a working hours account
	41.3	22.0	12.8	23.9
Women	42.9	23.9	9.8	23.5
Men	39.8	20.2	15.6	24.4
Full-time employment	40.0	20.7	12.8	26.6
Part-time employment	44.2	27.4	10.8	17.6
Marginal employed	53.0	18.8	24.5	3.7
Agriculture and forestry/ fishing	28.5	23.4	33.0	15.2
Production industry including construction	46.6	14.9	12.0	26.6
Production industry	45.8	12.8	11.6	29.8
Construction industry	51.1	27.2	14.0	7.7
Wholesale and retail trade, transportation and storage, accomodation	43.6	37.1	10.8	8.5
Other service activities	29.5	13.8	21.4	35.4
Public services	39.4	25.6	9.0	26.0
Less than 20 employess	50.5	27.1	14.8	7.5
20 to less than 200 employees	44.1	24.1	12.4	19.4
200 to less than 2000 employees	38.6	18.7	10.8	32.0
2000 and more employees	32.0	18.0	13.3	36.7
West Germany	41.0	20.5	13.6	24.9
East Germany	42.5	28.2	9.6	19.9

Source: SOEP 2011, weighted results, own calculations.

4.3.1 Fixed daily working hours

In general, women in part-time or marginal employment, white-collar workers and civil servants, employees with an intermediate school or upper secondary school degree and employees in a top management position or with a high autonomy are less likely to have fixed daily working hours. Fixed daily working hours are also less widespread among professionals, technicians and associate professionals, clerical support workers, service and sales workers as well as plant and machine operators and assemblers. In larger establishments, in the trade sector and in other service sectors employees are less likely to have fixed daily working hours. However, women and employees working in establishments with competitive pressure are more likely to have fixed daily working hours.

Describing the results in detail we can see that women are more likely to have fixed daily working hours as compared to men. Initially one would assume that women prefer flexible working hours to combine work and family. But women can also prefer fixed daily working hours as working hours are predictable then. The working

fixed daily working hours as working hours are predictable then. The working timeframe is fixed by the employer increasing the planning capability for activities outside the job. In contrast, women in regular part-time work have a lower probability of fixed daily working hours. As women in part-time have a lower volume of work it is easier to vary the beginning and ending of the working time. The lower volume of work enables a greater scope and more flexible working hours' arrangements. This assumption is supported by the result that women in part-time are more likely to have no normally fixed working hours and deciding the working hours on their own (Table 6). Establishments are interested in flexible working hours' arrangements of part-time employees as they also use part-time work to make operation hours more flexible. Women in marginal employment also have a lower probability of fixed daily working hours. The low number of working hours in marginal employment makes it easy to vary beginning and ending of the working time. The distribution of the working time among the weekdays can also vary to a great extent. Establishments also often use marginal employment at short-notice or to compensate absent employees. This is in accordance with the result that employees in marginal employment are more likely to have no normally fixed working hours.

White-collar workers and civil servants are less likely to have fixed daily working hours as compared to blue-collar workers. They have on average an about 13.1 and 15.7, respectively, percentage points lower probability of fixed daily working hours. The working hours of white-collar workers and civil servants are more flexible as they less likely have a typical "nine-to-five" job. This greater working-time flexibility is plausible as the tasks and activities are less strictly given. Therefore, the division of tasks and working hours can vary to a larger degree. These explanations are supported by the results that white-collar workers and civil servants are more likely to have flexitime within a working hours account and a certain degree of self-determination (Table 7). As white-collar workers and civil servants, also employees with an intermediate school or upper secondary school degree are less likely to have fixed daily working hours. The probability decreases by 7.1 and 13.1, respectively, percentage points compared to employees with a secondary general school degree. Here, we can also assume that employees with a higher educational level are less likely to perform a strict "nine-to-five" job. They can more often self-determine the working hours to a certain degree. Indeed, employees with an upper secondary school degree have a higher probability of deciding the working hours on their own with no normally fixed working hours (Table 6).

Employees in a top management position have on average an about 29.7 percentage points lower probability of fixed daily working hours as compared to employees in a middle, lower or another (lower) management position. Employees in top management are at the head of an establishment. They organise the tasks on their own and they can largely determine their working hours. This explanation is in accordance with the result that employees in a top management position have a higher probability of no normally fixed working hours, but deciding the working hours on their own (Table

6). Employees with a high autonomy also have a lower probability of fixed daily working hours. As in a top management position those employees organise their tasks on their own with rather low restrictions. Against this background they can also self-determine their working hours to a larger degree. This explanation is supported by the result that employees with a high autonomy less likely have working hours fixed by the employer which may vary from day to day (Table 5). The results show that they are more likely to have no normally fixed working hours, deciding the working hours on their own (Table 6).

According to the occupational activity professionals, technicians and associate professionals, clerical support workers, service and sales workers as well as plant and machine operators and assemblers are less likely to have fixed daily working hours. We can assume that on the one side the tasks in those occupational activities are not repetitive or monotonous, as e.g. for professionals, technicians and associate professionals. They have on average an about 15.7 and 15.9, respectively, percentage points lower probability of fixed daily working hours. As tasks change and new tasks have to be undertaken fixed daily working hours would impede fulfilling the tasks as short-term adjustments can occur. For clerical support workers we can assume that beginning and ending of the working day vary with the amount of tasks. They have on average an about 10.1 percentage points lower probability of fixed daily working hours. Their working hours are also influenced by superiors, as e.g. this is the case for secretaries. On the other side we can assume that in the above mentioned occupational activities employees are in contact to customers or they produce for the end-customer, as e.g. plant and machine operators and assemblers. To react quickly to customer requirements and to changes in demand establishments vary the working hours of employees in those occupational activities. This explanation is in accordance with the result that employees in the above mentioned activities are more likely to have working hours fixed by the employer which may vary from day to day (Table 5).

Employees working in the trade sector and in other service activities have on average an about 8.7 and 14.8, respectively, percentage points lower probability of fixed daily working hours. In these sectors a production in stock is not possible. In case of demand fluctuations establishments use flexible working hours to adjust the work effort to the workload. With fixed daily working hours an adjustment to demand changes is more difficult just as realizing customer requirements and customer wishes. The larger an establishment the less likely it is for employees to have fixed daily working hours. With an increasing establishment size it is less practical for the employer to fix the working hours generally for all employees and to control whether employees actually work the given working hours. In contrast, employees get a certain degree of self-determination. In larger establishments modern instruments of time-recording are more widespread allowing the employees a certain degree of self-determination of the beginning and ending of the workday. This explanation is in accordance with the result that employees in larger establishments are more likely to have flexitime within a working hours account (Table 7).

Finally, establishments with competitive pressure judging this as a big, a small or no problem at all are more likely to have fixed daily working hours as compared to establishments where competitive pressure is not applicable. Employees working in establishments having big problems due to competitive pressure have on average an about 10.1 percentage points higher probability of fixed daily working hours. This result is at first instance surprising as establishments could react to competitive pressure by varying the working hours of employees. An alternative explanation is that establishments with competitive pressure have an established product range in mature markets. We assume that those establishments are older and possibly subject to more traditional and regulated working-time arrangements.

Table 4
Logistic regression models for fixed daily working hours

Dependent variable: Fixed daily working hours			
Independent variables	APE		Std. Err.
Female	0.068	*	0.038
Men in part-time	0.062		0.093
Women in part-time	-0.084	**	0.041
Marginally employed	0.052		0.093
Women in marginal employment	-0.335	*	0.192
Intermediate school	-0.071	**	0.033
Upper secondary school	-0.131	***	0.044
White collar worker	-0.131	***	0.048
Civil servant	-0.157	**	0.066
Medium level of autonomy	-0.052		0.039
High level of autonomy	-0.111	**	0.051
In top management	-0.297	***	0.075
In a highly qualified specialist position	-0.085	*	0.052
Managers	-0.130		0.081
Professionals	-0.157	***	0.059
Technicians and associate professionals	-0.159	***	0.048
Clerical support workers	-0.101	**	0.055
Service and sales workers	-0.153	***	0.048
Plant and machine operators	-0.110	**	0.048
Big problems due to competitive pressure	0.101	**	0.050
Small problems due to competitive pressure	0.125	***	0.045
No problems due to competitive pressure	0.103	**	0.048
Establishment size	-0.021	**	0.008
Wholesale and retail trade	-0.087	**	0.041
Other service activities	-0.148	***	0.045
Public services	0.059		0.041
Number of observations	1,091		
Pseudo R²	0.15		

*p<0.1, **p<0.05, ***p<0.01
Source: SOEP-LEE 2011, own calculations.

4.3.2 Working hours fixed by employer which may vary

In the second category, employers determine working hours, but they are not constant over time. Giving a brief overview, civil servants, employees in a highly qualified specialist position, professionals, technicians and associate professionals, service and sales workers, skilled agricultural, forestry and fishery workers as well as craft and related trade workers are more likely to have working hours fixed by the employer which may vary from day to day. In the trade sector, in establishments with a higher proportion of women in a leadership position and in East Germany employees are more likely to have working hours fixed by the employer which may vary. However, it is less likely for employees with a medium or higher autonomy and for employees in larger establishments.

Civil servants have on average an about 17.8 percentage points higher probability of working hours fixed by the employer which may vary from day to day. This result shows that civil servants do not have typical "nine-to-five" job anymore and their working hours have become more flexible as e.g. opening hours in public authorities have changed. Opening hours are longer at certain days to enable employed persons to visit public authorities. The longer opening hours require a certain amount of working-time flexibility. Employers fix the working hours to avoid understaffing. Some groups of civil servants also have to comply with duty planning and are not able to fix their working hours on their own, as e.g. policemen or train drivers.

Employees in a highly qualified specialist position are more likely to have working hours fixed by the employer. Here, employees' position in the establishment is too low to organise their tasks and working hours completely self-determined, however they are likely to be indispensable for many activities. We can assume that employees in a highly qualified position are often in contact to employees in an even higher position and consequently given meetings affect the working hours. Meeting requirements lead to varying working hours for employees without the possibility to determine the working hours according to their own needs. Employees with a medium or high autonomy are less likely to have working hours fixed by the employer as compared to employees with a low autonomy. Establishments offer those employees a higher degree of authority to decide on their own. With a higher decision-making authority employees are more able to organise their tasks and their working hours. This explanation is in accordance with the results that employees with a medium or high autonomy more likely decide the working hours on their own (Table 6).

Regarding the occupational activity, professionals, technicians and associate professionals, service and sales workers, skilled agricultural, forestry and fishery workers, craft and related trade workers as well as plant and machine operators and assemblers have a higher probability of working hours fixed by the employer which may vary. For professionals and technicians and associate professionals the probability is on average about 11.3 and 15.3, respectively, percentage points higher. In those occupations employees have to undertake new or changing tasks. The flexibility of distributing and fulfilling the tasks requires a certain flexibility of working hours. Service and sales workers and plant and machine operators have on average an about 19.1 and 36.2, respectively, percentage points higher probability of working hours fixed by the employer, which may vary. We assume that service and sales workers as well as plant and machine operators and assemblers are in direct contact to the customer or they produce for the end-customer. Against this background these employees cannot freely determine their working hours, but their working hours can be influenced by the establishment's environment. It is plausible that employers determine the working hours to react quickly to customer requirements and changes in demand. Accordingly, the results show that employees in those occupational activities are less likely to have fixed daily working hours (Table 4). Employees working in the trade sector have on average an about 21.9 percentage points higher probability of working hours fixed by the employer, which may vary. As a production in stock is not possible in the trade

sector, establishments use flexible working hours to react quickly to customer wishes and to adjust the work effort to the workload. In this case it is plausible that establishments determine the working hours of their employees which may vary according to the specific situation. The above mentioned results show that employees in the trade sector less likely have fixed daily working hours (Table 4).

Table 5
Logistic regression models for working hours fixed by employer which may vary

Dependent variable: Working hours fixed by employer which may vary		
Independent variables	APE	Std. Err.
Civil servant	0.178 ***	0.060
45-54 years	-0.036	0.027
Medium level of autonomy	-0.060 *	0.035
High level of autonomy	-0.081 **	0.041
In a highly qualified specialist position	0.106 *	0.056
Professionals	0.113 *	0.060
Technicians and associate professionals	0.153 ***	0.045
Service and sales workers	0.191 ***	0.061
Skilled agricultural, forestry and fishery workers	0.266 *	0.158
Craft and related trade workers	0.151 **	0.062
Plant and machine operators	0.362 ***	0.073
Products or services mainly offered outside Germany	-0.059 *	0.035
Increasing business volume as compared to previous year	-0.044	0.027
Proportion of female workers	0.002 ***	0.001
Establishment size	-0.029 ***	0.009
Wholesale and retail trade	0.219 ***	0.047
East Germany	0.063 **	0.029
Number of observations	973	
Pseudo R²	0.13	

*p<0.1, **p<0.05, ***p<0.01
Source: SOEP-LEE 2011, own calculations.

With an increasing proportion of women in an establishment, employees have a higher probability of working hours fixed by the employer which may vary. Due to family obligations women have specific time requirements, which can be in conflict with the establishments' needs. Establishments are generally interested in organising the working hours according to their needs to react to demand fluctuations and to stay competitive in a fast changing economic environment. However, this might become more difficult with a higher proportion of female workers. The larger an establishment the less likely it is for employees to have working hours fixed by the employer which may vary. With an increase in establishment size by 1 percentage point the probability of fixed daily working hours decreases by 2.9 percentage points. In larger establishments the employer is less able to determine and control the working hours generally for all employees, whereas modern time-recording systems are more widespread as e.g. working-time accounts. With these time-recording systems employees can self-

determine the beginning and ending of the working day to a certain degree. This explanation is supported by the result that with an increasing establishment size, employees are more likely to have flexitime within a working hours account (Table 7).

Employees working in an establishment in East Germany more likely have working hours fixed by the employer, which may vary. The probability is on average about 6.3 percentage points higher as compared to establishments in West Germany. Against the historical background we assume that in East German establishments a stronger culture of following instructions exists. Accordingly, the working hours are determined by the employer and they are adjusted according to demand fluctuations.

4.3.3 Working hours determined by employee

Now we proceed to the category of employee-determined working hours. A first look shows that women and employees with children under 16 years have a lower probability of deciding the working hours on their own with no normally fixed working hours. Also civil servants, craft and related trade workers and employees working in establishments with a works council less decide the working hours on their own. In contrast, women in part-time, marginally employed persons and older employees have a higher probability of deciding the working hours on their own. Self-determined working hours are also more likely for employees in a top management position, for employees with a medium or high autonomy and for employees with an upper secondary school degree.

A closer look at the results reveals that women have on average an about 5.1 percentage points lower probability of self-determining their working hours as compared to men. This lower probability affects women in full-time employment as the association for women in part-time is positive (see next paragraph). We assume that in general women in full-time have a lower authority as compared to men to decide about the distribution of tasks and working hours. Employees with children under 16 years are less likely to have self-determined working hours. When employees can self-determine working hours we can assume a fluent boundary between work and private life leading to a negative work-life balance. Accordingly, we assume that employees with younger children wish a certain defined working timeframe not allowing a too strong intervention to private life. But within this timeframe they wish a certain degree of self-determination. This explanation is in accordance with the result that employees with younger children more likely have flexitime within a working hours account (Table 7).

Women in part-time employment have a higher probability of self-determining their working hours as compared to women in full-time. In case of part-time employment it is easier to vary beginning and ending of the working day. Women in part-time also have more possibilities to determine their working hours as they are less tied to operational processes in the establishment. Those reasons also apply for marginal employed persons. Their probability to have no normally fixed working hours, but decid-

ing their own working hours is on average about 29 percentage points higher. Marginally employed persons also often work at short notice or they replace absent employees leading to flexible working hours without a formal timeframe.

In comparison to the 18 to 24 years old, employees in the higher age groups have a higher probability of deciding the working hours on their own. Employees being 55 to 65 years old have on average an about 68.1 percentage points higher probability of self-determined working hours. Employees at a higher age have a longer work experience and they probably already work longer in the establishment. Younger employees have a lower work experience and are less established. Consequently, their decision-making authority and their competences are more restricted as compared to older employees. Due to the higher authority and larger competences older employees more often can determine the working hours on their own.

Employees in a top management position more likely decide the working hours on their own as compared to employees with a lower or no leadership position. Their probability of self-determining the working hours is on average about 25.1 percentage points higher. Top position managers are at the head of an establishment not having any working time requirements. They also often have trust-based working hours without recording the actual working hours. Employees with a medium or high autonomy also more likely decide the working hours on their own. As compared to employees with a low autonomy the probability is on average about 11.9 and 23.7, respectively, percentage points higher. Those employees have a higher authority to decide about the distribution of their tasks without or rather low requirements from the establishments' side. Due to the higher authority they can more often self-determine their working hours. Accordingly, the results above show that employees with a medium or high autonomy less likely have working hours fixed by the employer (Table 4). Employees with an upper secondary school degree have on average an about 8.0 percentage points higher probability of deciding their own working hours with no normally fixed working hours as compared to employees with secondary general school or intermediate school. As in the case of a top management position or higher autonomy employees with an upper secondary school degree have a higher authority with the possibility to organise their tasks and working hours more freely.

Civil servants have a lower probability of deciding the working hours on their own. They more often have duty planning and work in public authorities with given opening hours. During the opening hours a sufficient staffing is necessary so that civil servants cannot purely self-determine their working hours. Craft and related trade workers also less likely decide the working hours on their own. In this occupation employees have a broadly defined catalogue of tasks given by the employer. Craft and related trade workers have a lower sovereignty as in this occupation the company's hierarchy is more important. Due to the lower sovereignty employees cannot self-determine their working hours. The working hours are more likely fixed by the employer which may vary, as the results above show (Table 5). Finally, employees working in an establishment with a works council have on average an about 5.1 percentage points lower

probability of purely self-determining the working hours as compared to employees working in an establishment without a works council. Works councils negotiate the working hours of employees with the employer at the establishment level. They can be skeptical towards regulations setting no framework at all as boundaries between work and private life might become fluent then. In contrast, works councils can favour working hours with a certain timeframe, thus exerting a protective function for employees from too high burdens. Accordingly, works councils have a positive impact on flexitime within a working hours account (Table 7).

Table 6
Logistic regression model for working hours determined by employee

Dependent variable: Working hours determined by employee			
Independent variables	APE		Std. Err.
Female	-0.051	**	0.024
Men in part-time	-0.013		0.073
Women in part-time	0.104	***	0.028
Marginally employed	0.290	***	0.091
Children under 16 years living in household	-0.037	*	0.020
Upper secondary school	0.080	***	0.025
Civil servant	-0.079	***	0.021
25-34 years	0.737	***	0.009
35-44 years	0.680	***	0.009
45-54 years	0.597	***	0.009
55-65 years	0.681	***	0.009
Medium level of autonomy	0.119	***	0.034
High level of autonomy	0.237	***	0.047
In top management	0.251	***	0.079
Clerical support workers	0.045		0.033
Service and sales workers	0.062		0.047
Craft and related trade workers	-0.072	***	0.026
Big problems due to competitive pressure	0.022		0.021
Works council in the establishment	-0.051	**	0.021
Agriculture and forestry/fishing	0.073		0.073
Wholesale and retail trade	0.036		0.031
East Germany	0.035		0.022
Number of observations	1,082		
Pseudo R²	0.22		

*p<0.1, **p<0.05, ***p<0.01
Source: SOEP-LEE 2011, own calculations.

4.3.4 Flexitime within a working hours account

As the final category, we investigate flexitime arrangements. A first overview of the results shows that employees with children under 16 years are more likely to have flexitime within a working hours account, whereas the opposite occurs for women in part-time employment. White-collar workers and civil servants, employees with a medium autonomy, managers, professionals, technicians and associate professionals as well as clerical support workers more likely have flexitime. In contrast, employees at

a medium age less likely have flexitime. In larger establishments and in establishments with a works council employees have a higher probability of flexitime within a working hours account. The probability is lower in establishments with an increasing proportion of marginally employed persons and women in a leadership position, with a decreasing development of demand, with problems due to competitive pressure, in the trade sector and in public services.

Employees with children under 16 years more likely have flexitime within a working hours account as compared to employees without younger children. The probability is on average about 7.3 percentage points higher. Employees with younger children have to combine work and family from which time conflicts can arise. The working life for parents is facilitated if working hours are not entirely fixed, but can vary to a certain degree. Due to varying working hours working parents can better synchronize their beginning and ending of the working time with opening hours of school or kindergarten. However, if formal working time regulations would be completely missing the boundaries between work and private life would be fluent with a possible negative impact on private life. Working parents do not want to have completely flexible working hours, but they prefer working-time flexibility to a certain degree. Women in part-time have a lower probability of flexitime within a working hours account. In contrast, they more likely have self-determined working hours (Table 6). Compared to the 18 to 24 years old, employees in the higher age groups are also less likely to have flexitime within a working hours account. In contrast, they are more likely to have self-determined working hours as one can assume higher authority and larger competences compared to younger employees (Table 6).

White-collar workers and civil servants are more likely to have flexitime within a working hours account and a certain degree of self-determination as compared to blue-collar workers. Their probability to have flexitime is on average about 17.7 and 23.7, respectively, percentage points higher. The tasks of white-collar workers and civil servants are less strictly defined and the distribution can vary making flexible working hours in a certain framework easier. Employees with a medium autonomy have a higher probability of flexitime within a working hours account. Those employees can to a certain degree decide on their own and they can organise and distribute their tasks more freely as compared to employees with a low autonomy. Furthermore, for employees with a medium and high autonomy the above results show that they can more likely self-determine their working hours (Table 6). Assuming that employees with a medium autonomy have a certain amount of establishment-specific human capital, establishments are interested in keeping them in the establishment. Working-time accounts provide an instrument for this purpose. In case of negative demand fluctuations employees work fewer hours to avoid employment losses. In case of positive demand fluctuations the acquired human capital can be efficiently used as the working hours are extended.

Considering the occupational activity, managers, professionals, technicians and associate professionals as well as clerical support workers are more likely to have flexitime and a certain degree of self-determination. Professionals as well as technicians and associate professionals have new and changing tasks with a certain flexibility of distributing and fulfilling the tasks. Due to this flexibility a certain working-time flexibility is possible and necessary. For professionals and technicians and associate professionals the probability is on average about 17.3 and 18.6, respectively, percentage points higher as compared to elementary occupations, service and sales workers, skilled agricultural, forestry and fishery workers as well as plant and machine operators, and assemblers. In the case of clerical support workers the probability is on average about 27.1 percentage points higher. Though we expect that they are bound by instructions we assume that their occupational position in the establishment is high enough to vary the beginning and ending of the working hours according to the workload. Though clerical support workers are not capable to self-determine their working hours freely they can distribute their working hours to a certain degree. This explanation is supported by the result that employees in those occupational activities less likely have fixed daily working hours (Table 4).

With an increasing establishment size employees have a higher probability of flexitime within a working hours account. In larger establishments modern instruments of time-recording such as working-time accounts are more widespread. Working-time accounts enable employees to vary beginning and ending of the working hours in a certain framework and to distribute the working hours more flexible among the weekdays. In an establishment with a works council employees have on average an about 12.8 percentage points higher probability to have flexitime within a working hours account. Works councils can be in favour of flexitime within a working hours account and a certain degree of self-determination for different reasons. One reason is the higher working-time autonomy for employees. Another reason is that works councils prefer working-time flexibility to react to demand fluctuations instead of an adjustment of the number of employees through numerical flexibility. With working-time flexibility establishments can avoid or at least reduce numerical flexibility and thus working-time flexibility can safeguard employment at least for a certain time period.

With an increasing proportion of marginally employed persons in an establishment, employees have a lower probability of flexitime within a working hours account. When the proportion of marginally employed persons increases by 1 percentage point, the probability of flexitime within a working hours account decreases by 0.4 percentage points. Marginal employment is an instrument of working-time flexibility and can be used as a substitute for working-time accounts. Establishments use marginal employment to adjust the work effort to the workload. Marginal employment seems to be especially advantageous if demand fluctuations are too small to generate a regular (full-time) position. Establishments also use marginal employment to cover additional personnel requirements at the weekend or outside the core working times.

Table 7
Logistic regression models for flexitime within a working hours account

Dependent variable: Flexitime within a working hours account			
Independent variables	APE		Std. Err.
Part-time	0.041		0.049
Women in full-time or marginal employment	-0.055		0.033
Women in part-time	-0.032		0.033
Men in part-time	0.113		0.090
Children under 16 years living in household	0.073	**	0.031
German nationality	0.136	*	0.073
Upper secondary school	0.048		0.031
White collar worker	0.177	***	0.047
Civil servant	0.237	***	0.076
25-34 years	-0.109		0.071
35-44 years	-0.178	***	0.064
45-54 years	-0.137	*	0.074
55-65 years	-0.106		0.075
Medium level of autonomy	0.051	*	0.029
In lower management	0.057		0.037
Managers	0.240	***	0.086
Professionals	0.173	***	0.061
Technicians and associate professionals	0.186	***	0.051
Clerical support workers	0.271	***	0.062
Craft and related trade workers	0.114		0.079
Big problems due to competitive pressure	-0.134	***	0.032
Small problems due to competitive pressure	-0.124	***	0.029
No problems due to competitive pressure	-0.087	***	0.031
Decreasing demand as compared to previous year	-0.076	**	0.032
Works council in the establishment	0.128	***	0.034
Industry wide or company agreement	-0.046		0.034
Proportion of workers in marginal employment	-0.004	**	0.002
Proportion of workers with a higher education	-0.001		0.000
Proportion of women in leading positions	-0.001	*	0.000
Establishment size	0.034	***	0.009
Wholesale and retail trade	-0.145	***	0.036
Public services	-0.132	***	0.030
East Germany	-0.052	*	0.027
Number of observations	967		
Pseudo R²	0.31		

*p<0.1, **p<0.05, ***p<0.01

Source: SOEP-LEE 2011, own calculations.

In establishments with a decreasing development of demand, it is less likely for employees to have flexitime within a working hours account. Initially, one might expect a positive association as flexitime allows to adjust the working hours to demand fluctuations. But it is also plausible that employers determine the working hours to react to the decreasing demand. Employees working in establishments with problems due to competitive pressure also less likely have flexitime within a working hours account.

Again a positive association would have been plausible. The results show that in those establishments employees more likely have fixed daily working hours (Table 4).

Employees working in the trade sector or public services have on average an about 14.5 and 13.2, respectively, lower probability of flexitime within a working hours account. In the trade sector a production in stock is not possible. To react to demand fluctuations establishments can vary the working hours as e.g. through working-time accounts. However, empirical results show that working-time accounts are less widespread in the trade sector as compared to the manufacturing industry. In the trade sector the working hours are more often determined by the employer and they may vary, as the results above show (Table 5). With this working hours' arrangements establishments ensure a sufficient staffing and quick reaction to customer wishes and needs. In public services duty planning is widespread and a sufficient staffing is necessary so that employees can hardly self-determine their working hours.

4.4 The role of employer, job and employee characteristics

To test the role of employer, job and employee characteristics from an overall perspective, we re-estimate the logistic regression model for each of the dependent variables. When re-estimating the model, we exclude in each case one of the bundles of characteristics (see also section 3.2.2). That is, first we re-estimate the model and exclude employer characteristics (but keep job and employee characteristics), second we re-estimate the model and exclude job characteristics (but keep employer and employee characteristics) and third we re-estimate the model and exclude employee characteristics (but keep employer and job characteristics). Then, the reduction of R² compared to the full model represents a measure for the importance of the excluded bundle of characteristics.

The classification of part-time and marginal employment as either employee or job characteristic is not clear. We consider part-time and marginal employment as employee characteristic. This classification is based on the assumption that employees voluntarily choose part-time or marginal employment. In Germany, the group of part-timers or marginal employed persons consists in the large majority of women preferring fewer working hours to combine work with family responsibilities. The legal regulations for part-time work in Germany foster employees to better balance work and private life. Accordingly, employees wishing to reduce their working hours can claim part-time work to their employer. Alternatively, part-time and marginal employment could also be classified as job characteristic. When considering part-time and marginal employment as job characteristic, the results are only slightly different.

Table 8 shows the comparative results for R². The higher the R² the less important each bundle of employer, job or employee characteristics is. Overall, for each of the dependent variables R² still has the highest value when excluding the employee characteristics showing that employee characteristics play the least important role in determining overtime and the different working hours' arrangements. This result is most clear for working hours fixed by employers, which may vary and also for fixed daily

working hours. In contrast, R² clearly declines when excluding employer or job characteristics showing that employer and job characteristics play the most important role in determining overtime and the different working hours' arrangements. However, the importance of employer and job characteristics also varies for overtime and the different working hours' arrangements.

Employer characteristics largely determine paid overtime hours. This result is in line with the German regulations as paid overtime hours must be ordered by the employer. But employee' representatives, such as a works council, have to agree to it. In comparison to the employer characteristics, job characteristics play a much smaller role for paid overtime. Nevertheless, the results are in line with our hypothesis stating that paid overtime is mainly driven by employer and job characteristics. Regarding unpaid overtime the results show that job characteristics are most important, whereas the importance of employer characteristics is a bit smaller. Although employee characteristics play the least important role, R² also considerably declines when excluding this bundle of characteristics. Generally, this result is in line with our hypothesis stating that employer, job and employee characteristics determine unpaid overtime hours. However, the results show that job characteristics are more important than employer characteristics. All in all, our results of the determinants of paid and unpaid overtime augment evidence that overtime is employer-oriented (Chung/Tijdens 2013).

The comparative results show that fixed daily working hours and working hours fixed by employer, which may vary, are mainly driven by employer and job characteristics, thus confirming our hypothesis. However, job characteristics are most important for fixed daily working hours, whereas employer characteristics are most important for working hours fixed by employer, which may vary. Working hours determined by employees are also largely driven by job and employer characteristics and not by employee and job characteristics as we assumed. The same is true for flexitime within a working hours account, but here employer characteristics are more important than job characteristics. While employees can flexibly organize their working times and can benefit from these two arrangements their determining power is weak, even though selection into appropriate jobs is possible. Altogether, our results of the determinants of different working hours' arrangements show the negotiating power of employers with regard to working-time flexibility.

Table 8
Comparative results for R²

		Paid overtime	Unpaid overtime	Fixed daily working hours	Working hours fixed by employer which may vary	Working hours determined by employee	Flexitime within a working hours account
Full model		0.290	0.257	0.153	0.129	0.223	0.307
Excluding	employer characteristics	0.047	0.167	0.106	0.051	0.152	0.129
	job characteristics	0.176	0.136	0.097	0.081	0.107	0.218
	employee characteristics	0.191	0.206	0.146	0.128	0.200	0.288

Source: SOEP-LEE 2011, own calculations.

5 Conclusion

In the underlying study, we investigate the determinants of overtime work and different working hours' arrangements as two measures for working-time flexibility, using unique linked employer-employee data for Germany. With this data set we consider the employers' and employees' side simultaneously providing a new comprehensive picture of driving factors of flexibility. Our empirical analysis is motivated by the theoretical literature distinguishing between employer-oriented and employee-oriented working-time flexibility.

In general, our results show that paid and unpaid overtime work and the different working hours arrangements are mainly driven by employer and job characteristics, whereas employee characteristics play a comparatively minor role. This result is most clear for fixed daily working hours and working hours fixed by employer, which may vary. Contrary to a priori assumptions, self-determined working hours by employees and flexitime within a working hours account are also mainly driven by employer and job characteristics. Employer characteristics are most important for paid overtime, working hours fixed by employer, which may vary and flexitime within a working hours account pointing to the power of employers. In contrast, job characteristics are most important for unpaid overtime, fixed daily working hours and self-determined working hours by employee.

All in all, our results reveal that overtime and the different working hours' arrangements are mainly employer-oriented. Thus, the appearance of these flexibility settings are mainly determined by employer characteristics, although employees can flexibly organize their working times and can benefit from certain arrangements, such as self-determined working hours and flexitime. For the development of industrial relations and the organisation of flexibility in the future, this result should be considered as a point of departure.

A limitation of this study is the restriction of the data to 2011. Due to this restriction we can only provide cross-sectional results. A panel data set would allow to study the

determinants of overtime and different working hours' arrangements even more thoroughly. Notwithstanding this limitation, our study provides evidence that working-time flexibility in Germany is mainly employer-oriented. Accordingly, working-time flexibility is mainly driven by employer and job characteristics. However, not at least due to societal developments there is a need to reconcile employers' flexibility requirements with more employee-oriented working-time flexibility arrangements. Against the background of demographic changes and a possible lack of qualified personnel, employers should be interested in providing more employee-friendly working-time flexibility arrangements. This poses challenges to the design of working time arrangements both on the level of industrial relations as well as in terms of support and regulations from the political side.

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Appendix

Table 9
Overview of dependent and independent variables

Variables	Values
Dependent variables	
Paid overtime	Dummy variable: yes=1
Unpaid overtime	Dummy variable: yes=1
Fixed daily working hours	Dummy variable: yes=1
Working hours fixed by employer which may vary	Dummy variable: yes=1
Working hours determined by employee	Dummy variable: yes=1
Flexitime within a working hours account	Dummy variable: yes=1
Independent variables	
Gender	Dummy variable: female=1
Working hours	Dummy variables:
	Full-time (reference category)
	Part-time
	Marginally employed
Fixed-term employment contract	Dummy variable: yes=1
Temporary employment contract	Dummy variable: yes=1
Number of years working in the establishment	0-50.9 years
Job-related burdens due to job at risk	Dummy variables:
	No (reference category)
	Yes, but does not at all burden
	Yes, does somewhat burden
	Yes, does heavily burden
	Yes, does very heavily burden
Health status	Dummy variables:
	Very good (reference category)
	Good
	Satisfactory
	Poor
	Bad
Family status	Dummy variable: living together=1
Children under 16 years living in household	Dummy variable: yes=1
German nationality	Dummy variable: yes=1
Educational level	Dummy variables:
	Secondary general school or „*Hauptschule*" (reference category)
	Intermediate school or „*Realschule*"
	Upper secondary school or „*Gymnasium/Fachhochschulreife*"
Current occupational status	Dummy variables:
	Blue collar worker (reference category)
	White-collar worker
	Civil servant
Age of employee	Dummy variables:
	18-24 years (reference category)
	25-34 years
	35-44 years
	45-54 years
	55-65 years
Autonomy in occupational status	Dummy variables:
	Low autonomy (reference category)
	Medium autonomy
	High autonomy
Leadership position	Dummy variables:
	No leadership position (reference category)
	In top management
	In middle management
	In lower management
	In an highly qualified specialist position
	In another position
Occupational activity	Dummy variables:

Variables	Values
Dependent variables	
	Elementary occupations (reference category)
	Managers (e.g. chief executives, administrative and commercial managers)
	Professionals (e.g. science and engineering professionals, health professionals)
	Technicians and associate professionals (e.g. health associate professionals, business and administration associate professionals)
	Clerical support workers (e.g. general and keyboard clerks, customer service clerks)
	Service and sales workers (e.g. personal service workers, personal care workers)
	Skilled agricultural, forestry and fishery workers (e.g. market-oriented skilled agricultural workers, subsistence farmers, fishers, hunters and gatherers)
	Craft and related trade workers (e.g. handicraft and printing workers, electrical and electronic trade workers)
	Plant and machine operators, and assemblers (e.g. stationary plant and machine operators)
Products/services mainly offered outside Germany	Dummy variable: yes=1
Problems due to competitive pressure	Dummy variables:
	Problem not applicable (reference category)
	A big problem
	A small problem
	No problem
Demand development compared to previous year	Dummy variables:
	Constant (reference category)
	Decreasing
	Increasing
Development of business volume	Dummy variables:
	Constant (reference category)
	Decreasing
	Increasing
Existence of industry wide or company agreement	Dummy variable: yes=1
Existence of works council	Dummy variable: yes=1
Proportion of female workers in leading positions	0-100%
Workers with temporary contract	Dummy variable: yes=1
Establishment size (logarithmic values)	1.6-11.2
Economic sector	Dummy variables:
	Production industry including construction (reference category)
	Agriculture, forestry and fishing
	Wholesale and retail trade
	Transportation and storage and accommodation
	Other service activities
	Public services
Region	Dummy variable: East Germany=1

Source: SOEP-LEE 2011, own compilation

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