Labor Market and Income Effects
of a Legal Minimum Wage in Germany

Preliminary version, please do not cite!

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Abstract: In view of rising wage and income inequality, the introduction of a legal minimum wage has recently become an important policy issue in Germany. We analyze the distributional effects of a nationwide legal minimum wage of 7.50 € per hour on the basis of a microsimulation model which accounts for the complex interactions between individual wages, the tax-benefit system and net household incomes. Apart from changes in the wage distribution we consider effects of a statutory minimum on labor supply and demand. Effects on the distribution of net household incomes are simulated taking labor demand restrictions into account. Simulation results show that the minimum wage would be rather ineffective in raising net household incomes and reducing income inequality, even if it led to a substantial increase in hourly wages at the bottom of the wage distribution. The ineffectiveness of a minimum wage in Germany is mainly due to the existing system of means-tested income support and the position of minimum wage earners in the income distribution.

JEL classification: I32, H31, J32

Keywords: minimum wage, wage distribution, income distribution, inequality, microsimulation

1 Introduction

Germany is one of the few OECD countries where no general legal minimum wage currently exists (see Immervoll, 2007). However, in view of rising wage inequality, the introduction of a legal minimum wage has recently become an important policy issue in Germany. One argument for the introduction of a legal minimum wage view is that the existing wage bargaining system no longer prevents 'excessive' downward wage flexibility. This is said to be related to the significant decline of union coverage in the economy and an expanding low wage sector partly as a result of recent labor market reforms in Germany. In this view, a minimum wage prevents 'unfair' competition as a result of wage subsidies aimed at increasing employment in the low-wage sector. Another argument is that earnings of anyone working full-time should be sufficient to cover at least the means-tested social minimum. In this view, a minimum wage is a means to prevent the emergence of the so-called 'working poor'. Proponents of this approach, including the governing Social Democratic Party and the unions, have suggested a legal minimum wage of 7.50 € per hour. It is this latter view on which we focus in this paper. In particular, we will investigate whether the suggested legal minimum wage would achieve the stated goal to reduce the degree and depth of *income inequality* among the working population.

Whereas the extensive literature on the economic effects of minimum wages primarily focuses on their wage and employment effects (see, e.g., Brown, 1999; Neumark and Wascher, 2007), there has been comparatively little research on the important policy question to what extent minimum wages affect the available income at the household level and thus the income distribution and inequality.[1] This literature, which mostly deals with the U.S., has shown that only a small fraction of families at the bottom of the income distribution includes workers that are employed at the minimum. Those households often do not work at all or have only a single wage earner with the spouse caring for children. Therefore, a change of minimum wages is only weakly or not at all related to household income and has no significant effect on income inequality. In order to comprehensively analyze the potential income effects of minimum wages, the composition of households, the interplay of minimum wages and the tax-benefit system, as well as the adjustment of labor supply and demand have to be taken into account.

For Germany, there are hitherto only a few explorative studies on the potential effects of a statutory minimum wage on the wage and income distribution. On the basis of data from the German Socioeconomic Panel (SOEP), DIW (2006) documents that in West Germany very low wages

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[1] This literature includes Johnson and Browning (1983), Burkhauser *et al*. (1996), Burkhauser and Sabia (2005), Bluestone and Ghilarducci (1996), MaCurdy and McIntyre (2001); Neumark and Wascher (1997, 2000), Neumark (2008) for the US; Goldberg and Green (1999) for Canada; Gosling (1996) and Sutherland (2001) for the UK. OECD (1998) and Brown (1999) summarize the older literature.

are concentrated among marginally employed persons working few hours in jobs exempted for social security contributions (so-called 'Mini jobs'), whereas in East Germany low-wage jobs are also common among regularly employed people. It is also shown that minimum wages would disproportionately affect employees working in small firms and certain sectors of the economy, in particular agriculture and services. Moreover, the relationship between lower wages and low incomes is found to be rather weak since low wages contribute only a relatively small share to household incomes. Bosch and Weinkopf (2006) report similar results for full-time employed people on the basis of administrative employment register data. Using SOEP data for 2004, Kalina and Weinkopf (2007) show that about 14 % of all dependent employed persons would have received a hypothetical minimum wage of 7.50 € in Germany, with higher shares among unskilled workers, women, youth, and people in marginal employment. Similar results are reported by Ragnitz and Thum (2007) who use individual wage data from the Earnings Survey for Germany from the year 2001.

The focus of our paper is on the effects of the introduction of a nationwide minimum wage of 7.50 € per hour distribution on household incomes and income inequality. In a first step, it is shown how a minimum wage in the suggested amount would affect the distribution of hourly wages abstracting from behavioral adjustments. To move from shifts in hourly wages to changes in net household incomes, we apply a microsimulation model based on the SOEP. This model accounts for the complexity of the German tax-benefits system, in particular means-tested income-support schemes, exemptions of very low earnings from social security contributions, and the joint income taxation of married couples imposing relatively high marginal tax rates on secondary earners. In addition to the static simulation of income effects ('first round effects') we allow behavioral adjustments of labor supply and demand and calculate net household incomes after the adaptation of employment ('second round effects'). Simulation results show that the proposed minimum wage would have little impact on the overall distribution of net household incomes and the reduction of inequality among households with at least one low-wage worker. If negative effects on labor demand are taken into account the average effects on income are reduced by about 50 %. To a large extent, the ineffectiveness of a minimum wage to increase net household incomes of the working poor and to reduce income inequality can be explained by the system of means-tested income support already existing in Germany.

In the next section, we provide the reader with information on the evolution of the low-wage sector as well as the relationship between low wages, means-tested income support and household incomes in Germany. Section 3 describes our methodological approach to estimate minimum wage effects on wages, employment, and ultimately net household income. Simulation results on the effects of the introduction of a minimum wage on hourly wages, employment, net household income and inequality are presented in Section 4. Section 5 summarizes our main findings and concludes.

2 Wage and Income Inequality, and the Minimum Wage Debate in Germany

Policy proposals to introduce a legal minimum wage in Germany are often made with reference to the alleged increase in wage and income inequality as well as rising poverty among the working poor associated with an expanding low-wage sector. These developments are often said to have especially affected women, who are disproportionately employed in low-wage jobs, and people in East Germany due to the still much higher unemployment and comparably weak union coverage.

Figure 1 documents the evolution of *wage inequality* between the mid-1990s and 2006 based on representative data from the German Socioeconomic Panel (SOEP).[2] Changes in the overall wage inequality, as measured by the ratio between the median and the mean of the hourly wage distribution in the respective group of employed people (excluding the self-employed), is mainly driven by the increasing divergence between the median and wages at the bottom of the wage distribution, as measured by the ratio between the first decile (p10) and the median. The decline in this wage ratio is particularly pronounced for men in West Germany and for both men and women in East Germany. By 2006, it had declined by a third to about 0.4 for men, which is roughly the same level as obtained by women in both regions. Except for women in West Germany, the decline of the p10/median wage ratio was much more pronounced in this period than the one recorded for the p25/median ratio.

Figure 2 documents that the share of *low-wage employment*, defined by an hourly wage of less than 50 % of the median, has been increasing markedly since the late 1990s, and in particular during the past few years. For men this share almost doubled in the observation period, reaching about 13 % in 2006, but the incidence of low-wage employment has also been increasing substantially for women, especially in East Germany. This strong increase occurred well before the recent labor market reforms which improved financial incentives to take up low-wage jobs, as described below.

Figure 3 plots *Lorenz curves* for the years 1995, 2000, and 2006 showing how *inequality* with respect to *net household equivalent income* has evolved over the last years.[3] As shown by the dotted graph for the year 2006 lying below the dashed and solid curves, income inequality has risen both in the West and East since 2000. In East Germany the increase in inequality is sharper and follows a common trend since 1995 as evidenced by the higher differences between Gini coefficients (see Table 1).

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[2] For more on the SOEP, see Section 3.

[3] The *Lorenz curve* is a graph of the cumulative net equivalent income share of the poorest 100 p % against the cumulative population share p (with units ordered in ascending order of equivalent income). The Gini coefficient equals twice the area between the Lorenz curve and the 45° ray. The new OECD scale has been used for the calculation of equivalent income which gives a factor of 1 to the head of household, of 0.5 to each adult person and of 0.3 to each family member younger than 18. For a discussion on the measurement of the poverty rate, see Section 3.

Figure 1   Evolution of wage inequality in Germany, 1995-2006

Men West

Men East

Women West

Women East
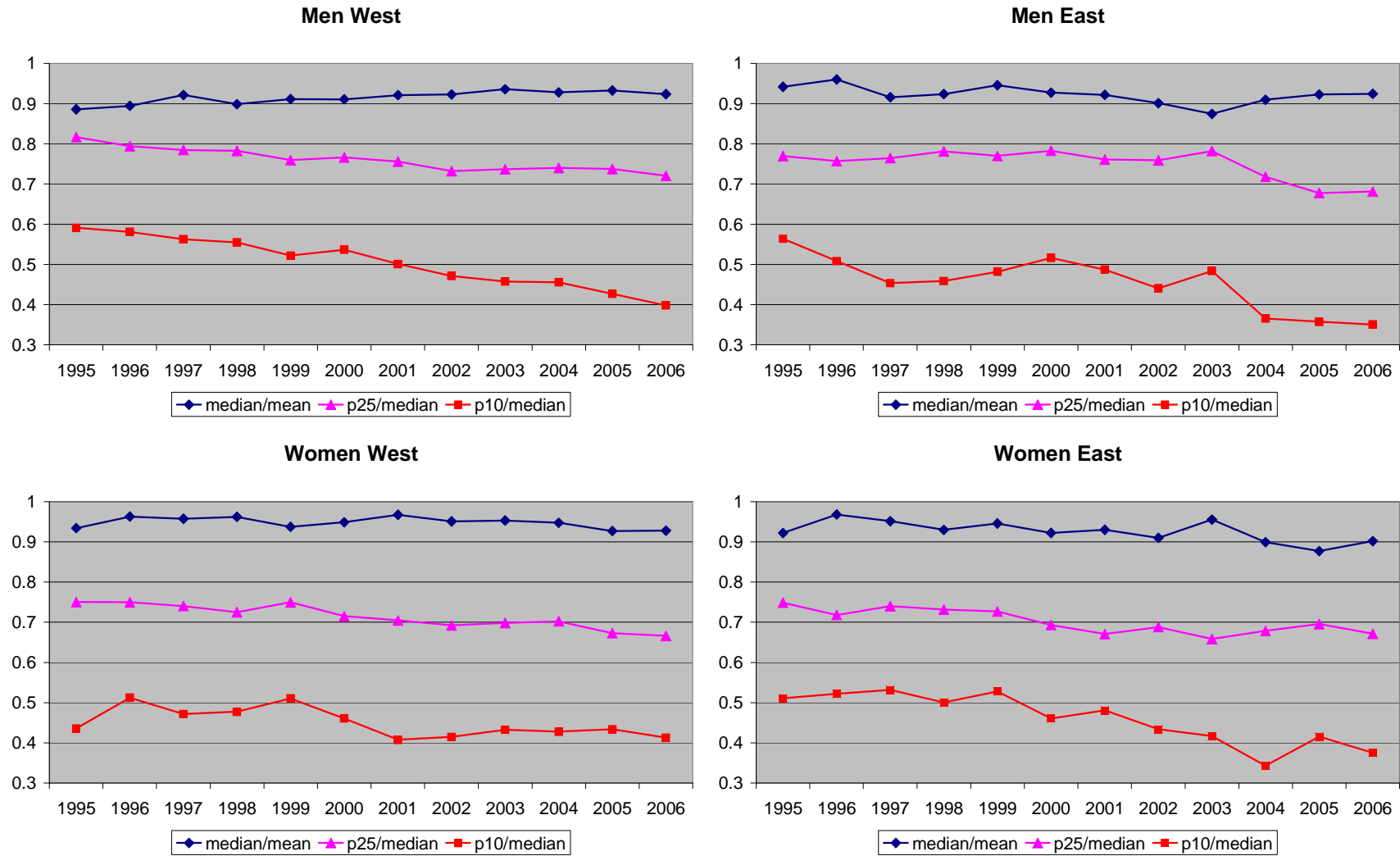
Notes: p10 is the 10th percentile, p25 is the 25th percentile of the wage distribution. Calculations are based on personal SOEP weights. Only employed people aged 18-65 are included, the self-employed are excluded.

Source: Own calculations based on SOEP, waves 1995-2006.

Figure 2   Share of low-wage employment (< 50% median hourly gross wage, in %), 1995-2006
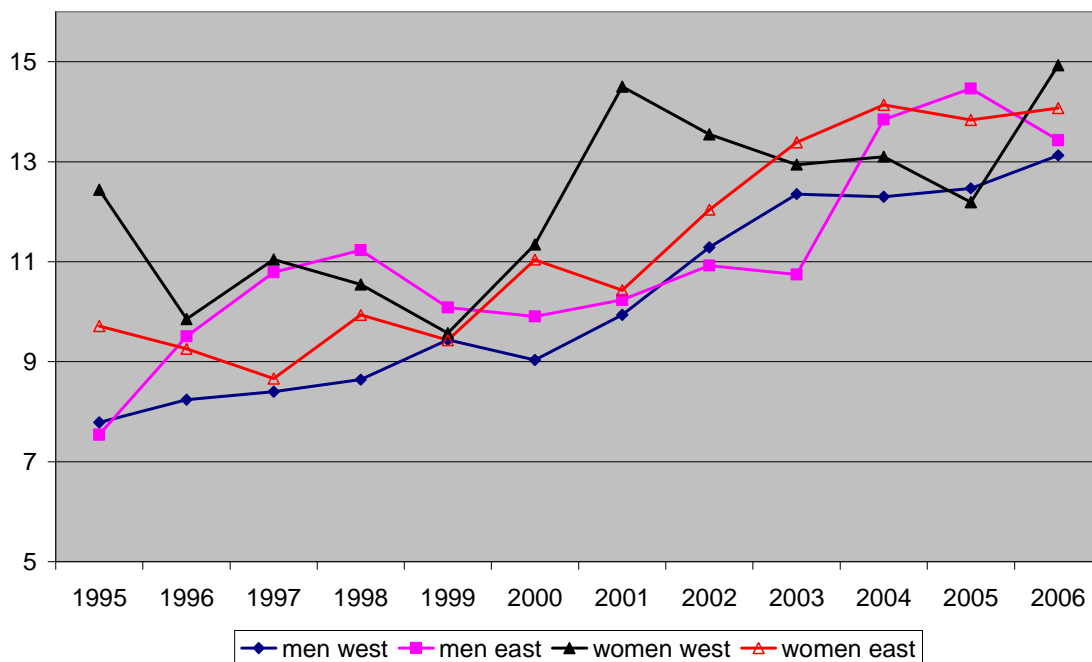
Notes: Low-wage share: share of people with an hourly wage < 0.5 median wage in the respective population subgroup (men in East Germany etc.). Only employed people aged 18-65 are included, the self-employed are excluded.

Source: Own calculations based on SOEP, waves 1995-2006, using sampling weights.

Figure 3   Lorenz Curves for net household equivalent incomes, West and East Germany, 1995, 2000, and 2006
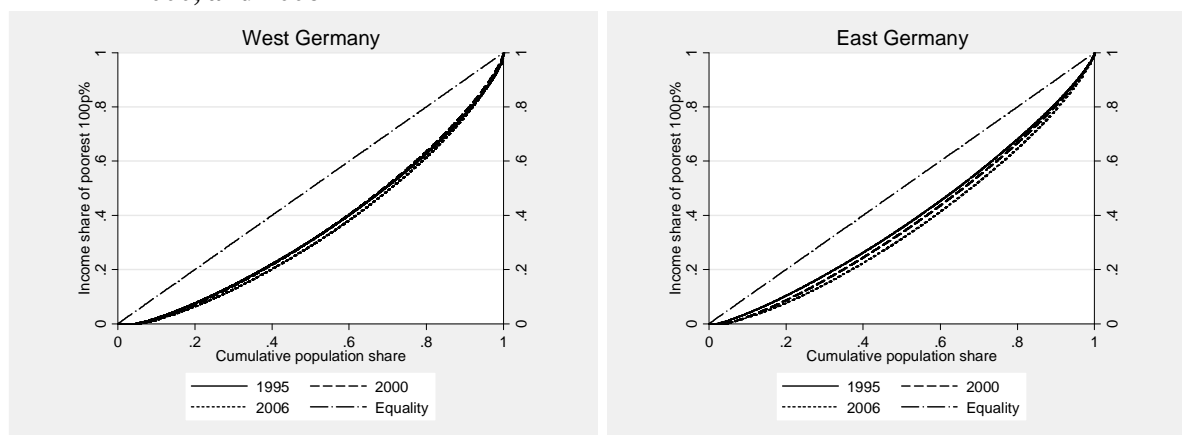
Source: Own calculations based on SOEP, waves 1995-2006.

Table 1   Gini coefficients, net household equivalent incomes

Year	West Germany	%Δ since 1995	East Germany	%Δ since 1995
1995	0.2906		0.2145	
2000	0.2884	-0.76	0.2421	12.87
2006	0.3164	8.88	0.2731	27.32

Source: Own calculations based on SOEP, waves 1995-2006.

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The empirical evidence indeed seems to support the claim that inequality at the bottom of the wage distribution has been strongly increasing, and that this is related to an expanding share of low-wage employment. Contrary to what is usually assumed, though, the empirical evidence also shows that men have been even more strongly affected by this development than women, and that the low-wage sector has been expanding strongly in both West and East Germany. In terms of increasing income inequality, however, the situation is worse in East Germany, where – measured by the Gini coefficient – inequality has risen by almost 30% between 1995 and 2006.

What are possible reasons for these developments? One factor for the widening of the wage distribution might be that union coverage has been declining since the mid 1990's (see, e.g., Schnabel and Wagner, 2006). Another explanation may be the labor market reforms of recent years. In particular, in 2003 the "mini-jobs" reform was introduced in Germany with the aim to boost employment in the low-wage sector.[4] However, this policy change cannot be responsible for the strong increase in the share of low-wage employment among men in West Germany and women in both regions which already set in before 2003. More recently, means-tested income support and unemployment insurance have been reformed with the aim to improve financial work incentives and increase the pressure on unemployed people to take up jobs in the low-wage sector of the economy (see, e.g., Schmitz and Steiner, 2007). Since these latter policy changes became only effective in 2005, they alone cannot explain the increase in inequality in East Germany. Part of this increase could also be related to the substantial reduction in expenditures on "active" labor market policies in East Germany, such as public works and training programs, which already started in the late 1990s (for a recent survey, see Caliendo and Steiner, 2005).

Whatever the reasons for these developments may be, they are used in support for the introduction of a minimum wage in the current German economic policy debate. As mentioned in the Introduction, basically two arguments can be distinguished: First, the existing wage bargaining system no longer prevents 'excessive' downward wage flexibility, partly due to subsidies of "mini jobs" and unemployment benefits which are not fully withdrawn when low-paid jobs are taken up. In this view, the government therefore has to intervene either by declaring existing industry wage contracts as generally binding or, where this is not applica-

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[4] There already existed special regulations for "mini jobs" regarding social security contributions. The "Mini Jobs" reform abolished the maximum hours restriction and expanded the range of exempted earnings up to 400 €; and reduced the social security contributionrate on earnings between 401 € and 800 € (for details, see Steiner and Wrohlich, 2005).

ble, by introducing a legal minimum wage.[5] The second view holds that earnings of anyone working full-time should be sufficient to at least cover the means tested social minimum. In this view, a minimum wage is a means to prevent poverty among the working poor, which can only be achieved by a statutory nationwide minimum wage.

Proponents of this view, including the governing Social Democratic Party and the unions, have suggested a legal minimum wage of 7.50 €per hour. Although this suggested minimum is well below the union wages already declared legally binding for all employees in some industries (see footnote 5), it is said to raise incomes of employees in industries with low union coverage and a large share of low-wage jobs. However, this view does not take into account that low hourly individual wages need not translate into low household income due to the existing system of means-tested income support and the distribution of low wage earners among households. The German transfer system is characterized by a comparatively high 'social minimum' relative to net in-work income of low qualified people and benefit-withdrawal rates close to 100 %. It includes a basic rate for each family member, which depends on the age of children, and a maximum amount for housing costs also depending on family size. Since 2005, the social minimum defines the amount of means-tested unemployment benefits (UB II) for people deemed 'employable' by the labor agency.[6] People not fulfilling this criterion receive "social assistance" ('*Sozialgeld*') which is also means tested and paid at similar amounts as UB II.

Table 2 shows average amounts of UB II for various types of households.[7] For a single person the monthly UB II amount is quite close to the poverty line defined above. As Table 2 also illustrates, for people entitled to UB II the hourly wage which would yield the same net income in a full-time job may well come close to or even exceed the current wage in the low-wage sector. The *implicit* minimum wage, given by UB II levels for different household types (see the note to Table 2 for an exact definition), is especially high for one-earner couples with

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[5] Contract wages set at the industry level can be declared generally binding by the government based on a special regulation contained in the so called '*Entsendegesetz*' which was initially introduced in the construction industry in 1997 with the aim to prevent firms from other EU countries to compete at lower wages than the contract wage set by German employers and unions. Since then, this regulation has been extended to the cleaning and maintenance industry, the temporary work's industry and most recently to the postal service industry. In these industries, minimum wages range from about 6.50 € per hour in the cleaning and maintenance industry in East Germany to almost 12 € in the West-German construction industry. A prerequisite for the applicability of this regulation is that any existing union wage contract covers at least 50 % of all regularly employed people in the respective industry.

[6] 'Employability' is defined as the ability to work at least 3 hours a day and thus excludes persons with severe physical and mental disabilities only.

[7] The standard rate of UB II is derived from consumption expenditures of low income households observed in the Income and Expenditure Survey (EVS) of the Federal Statistical Office which is conducted every five years. The amounts reported in Table 1 may differ between East and West Germany because of differences in housing costs.

children.[8] A wage ratio exceeding 100 % means that net household income of people entitled to means-tested income support would exceed their potential in-work income and they would, therefore tend not to work.[9] For one-earner couples and for single women with at least one child, this wage ratio exceeds 100 %. This wage gap is particularly large in East Germany where it is close to 200 % for couples with children.[10]

Table 2   Means-tested unemployment benefits, the "implicit minimum wage", and its relation to observed wages at the bottom of the wage distribution and a minimum wage of 7.50 € / hour, 2008

	West Germany				East Germany			
	UB II	Im-plicit MW	Wage ratio		UB II	Im-plicit MW	Wage ratio	
			2008	MW			2008	MW
	€/month	€/hour	%	%	€/month	€/hour	%	%
Single women								
no children	601.42	4.81	88.28	64.15	563.63	4.51	95.94	60.12
1 child, < 7 years	1,015.17	6.89	126.41	91.86	1,010.13	6.85	145.72	91.32
Couples (men working)								
no children	959.17	7.67	102.04	102.31	954.13	7.63	162.41	101.77
1 child, < 7 years	1,198.62	8.36	111.13	111.43	1,161.45	8.06	171.48	107.46
2 children, 13 years	1,447.95	9.12	121.27	121.59	1,408.98	8.81	187.40	117.44

Notes: It is assumed that the household is eligible to UB II and that, in couple households, only one person would work full-time, i.e.150 hours per month. Regular UB II benefits according to § 20 SGB II ("Sozialgesetzbuch II") include subsidized housing costs (including heating) which are borne up to certain maximum amounts, depending on the number of people living in the household; instead of these maximum amounts we use average housing costs for UB II recipients and heating costs differentiated by size of household as derived from the SOEP data here.

Implicit MW = ([UB II – child benefit] / 150) × 1.2, including the employee's share of social security contributions of 20%, but no income tax paid and no transfers other than the child benefit which depends on the number and age of children. UB II is means tested unemployment benefit which varies by number of household members and age of children.

Wage ratio = (implicit MW / wage)×100, where wage is either the average hourly wage in the bottom decile of the 2008 wage distribution, or the proposed minimum wage of 7.50 € per hour. The average hourly wage in 2008 is taken from Table 3 in Section 4.1 (men west = 7.52, men east = 4.53, women wes = 5.45, women east = 4.70).

Source: Own calculations based on data from SOEP/STSM.

Table 2 also reveals that a legal minimum wage of 7.50 € per hour would fall short of the implicit minimum wage for couples, although it would exceed the implicit minimum for singles without children and would be roughly equal to the one for singles with children. Further-

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[8]   Given the scarcity of subsidized child care especially in West Germany (see, e.g., Wrohlich, 2007), full-time employment of both spouses is often not an option.

[9]   Since take-up of means-tested income support is incomplete, not all eligible people would refrain from working, however. Concerning the incomplete take-up of means-tested income support in Germany see, e.g., Riphahn (2001), and Kayser and Frick (2001).

[10]   If maximum rather than average amounts for housing and heating costs were assumed, the wage ratio for one-earner couples in East Germany would be even higher than those reported in Table 1 but would differ little in West Germany.

more, these illustrative calculations show that the minimum wage would not change the wage ratio and hence net household income for couples living in West Germany. Although net household income would be substantially higher for couples in East Germany, a minimum wage of 7.50 € per hour would still not be sufficient to raise net household income in full-time employment above the level of the means-tested unemployment benefit. Thus, to prevent families with children with one low-wage worker to become eligible for means-tested income support, the minimum wage would have to be set at a considerably higher level than the proposed 7.50 € per hour, perhaps as high as 10 € per hour for families with more than one child.

Although these illustrative calculations do indicate that, at least for certain types of households, there might only be a weak link between minimum wages and net household income, they do not account for various important features of the German tax-benefit system. These include income taxation, especially the joint taxation of couples, other means-tested transfers, such as housing benefits, the exemption of 'mini jobs' from social security contributions, and unemployment benefit withdrawal rates below 100 %. Moreover, not all households are entitled to means-tested unemployment benefits, and not all couple households with children consist of only one earner. In the subsequent empirical analysis we will analyze the relationship between the minimum wage, the hourly wage and net household income on the basis of a microsimulation model which also takes employment effects of the minimum wage into account, as described in the next section.

3 Methodology

In order to simulate the effects of a shift in gross hourly wages induced by a federal minimum wage on net household income we employ a behavioral tax-benefit microsimulation model on the basis of the SOEP data. Since the introduction of a minimum wage will also influence the allocation of labor we incorporate the adjustment of employment, especially labor demand constraints into the model. This section sketches, first, our approach to calculate wage changes, second, the methods for the analysis of changes in labor demand and supply, and third, the simulation of income effects with and without behavioral adjustments of employment.

Effects on the wage distribution

In a first step, we substitute the suggested minimum wage of 7.50 € per hour for the hourly gross wage of employed people in our sample if a person's observed wage falls short of the minimum. We rule out spill-over effects, i.e. wages higher than 7.50 € remain constant. For each employed person, the gross hourly wage is obtained by dividing reported gross earnings

in the month before the interview by the number of hours worked in that month, where paid overtime hours are included.[11] Using SOEP sampling weights, we then compare the observed wage distribution (no minimum wage) and the hypothetical wage distribution conditional on the minimum wage under the assumption of no labor market adjustment.

We make use of wage data from the latest SOEP wave available and extrapolate to the year 2008. The main simulation assumes constant growth rates. For a sensitivity analysis individual specific growth rates are derived from dynamic wage growth regressions estimated on SOEP data for the years 1995-2007.[12] Another critical assumption concerns the question how to deal with very low hourly wages in the SOEP data. To account for measurement errors in the hours and wage data, we have excluded wages below 3 €/hour received in regular employment. This equals roughly the 1 % percentile of the raw hourly wage distribution. We have included hourly wages below 3 €/hour, though, if they refer to supplementary work of people drawing unemployment benefits (so-called 'Aufstocker', see also Section 2). Sensitivity analyses are provided for the scenarios where hourly wages below 3 € per hour remain in the analysis as measured or are set to the margin of 3 € per hour, respectively. We generally delete people in full-time vocational and apprenticeship training as well as disabled employees from the sample. „Secondary jobs", i.e. jobs held in addition to the main job, are excluded in the base simulations. We present a sensitivity analysis with regard to the latter exclusion restriction.

Effects on labor supply and demand

As mentioned in the Introduction, there is an extensive literature on the economic effects of minimum wages which primarily focuses on their wage and employment effects. In their recent survey of this literature, Neumark and Wascher (2007) conclude that the majority of stu-

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[11] This hourly wage measure may underestimate the effective hourly wage, for at least two reasons: First, since the majority of people in the SOEP is interviewed in the first three months of the year, fringe benefits are underrepresented. Second, 'paid hours' may partly be paid for in later months, or may be compensated for by working less than normal hours in the future.

[12] $\Delta \ln(w_{it}) = \alpha + \beta \times trend + \gamma \times \Delta \ln(w_{i,t-1}) + v_{it}$, where w_{it} is the hourly gross wage of individual i in year t (t = 1997, 1998, …, 2007), α is a constant, *trend* is a linear time trend and $v_{it} = u_{it} - u_{i,t-1}$ is a MA(1) error term. Since the error term is correlated with the lagged dependent variable, we estimated the equation with $\ln(w_{i,t-2})$ and *trend* as instrumental variables separately for men and women and for East and West Germany. IV estimates yielded statistically significant positive γ-coefficients and significant negative β-coefficients for all groups, although both turned out relatively small in absolute terms. On the basis of the estimated wage growth equations expected growth rates for the years 2007 and 2008 were derived recursively, with $g_{ir} = E(\Delta \ln w_{ir} \mid \Delta \ln w_{i,r-1}), \tau = 2007, 2008$. Using these estimated growth rates and the relation $w_{i,2008} = w_{i,2006} \prod_{r=2007}^{2008}(1 + g_{ir})$, individual wages for 2008 are then derived for all persons for whom a wage was observed for 2006. For those individuals for whom growth rates could not be calculated due to sample attrition (at least three successive individual observations are required in the dynamic growth rate regressions), mean values of growth rates within the estimation sample were imputed.

dies to date, which mainly refer to the US, have found no clear-cut evidence on the labor market effects of minimum wages. For Germany, one related empirical study by König and Möller (2007) refers to the construction sector, where the contract wage was declared generally binding by the "*Entsendegesetz*" (see footnote 5). The authors find negative employment effects in parts of the East German construction sector but insignificant or even positive effects for West Germany.

In order to investigate work incentive effects of the introduction of a federal minimum wage, we estimate a static discrete-choice *labor supply* model at the household level.[13] As suggested by van Soest (1995) the basis is a household utility model where utility is jointly maximized by the choice of different bundles of disposable income and leisure. Net household incomes for different categories of working hours and the scenarios with and without minimum wage are obtained from the tax-benefit calculator of the microsimulation model (see next sub-section). The specification as a conditional logit model and the assumptions of the approach are discussed in greater detail, e.g., in Haan and Steiner (2006). To sketch the main idea, the labor supply model is first estimated on the status quo data without a minimum wage. Then the parameters of the model are used to predict changes in participation and hours worked for the status quo and also for the scenario of a federal minimum of 7.5 € per hour (including the resulting change in net household income). The difference between the predictions yields the labor supply effects of the minimum wage. For those households affected by the minimum wage who have higher incomes after its introduction the theoretically expected effect on labor supply is ambiguous, since income and substitution effects act in opposite directions.

Labor demand effects are determined, first, by the wage changes induced by a federal minimum (see last sub-section), and, second, by the wage elasticities of labor demand. Both elements vary for different groups on the labor market – by gender, qualification level or type of employment status (e.g. full-time contracts vs. marginal employment)[14] – and are influenced by institutional factors and the degree of substitutability between the different groups. With regard to demand elasticities direct and indirect effects have to be distinguished. For given wages, factors of production and demand for goods the direct effect for a specific labor

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[13] The model is estimated separately for different household types: couple households where with both spouses' labor supply assumed to be fix, couple households where one spouse's labor supply is assumed to be fix, and male and female single households.

[14] For the simulation of labor demand effects we distinguish between skilled (secondary school or vocational education) and unskilled (neither secondary school nor vocational education) full-time workers, part-time workers and marginally employed. Those groups are divided by gender, yielding 8 different categories and are estimated separately for West and East Germany. Highly skilled workers (with university degree) are assumed to be a quasi-fix factor in the short run.

market group results from the substitution due to an increase in the cost of labor. Indirect effects follow from the substitution between different categories of labor which are all, but to a different degree, affected by the minimum wage. Moreover, the demand for labor is further reduced by a decreasing demand for goods as a result of higher production costs and prices.[15] We use empirical labor demand elasticities for different labor market groups and distinguished by region and gender (see Freier and Steiner, 2007).

To sum up, labor demand effects of the introduction of a federal minimum wage for a labor market group i (ΔB_i) depend (for a constant capital stock) on the average wage change ($\Delta w_j / w_j$), the (Hicks/Allen-) substitution elasticities (σ_{ij}), the share of the wage costs per group in total wage costs (c_j), the price elasticity of demand for goods (η), and the number of persons currently employed in group i (ΔB_i). The index goes from i=1, .., 8 according to the distinguished groups (see footnote 13):[16]

$$\Delta B_i = \sum_{j=1}^{8} c_j (\sigma_{ij} + \eta)(\Delta w_j / w_j) B_i$$

Effects on the distribution of net household incomes

To analyze minimum wage effects on the distribution of net household incomes we make use of the microsimulation model STSM which incorporates all major components of the German tax-benefit system. STSM is based on the Socio-Economic Panel (SOEP) which is a representative sample of households living in Germany with detailed information on household incomes, working hours and household structure.[17] The tax-benefit calculator embedded in STSM allows us to compute net household incomes not only under the current wage structure but also for alternative wage structures, such as the one resulting from the introduction of a minimum wage. Earnings from dependent employment is the most important income component for the great majority of households. The SOEP also contains information on earnings (and working hours) from a "secondary job", i.e. a job held in addition to the main job, which we add to wage income for the calculation of net household income. Em-

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[15] We do not consider adjustments of the capital stock. In the long run it is likely that low-skilled labor is substituted by capital.

[16] The procedure is also described in Müller and Steiner (2008). Bachmann et al. (2008) follow a similar approach but define different labor market groups, use a slightly different specification of the labor demand model and use a different data base for the employment figures. Ragnitz and Thum (2008) use a simpler method assuming one constant labor demand elasticity.

[17] STSM basically consists of two parts: a tax-benefit calculator that computes net household incomes for each sample household on the basis of information on gross incomes, and for different (hypothetical) legislations and different working hours of individuals, and an empirical labor supply model. A detailed description of STSM is contained in Steiner et al. (2008). For more information on the SOEP, see http://www.diw.de/soep.

ployees' social security contributions and the income tax are deducted from gross household income and social transfers are added to get net household income. Social transfers include child allowances, child-rearing benefits, educational allowances for students and apprentices, unemployment compensation, the housing allowance, and social assistance. Taxable income is calculated by deducting certain expenses from gross household income. Analog to the wage analysis we compare the net household incomes under the status quo and the hypothetical minimum wage scenario using SOEP sampling weights.

First, we simulate the income effects as described without behavioral adjustments of labor supply and demand ('first round effects'). In a second step we take employment changes explicitly into account ('second round effects'). Since labor supply effects are quantitatively negligible (see sub-section 4.2 below) we abstract from those behavioral labor supply adjustments and focus only on the labor demand effects. Based on the simulated labor demand changes (see last sub-section) we calculate the share of people who become unemployed after the introduction of the minimum wage due to the demand side constraints for each group i of the labor market ($\Delta B_i / B_i$).[18] We then draw a weighted random sample of the same size among those who are affected by the minimum wage (i.e. earn wages below 7.50 € per hour) per group i with the weights being determined linearly by the distance of the earned wage to the minimum wage. Those individuals selected in this manner become unemployed under the simulated minimum wage scenario. The procedure is repeated 50 times and average net household incomes are simulated as described above to get robust results.

The data are taken from the current SOEP wave for the year 2007. Since the STSM is based on retrospective information on income components for the computation of net household incomes for a given year, incomes computed on basis of the SOEP wave from 2007 refer to the year 2006. Because our analysis is focused on to the year 2008, we extrapolate incomes to that year on the basis of realized average growth rates for 2007 and expected growth rates for 2008.[19] The tax-benefit system is also updated to include all known changes in regulations up to 2008.

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[18] Depending on the assumed size of η the demand change is positive for some i. Since we abstract from labor supply effects and in order to simplify the analysis we disregard positive employment changes in this version of the simulation. The only group where this simplification is relevant are women working part-time in West Germany.

[19] Since most interviews in the SOEP refer to the first quarter of the year, we have assumed that they will increase with the annual growth rate in that year. Average annual growth rates are derived from the following indices for the years 2007 and 2008: 1.016, 1.016 for consumer prices; 1.020, 1.025 for wages; 1.003, 1.012 for old-age pensions; 1.016, 1.016 for income from rents; and 1.04, 1.04 for income from profits (source: national accounts; BMWi (2007); own calculations). We check the sensitivity of our simulation results to the assumptions underlying the forecasting of wages below.

4   Results

4.1   Effects on the wage distribution

In Table 3 we summarize the effects of the introduction of a minimum wage of 7.50 € per hour would have on the wages of already employed people in the absence of employment effects. The upper part of the table shows for Germany overall and for various subgroups the average gross hourly wage prevailing in 2008 and the average wage of currently employed people, if the minimum was introduced.[20] The numbers in parentheses give, for each group, the absolute and relative differences in these two wage measures. We also report the median and the mean of these two wages.[21] On average a minimum wage of 7.50 € per hour amounts to about 50 % of the median and 47 % of the average gross hourly wage in the German economy.[22] For the median, this share varies between about 40 % for men in West Germany to about two third for women in East Germany.

As shown in the lower part of the table, in Germany overall 10 % of all employees would be affected by the minimum wage. Whilst among men in West Germany only about 4 % of all employees would be affected, almost 12 % of males in East Germany and 13 % (20 %) of employed women in West (East) Germany earn wages below this minimum. Except for men in West Germany, all currently employed people in the bottom decile of the wage distribution would be affected by the minimum wage. Table A1 in the Appendix shows that the minimum wage would disproportionately affect younger employees, those with low qualification, marginally employed people (i.e., those in "mini jobs"), employees in certain industries, in particular in agriculture and forestry, in the textile and food industry and in wholesaled and retail trade, in private services, and those working in small firms.

Overall, the introduction of the minimum wage would increase the total wage bill by more than 400 million € per month, or 5.5 billion € per year, which is about 0.7 % of the wage bill in 2008. In absolute terms, the lion's share of this increase would go to female employees in West Germany, which reflects the still existing gender wage differential. The largest relative increase in the wage bill is estimated for women in East Germany (1.7 %), while the wage bill would only increase by about 0.3 % for men in West Germany.

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[20]   Expected wages of currently not employed people would also be affected by the minimum wage and thus also potentially increase labor supply (see sub-section 4.2).

[21]   As mentioned above wages below 3 €/hour earned in regular employment are excluded from the analysis. Wages below 3 €/hour are included, if they refer to supplementary work of people drawing unemployment benefits (see also Section 2).

[22]   People in full-time vocational and apprenticeship training as well as „secondary jobs", i.e. jobs held in addition to the main job, are excluded. With regard to the latter exclusion restriction see the discussion below.

Table 3   Wage distribution before and after the introduction of a legal minimum wage of 7.50 € / hour, currently employed people only, 2008 (wage projections based on average growth rates)

	Total		Men				Women			
	Germany		West		East		West		East	
	No MW	MW	No MW	MW	No MW	MW	No MW	MW	No MW	MW
1st-10th percentile	5.95	7.50	7.62	8.31	6.27	7.50	5.37	7.50	5.51	7.50
	(1.55; 26.05)		(0.69; 8.31)		(1.23; 19.62)		(2.13; 39.66)		(1.99; 36.12)	
1st-5th percentile	5.08	7.50	6.13	7.54	5.74	7.50	4.62	7.50	4.47	7.50
	(2.42; 47.64)		(1.41; 23.00)		(1.76; 30.66)		(2.88; 62.34)		(3.03; 67.79)	
6th-10th percentile	6.93	7.50	9.07	9.07	6.88	7.50	6.22	7.50	6.36	7.50
	(0.57; 8.23)		(0.00; 0.00)		(0.62; 9.01)		(1.28; 20.58)		(1.14; 17.92)	
11th-15th percentile	8.09	8.09	10.77	10.77	7.62	7.69	7.45	7.62	6.93	7.50
	(0.00; 0.00)		(0.00; 0.00)		(0.07; 0.92)		(0.17; 2.28)		(0.57; 8.23)	
16th-25th percentile	9.59	9.59	12.40	12.40	8.75	8.75	8.67	8.67	7.54	7.62
	(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.08; 1.06)	
Median	14.49	14.49	17.34	17.34	12.27	12.27	13.19	13.19	11.77	11.77
	(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)	
Mean	15.92	16.07	19.05	19.12	13.73	13.86	14.03	14.25	12.75	13.00
	(0.18; 1.01)		(0.07; 0.37)		(0.13; 0.95)		(0.22; 1.57)		(0.25; 1.96)	
MW as % of										
median		51.76		43.25		61.12		56.86		63.72
mean		47.11		39.37		54.62		53.46		58.82
People affected (%)										
overall		10.03		4.36		12.48		12.75		20.61
within 1st decile		100.00		42.46		100.00		100.00		100.00
Δ wage bill (1000 € / month)	425,793.10		106,241.87		45,821.44		202,704.44		71,025.34	
% of wage sum	0.69		0.32		0.88		1.09		1.67	

Notes: Only employed people aged 18-65 are included. Percentiles are defined for the wage distribution without the minimum wage. Means are calculated within the range of given percentiles. Δ wage bill is the difference between the wage sum with and without the minimum wage, with wage sum = Σ (hourly wage×weekly working hours×4.2); employers' social security contributions not included.
The numbers in parentheses refer to absolute and relative differences in the two wage measures.

Source: Own calculations based on SOEP, wave 2007.

Despite this substantial increase in the wage bill, the minimum wage would have very little effect on average wages: Overall, the average hourly gross wage would increase by less than 20 cent, or by about 1 %. This direct wage effect varies between about 0.4 % for men in West Germany to about 2 % for women in East Germany. Table 3 also shows that for men in West Germany the modest wage increase would only occur in the bottom decile of the wage distribution, whereas wages would also slightly increase for the other groups with current wages just above the 10th percentile. However, compared to the very pronounced increase in the first decile of the distribution, and in particular in the 1st-5th percentile, these changes seem negli-

gible. For Germany overall, the minimum wage would raise the average hourly gross wage in the first decile by more than 25 %, from 5.95 to 7.50 € per month. Within the first decile, the wage increase varies between 8.3 % for men in West Germany to about 40 % for women in West Germany. Within the 1st-5th percentile of wage distribution, the average wage increase amounts to about 50 %, ranging from about 23 % for men in West Germany to almost 70 % for women in East Germany.

Table A1 in the Appendix documents that these wage changes differ surprisingly little by age and qualification, but significantly by employment status. As mentioned in Section 2, the perceived low-pay of people in 'marginal employment', i.e. in jobs earning less than 400 € per month and not covered by social security, has been one alleged reason for introducing a minimum wage. As shown in Table A1 hourly gross wages of people holding such jobs would be raised by more than 30 % on average compared to 16 % for full-time employed people. Part-time employed individuals in the bottom decile of the wage distribution would receive a similar wage raise as a result of the federal minimum. Corresponding to the well-known firm-size wage differentials, minimum wage effects are declining in firm size, with the share of affected individuals declining from more than 20 % in firms with less than 5 employees to less than 5 % in large firms.

In view of the recent development of wage inequality documented in Section 2 (see Figure 1) forecasting wages to 2008 on the basis of common growth rates may be questioned. To check the sensitivity of simulation results to this assumption, we have forecasted wages on the basis of individual specific growth rates derived from dynamic wage growth regressions estimated on SOEP data for the years 1995-2007. Although the correlation between wages updated this way and on the basis of the common growth rates reported in footnote 19 is surprisingly high (correlation coefficient of 0.99), the level of individually predicted wages is slightly below that obtained by updating wages by common growth rates, especially in the bottom decile of the wage distribution. The overall wage bill would increase by 0.9 % instead of 0.7 % (compare Table 3 and Table A2 in the Appendix). Still, the effects of the minimum wage on the 2008 wage distribution are very similar if wages were updated on the basis of individual rather than common growth rates. Since estimated individual growth rates are derived from a period with an extraordinary decline in wages at the bottom of the distribution (see Figure 1 in Section 2), our wage growth regressions somewhat underestimate the relatively high wage gains realized between 2006 and 2008. The use of average growth rates seems therefore more appropriate from an empirical standpoint and we will, therefore, base the following analysis of how wage increases affect net household incomes on the simulation results in Table 3.

Another sensitivity check concerns the treatment of "secondary jobs". Since the 2003 "Mini Jobs" reform, jobs with earnings below 400 €per month have also been exempted from employees' social security contributions if held in addition to a main job (see, e.g., Steiner and Wrohlich, 2005). Our calculations of the wage effects of the introduction of a legal minimum wage do not include secondary jobs. Although it is currently not clear how they would be treated if a legal minimum wage were actually implemented in Germany, it seems rather difficult, both legally and politically, to exclude secondary jobs. Since the SOEP contains information on both earnings and hours worked in secondary jobs, we can include them in our analysis of the wage effects of the introduction of a minimum wage. Estimation results for this alternative simulation, which are summarized in Table A3 in the Appendix, show that the results deviate only somewhat within the first decile of the wage distribution. Since only a limited number of people is affected by potential changes of secondary incomes, the overall findings change only marginally and do not affect any of our conclusions. We thus continue our analysis on the basis of our estimation results in Table 3.

4.2 Employment effects

Effects on labor supply

Table A4 in the Appendix documents the empirical distribution of working hours categories among different household types. Slightly less than 30 % of women in the sample do not work. Moreover, women are distributed relatively even over the hours categories; about 40 % in couple households and nearly 30 % in single households work part-time. Detailed estimation results for the conditional logit models are presented in Table A5 in the Appendix. Crucial model assumptions (e.g. positive first derivatives with respect to income) are satisfied.

Table A6 in the Appendix shows the predicted effects of the introduction of the minimum wage on labor supply detailing the increase in labor force participation and total hours worked in relative and absolute terms. It can be seen that labor supply effects are very moderate. In total the increase in labor force participation amounts to about 15,000 persons, the increase in total hours worked equals about 50,000 full-time equivalents. The main explanation for the small effects is the fact that the previously described wage changes correspond to only limited increases of available household income (see discussion in sub-section 4.3) on which the labor supply decision is based. Both, with respect to participation and hours choices the effects are stronger for women compared to men and households in East compared to West Germany. Since the overall effects are limited we will not consider labor supply changes in the simulation of household incomes with behavioral adjustment in this version of the paper.

Effects on labor demand

As discussed above substitution elasticities between different types of labor are crucial parameters for the simulation of labor demand effects. Table 4 contains empirical elasticities for several groups on the labor market which were estimated by Freier & Steiner (2007) for given demand for goods, constant capital stock, and separately for West and East Germany. For instance, marginally employed women in West Germany and women working part-time are substitutes in production whereas marginally employed women and skilled women with full-time jobs are complements. For given demand for goods a relatively high increase in wages for marginally employed women induced by the minimum wage will lead to a decrease in labor demand for this group and also for skilled women in full-time, but an increase in labor demand for women working part-time. The elasticities for East Germany follow a similar pattern for this example. Note that highly skilled individuals were assumed to be quasi-fix in the labor demand estimations of Freier & Steiner (2007) which is why we do not calculate labor demand effects for this group.

Table 4   Compensated own- & cross wage elasticities

Heads West	FT, U, M	FT, S, M	PT, M	ME, M	FT, U, W	FT, S, W	PT, W	ME, W
FT, U, M	-0.510	0.419	0.003	-0.001	0.050	0.034	-0.048	0.055
FT, S, M	0.085	-0.200	0.001	0.004	0.032	0.062	0.002	0.017
PT, M	0.023	-0.001	-0.070	-0.110	0.031	-0.268	0.204	0.186
ME, M	-0.019	0.316	-0.246	-0.130	-0.093	0.187	0.148	-0.162
FT, U, W	0.108	0.367	0.012	-0.013	-0.370	-0.055	-0.081	0.030
FT, S, W	0.020	0.136	-0.014	0.005	-0.009	-0.160	0.071	-0.051
PT, W	-0.044	0.007	0.033	0.011	-0.044	0.196	-0.260	0.099
ME, W	0.255	0.495	0.144	-0.058	0.056	-0.805	0.483	-0.570
Heads East	FT, U, M	FT, S, M	PT, M	ME, M	FT, U, W	FT, S, W	PT, W	ME, W
FT, U, M	-0.300	-0.086	-0.076	0.028	-0.036	0.487	-0.008	-0.008
FT, S, M	-0.002	-0.110	-0.008	0.005	0.006	0.091	0.015	0.005
PT, M	-0.135	-0.235	-0.290	0.006	0.114	0.235	0.302	-0.002
ME, M	0.172	0.476	0.019	-0.300	0.152	-0.778	0.332	-0.073
FT, U, W	-0.060	0.099	0.116	0.041	-0.250	-0.273	0.237	0.091
FT, S, W	0.044	0.128	0.012	-0.011	-0.014	-0.230	0.076	-0.010
PT, W	-0.010	0.063	0.055	0.018	0.040	0.245	-0.440	0.032
ME, W	-0.038	0.323	-0.008	-0.053	0.248	-0.582	0.437	-0.330

Notes: FT, U, M – Full-time unskilled men; FT, S, M – Full-time skilled men; PT, M – Part-time men; ME, M – Marginally employed men; FT, U, W – Full-time unskilled women; FT, S, W – Full-time skilled women; PT, W – Part-time women; ME, W – Marginally employed women.

Source: Elasticities taken from Freier, R.; Steiner, V. (2007).

Another important factor for the changes in labor demand is the wage change per group induced by the minimum wage. In the first part of Table 5 the wage effects are broken down to the labor market groups used for the labor demand simulations. As mentioned above margin-

ally employed workers are most strongly affected by the introduction of the minimum wage, followed by part-time employed and unskilled workers. The highest relative wage increase occurs for marginally employed workers with 14 % (8 %) for women in the East (West), and about 5% for men. Other notable wage changes affect part-time employed and unskilled women working full-time in East Germany.

Table 5   Changes in wages and labor demand (heads)

			Wage effects				Employment Effects		
			Affected	No MW	MW		Output price elasticities		
West Germany			(%)	(€/hour)	(Δ€)	(Δ%)	0.0	-0.5	-1.0
Full-time	skilled	*women*	5.04	15.07	0.06	0.40	-13,819	-23,619	-33,419
		men	2.33	17.80	0.04	0.22	15,178	-4,680	-24,538
	unskilled	*women*	10.73	11.35	0.09	0.79	-920	-2,537	-4,153
		men	3.72	16.49	0.05	0.30	4,147	1,344	-1,459
Part-time		*women*	8.94	14.24	0.17	1.19	32,823	19,480	6,138
		men	13.78	14.28	0.33	2.31	5,346	3,859	2,373
Marginally employed		*women*	42.07	8.87	0.79	8.91	-83,732	-89,009	-94,287
		men	37.86	10.59	0.60	5.67	-10,238	-11,430	-12,622
Total				8.63	16.49	0.15	0.90	-51,216	-106,591	-161,967
			Affected	No MW	MW		Output price elasticities		
East Germany			(%)	(€/hour)	(Δ€)	(Δ%)	0.0	-0.5	-1.0
Full-time	skilled	*women*	21.52	11.38	0.18	1.58	-1,721	-7,797	-13,873
		men	11.94	13.24	0.10	0.76	2,541	-8,711	-19,963
	unskilled	*women*	42.93	10.81	0.25	2.31	829	447	64
		men	18.12	10.53	0.10	0.95	-20	-947	-1,874
Part-time		*women*	21.03	12.19	0.29	2.38	1,669	-3,745	-9,159
		men	25.65	11.23	0.38	3.38	-103	-1,253	-2,402
Marginally employed		*women*	53.98	7.41	1.04	14.04	-8,250	-9,661	-11,073
		men	24.70	9.04	0.47	5.20	-2,327	-3,147	-3,967
Total				16.53	13.24	0.19	1.44	-7,381	-34,814	-62,248

Notes: Own- and cross-wage elasticities taken into account. Demand changes in numbers of employees ('heads').
Qualification categories according to Freier and Steiner (2007): 'skilled' = secondary-school education or vocational training, 'unskilled' = neither secondary-school education nor vocational training.

Source: Own calculations based on elasticities by Freier, R.; Steiner, V. (2007), SOEP wave 2007.

In the second part of Table 5 the employment effects are documented which were calculated on the basis of the elasticities shown in Table 4, the wage changes per group, and 3 different price elasticities for the demand for goods (0, -0.5, 1). The overall employment effects depend on the assumed price elasticity of demand. If the demand for goods was perfectly inelastic, labor demand would decrease only by about 60,000 persons. In this scenario the loss of marginal employment would partially be compensated by an increase in demand especially for part-time employed women. If the demand for goods was highly elastic with respect to price changes (assumed elasticity of -1), the overall decrease in demand for labor would amount to

225,000 persons. Again the lion's share of employment losses concerns marginal employment. In this scenario the demand for skilled full-time labor would shrink considerably. We use the middle scenario with an assumed price elasticity of demand for goods of -0.5 and a resulting decrease of labor demand of about 140,000 persons for the simulation of household incomes that includes the behavioral adjustment of labor demand in the next sub-section.

The results are sensitive with respect to the data base, the elasticities assumed, and the treatment of low hourly wages at the bottom of the wage distribution. We discuss these issues elsewhere (see Müller and Steiner, 2008), compare our results to other studies (Bachmann et al., 2008; Ragnitz and Thum, 2008), and present some sensitivity analyses.

4.3 Effects on the income distribution and inequality

To which extent are the substantial increases in hourly wages we observe at the bottom of the wage distribution translated into higher net household incomes and a reduction in poverty? This question is answered by Table 6 which summarizes, for various types of households affected by a legal minimum, income changes which would be induced by the minimum wage. The second column of the table shows that, whilst the overall share of households affected by the minimum wage in Germany is 9.5 %, it amounts to 14 % in East and 8.5 % in West Germany. In the total population, the share is above average for families with children, if both spouses work, and also for singles with children.

Table 6 **Effects on net incomes of households affected by a minimum wage of 7.50 € / hour, 2008 (income projections based on average growth rates)**

| | Households affected by MW | No MW | MW of 7.50 €/hour | | | |
| | | | Δ average income | | Δ total income | |
	%	€ / month	€ / month	%	1000 € / month	%
West Germany	8.52	2,686.99	47.14	1.75	88,983.62	70.96
East Germany	14.02	2,183.81	52.99	2.43	36,414.97	29.04
Germany, overall	9.51	2,552.71	48.70	1.91	125,398.58	100.00
without children	6.38	1,653.05	66.80	4.04	69,532.12	55.45
with children	14.27	3,163.16	36.42	1.15	55,866.46	44.55
Germany, couples	12.55	3,063.01	45.69	1.49	82,644.25	65.91
without children	8.37	2,245.51	67.88	3.02	32,578.39	25.98
with children	15.32	3,358.24	37.67	1.12	50,065.86	39.93
both spouses work	15.69	3,326.23	53.84	1.62	73,919.20	58.95
one spouse works	7.11	2,572.60	14.78	0.57	3,216.82	2.57
Germany, singles	6.05	1,347.60	55.82	4.14	42,754.33	34.09
without children	5.30	1,146.13	65.88	5.75	36,953.73	29.47
with children	9.86	1,898.77	28.29	1.49	5,800.60	4.63

Notes: Households affected by the minimum wage as percentage of all households in each group. Percentage changes of average income refer to households within the respective group, percentage changes of total income are calculated relative to the whole population.

Source: Own calculations based on SOEP, wave 2007.

As documented in Table A7 in the Appendix, these differences by type of household can also be observed within the two regions, although they are more pronounced in West Germany. The minimum wage would increase net monthly household incomes by about 50 €, on average, in Germany overall; the increase in income would amount to about 47 € in West Germany and 53 € in East Germany. Relative to the current situation, net household income would increase by about 1.8 % in West Germany and 2.5 % in East Germany. Compared to the very large wage increases at the bottom of the wage distribution documented in the previous section, income changes are rather small and reflect the weak link between (hourly) wages and net household income. Since means-tested transfers are related to the presence of children in the household and to the employment status of the spouse, the minimum wage would lead to smaller increases of the monthly household income for families with children and couples with only one employed spouse. As Table A7 shows this pattern is again somewhat more pronounced in West Germany, but can also be observed in the East.

Table 6 documents how the total income change induced by the introduction of the minimum wage would be distributed across households. In total, the income change would amount to about 125 million € per month, or roughly 1.5 billion € per year, which equals only about 25 % of the total increase in the wage bill (see Table 3). In this simulation without labor demand and supply responses, the relatively small increase in net incomes reflects the "mechanical" substitution effect between wages and means-tested income support. The relatively large wage increases induced by the minimum wage at the bottom of the wage distribution thus mainly lead to the withdrawal of social transfers, higher income taxes, and increased public savings with relatively little impact on net household incomes.

The last column of Table 6 reveals that about 30 % of the total increase in net household income would go to East Germany, where about 20 % of the total population lives. Only about one third of the income gain would go to single-earner households including single parents, and families with children would receive about 45 % of the income gain. Although households with children are more often affected by the minimum wage, the average and total income gain for these families is lower. Thus, if one of the aims of a legal minimum wage is to increase the available income of families with children, it does not seem to be an effective policy instrument from this perspective.

The corresponding results for the simulation including the *adjustment of labor demand* are reported in Table 7. The average monthly income gain for households affected by the minimum wage diminishes from 47 € to 33 € cutting the total increase in household incomes to about 86 million € per month. Therefore employment losses due to the legal minimum further reduce the moderate increases in household income substantially. Since the labor demand

constraints are not distributed equally over household types the gains for families with children, for couple households, especially with only one spouse working, are diminished disproportionately. Demand side constraints reduce income gains in West Germany more than in East Germany (see also Table A8 compared to A7 in the Appendix).

Table 7   Effects on net incomes of households affected by a minimum wage of 7.50 € / hour, taking into account labor demand adjustment, 2008 (income projections based on average growth rates)

	Households affected by MW	No MW	MW of 7.50 € / hour			
			Δ average income		Δ total income	
	%	€ / month	€ / month	%	1000 € / month	%
West Germany	8.52	2,686.99	29.25	1.09	55,212.79	100.00
East Germany	14.02	2,183.81	45.10	2.07	30,988.90	100.00
Germany, overall	9.51	2,552.71	33.48	1.31	86,201.68	100.00
without children	6.38	1,653.05	52.53	3.18	54,677.35	63.43
with children	14.27	3,163.16	20.55	0.65	31,524.33	36.57
Germany, couples	12.55	3,063.01	28.52	0.93	51,588.44	59.85
without children	8.37	2,245.51	50.14	2.23	24,062.55	27.91
with children	15.32	3,358.24	20.71	0.62	27,525.89	31.93
both spouses work	15.69	3,326.23	34.44	1.04	47,278.85	54.85
one spouse works	7.11	2,572.60	8.04	0.31	1,749.44	2.03
Germany, singles	6.05	1,347.60	45.19	3.35	34,613.25	40.15
without children	5.3	1,146.13	54.58	4.76	30,614.81	35.52
with children	9.86	1,898.77	19.50	1.03	3,998.44	4.64

Notes: Households affected by the minimum wage as percentage of all households in each group. Percentage changes of average income refer to households within the respective group, percentage changes of total income are calculated relative to the whole population.

Source: Own calculations based on SOEP, wave 2007.

Another relevant policy issue is how the minimum wage would affect the distribution of incomes. Table 8 answers this question regarding the distribution of net equivalent incomes of households affected by the minimum wage, by deciles, calculated for the 2008 wage structure. For Germany overall, the share of persons affected by the minimum wage in the bottom decile of the net equivalent income distribution is less than 6 %, and thus substantially smaller than the shares affected in each of the 2nd-5th deciles. Only in the higher deciles of the distribution does this share decline below the level it obtains in the bottom decile. As the regional breakdown in Table A9 in the Appendix reveals, the distribution of people affected by the minimum wage across deciles of the net equivalence income distribution differs between the two regions. Whereas the share of people affected by the minimum is low in the first and second decile and highest between the 3rd and 7th decile in East Germany, this share is highest in the 2nd decile and declines after that in West Germany. However, the share of people affected at the bottom of the income distribution is rather small in both regions. Thus, the minimum

wage does not seem to be particularly well targeted at the poor also from the perspective of the distribution of net equivalence income implicitly taking into account the composition of households of people whose gross wages might have increased substantially.

Table 8 **Effects of a minimum wage of 7.50 € / hour on net equivalent incomes of households affected (€ per month), Inequality measures, Germany 2008 (income projections based on average growth rates)**

Decile	Persons affected by MW	No MW	MW of 7.50 € / hour Δ average equivalent income	
	%	€ / month	€ / month	%
1st	5.56	688.44	22.75	3.30
2nd	18.48	885.51	39.08	4.41
3rd	19.50	1,087.65	26.90	2.47
4th	14.45	1,332.58	28.48	2.14
5th	12.47	1,506.64	39.57	2.63
6th	8.11	1,708.04	33.5	1.96
7th	6.12	1,874.81	20.98	1.12
8th	4.93	2,148.11	63.87	2.97
9th	4.79	2,666.86	37.64	1.41
10th	0.75	4,340.16	-2.67	-0.06
Total	9.51	1,380.78	33.33	2.41
Inequality measures × 100	No MW	MW	Δ absolute	Δ %
Gini coefficient	28.13	28.05	-0.0008	-0.28
MLD	13.70	13.64	-0.0006	-0.47
Atkinson ($\varepsilon = 2$)	27.46	27.40	-0.0006	-0.23

Notes: Deciles for the overall equivalent net income distribution are calculated for the wage structure in 2008 (without minimum wage). Persons affected by the minimum wage as percentage of all people within a given decile of the net equivalence income distribution. Percentage changes of average income refer to equivalent persons within the respective group, percentage changes of total income are calculated relative to the whole population, measured in equivalence units.

The Gini coefficient is sensitive to changes in the middle of the income distribution. MLD is the mean log deviation of equivalent income which is a "bottom-sensitive" inequality measure. The Atkinson inequality measure is calculated for a high degree of inequality aversion ($\varepsilon = 2$). For the exact definition and properties of these inequality measures, see, e.g., Cowell (1995) or Atkinson, A.B. (1987).

Source: Own calculations based on SOEP, wave 2007.

On average, net equivalent income would increase for households affected by the minimum wage by about 33 €, or 2.4 %. The average increase would be slightly larger in East Germany, both in absolute and in relative terms (see Table A9 in the Appendix). The largest relative increase in average equivalent income would occur in the 2nd decile of the income distribution and amount to about 40 € per month, or 4% of this group's net equivalent income in 2008. The negative difference for the affected households in the top decile likely follows from the loss of the splitting advantage as soon as the second earner's income grows as a result of the minimum wage. In relative terms this negative effect is not substantial, though.

To investigate the potential effect the introduction of a legal minimum wage would have on the overall income distribution, Table 8 also reports standard summary inequality measures. The *Gini coefficient*, which is sensitive to income changes in the middle of the distribution, does not record any significant change. Using the bottom-sensitive *mean logarithmic deviation* (MLD) measure shows a very small decline in income inequality, which is also recorded by the *Atkinson measure* assuming a relatively high value for the inequality aversion parameter, i.e. $\varepsilon = 2$. These very small reductions in income inequality are comparable in West and East Germany (see Table A9 in the Appendix). Thus, in neither region would the minimum wage have any noticeable effect on overall income inequality.

In Table 9 results from the same analysis is provided for the simulation which takes *labor demand constraints* into account. Due to the reduction in labor demand the average net equivalent income gain declines by one third to 24 € per month. Especially the relatively high absolute gain in the 8th decile is cut substantially. Moreover, the minimum wage becomes less effective with respect to the reduction of overall income inequality as the smaller differences for the inequality measures show compared to Table 8. The results for West and East Germany show that the reduction of labor demand diminishes income gains slightly more in the West (see Table A10 in the Appendix). In West Germany the absolute income gains in the 1st, 2nd, and 7th deciles are reduced significantly. In East Germany the reduction of income gains is more evenly distributed but slightly higher in the upper deciles.

Table 9   Effects of a minimum wage of 7.50 € / hour on net equivalent incomes of households affected (€ per month), taking into account labor demand adjustment, Germany 2008 (income projections based on average growth rates)

Decile	Persons affected by MW %	No MW € / month	MW of 7.50 € / hour Δ average equivalent income € / month	%
1st	5.56	688.44	21.14	3.07
2nd	18.48	885.51	27.01	3.05
3rd	19.50	1,087.65	21.35	1.96
4th	14.45	1,332.58	20.77	1.56
5th	12.47	1,506.64	27.59	1.83
6th	8.11	1,708.04	25.53	1.49
7th	6.12	1,874.81	15.86	0.85
8th	4.93	2,148.11	38.29	1.78
9th	4.79	2,666.86	30.34	1.14
10th	0.75	4,340.16	-5.94	-0.14
Total	9.51	1,380.78	24.28	1.76
Inequality measures × 100	No MW	MW	Δ absolute	Δ %
Gini coefficient	28.13	28.08	-0.052	-0.18
MLD	13.70	13.67	-0.039	-0.28
Atkinson ($\varepsilon = 2$)	27.46	27.44	-0.029	-0.11

Source: Own calculations based on SOEP, wave 2007.

5 Summary and Conclusion

Since the mid-1990s, wage inequality has been increasing significantly in Germany, mainly driven by a marked relative decline of hourly gross wages at the bottom of the wage distribution and an increasing share of the low-wage sector. Although the decline in relative wages was most pronounced in East Germany, on average, male employees in West Germany were also strongly affected by it. Furthermore, income inequality has been increasing in recent years, especially in East Germany. These developments have led to the proposed introduction of a general statutory minimum wage in the amount of 7.50 € in Germany, one of the few OECD countries where a legal minimum wage does currently not exist. One popular rationale for the introduction of this proposed legal minimum wage is to reduce income inequality and prevent poverty. However, as stressed by previous minimum wage studies, there might only be a weak link between low hourly wages and net household incomes which renders the minimum wage policy a rather ineffective tool to combat inequality. This may be of particular relevance for Germany, due to the existing means-tested income support system with a high social minimum relative to net in-work income and high benefit withdrawal rates.

To account for this important relationship we have analyzed the distributional effects of the introduction of a nationwide minimum wage of 7.50 € per hour on the basis of a micro-simulation model which accounts for the complex interactions between individual wages, the tax-benefit system and net household incomes. We also analyzed potential labor supply and demand effects of the minimum wage and integrated these results in the microsimulation model. Simulation results on the basis of individual-level data from the German Socio Economic Panel (SOEP) show that the proposed minimum wage would have only a modest over-all impact on average wages in the German economy, but would have very substantial effects on wages at the bottom of the hourly wage distribution. Overall, the incidence of the minimum wage varies from about 4 % for men in West Germany to 20% for women in the East. Except for men in West Germany, all currently employed people in the bottom decile of the wage distribution would be affected by the minimum wage. It would disproportionately affect younger employees, those with low qualification, and marginally employed people. The average hourly gross wage would increase by about 25 % in the bottom decile of the wage distribution, and by about 50 % in the 1st-5th percentile, where these wage effects would vary substantially by gender and region. Expected wage increases at the bottom of the wage distributions would differ surprisingly little by age and qualification, but do differ significantly between full-time, part-time and marginally employed people.

The work incentives of the proposed minimum wage are rather limited. We estimated an increase in labor force participation equivalent to 15,000 workers and an increase in hours worked equal to 50,000 full-time equivalents. The labor demand effects depend on the assumed wage and output price elasticities. In the discussed scenario with an assumed price elasticity of demand for goods equal to -0.5 we estimate the decrease in labor demand to be about 140,000 persons. Marginally employed people would bear most of the employment losses.

In contrast to the substantial wage effects at the bottom of the wage distribution, the introduction of a minimum wage in the proposed amount would have little impact on net household incomes: On average, the increase in monthly net income of households affected by the minimum wage would amount to about 47 € (1.8%) in West Germany and 53 € (2.4 %) in East Germany, and would be even smaller for families with children and couples with one employed spouse. If labor demand effects are also considered, the income gains are reduced to about 30 € for the West and 45 € for the East. These relatively small income changes reflect the weak link between (hourly) wages and net household income. In total, the income change induced by the proposed minimum wage would amount to roughly 1.5 billion € per year, which is only about 25 % of the total expected increase in gross earnings. This amount would also diminish to 1 billion € per year, if the reduction in labor demand would be taken into account. About 30 % of the total increase in net household income would go to East Germany, where about 20 % of the population lives. Families with children would receive less than half of the income gain and only a relatively small share of the income gain would be received by single-earner households.

The minimum wage would also not be particularly well targeted at low income households: For Germany overall, the share of persons in the bottom decile of the distribution of net equivalent household income who are affected by the minimum wage is markedly below the respective shares in the middle of the distribution. However, the largest relative increase in average equivalent income would occur in the bottom deciles of the income distribution, with only small gains in higher deciles in both East and West Germany. Consequently the suggested legal minimum would only have negligible effects on the overall income distribution, as indicated by standard summary inequality measures. The redistributive effects are further diminished by the reduction in labor demand.

The suggested minimum wage does not seem to be an effective policy instrument to redistribute income. To a large extent, these results can be related to the structure of the means-tested income support existing in Germany with its relatively high social minimum and high benefit withdrawal rates. This also implies that the lion's share of the costs of income support

for households with people earning low wages would be shifted from the tax-benefit system to the costs employing these people. Moreover, low wage earners are not primarily concentrated in households at the bottom of the income distribution, which is why the minimum wage would not be a well-targeted policy instrument for income re-distribution.

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Appendix

Table A1 Mean hourly gross wage (in €) with and without a minimum wage of 7.50 € / hour, within first decile of the hourly wage distribution, 2008 (wage projections based on average growth rates)

	People affected (in %)		No MW	MW		
	Overall	1st Decile	€ / hour	€ / hour	Δ€	%Δ
Germany, overall	10.03	100.00	5.95	7.50	1.55	26.05
Gender						
Men	8.63	100.00	5.79	7.50	1.71	29.53
Women	16.53	100.00	6.33	7.50	1.17	18.48
Age						
18-25 years	24.50	100.00	6.06	7.50	1.44	23.76
26-35 years	8.59	100.00	6.06	7.50	1.44	23.76
36-45 years	9.97	100.00	5.81	7.50	1.69	29.09
46-55 years	7.45	100.00	5.95	7.50	1.55	26.05
56-65 years	8.19	100.00	5.94	7.50	1.56	26.26
Qualification						
High	4.17	100.00	6.00	7.50	1.50	25.00
Medium	10.39	100.00	5.91	7.50	1.59	26.90
Low	17.59	100.00	6.05	7.50	1.45	23.97
Employment status						
Employed full-time	5.14	100.00	6.43	7.50	1.07	16.64
Employed part-time	11.33	100.00	5.69	7.50	1.81	31.81
Marginally employed	41.54	100.00	5.69	7.50	1.81	31.81
Sector						
Agriculture, forestry	22.83	100.00	6.33	7.50	1.17	18.48
Mining, energy	0.05	100.00	7.26	7.50	0.24	3.31
Chemical., synthetics., wood, paper industry.	4.54	100.00	5.81	7.50	1.69	29.09
Building industry	8.50	100.00	6.06	7.50	1.44	23.76
Iron, steal, and heavy industry	5.26	100.00	5.24	7.50	2.26	43.13
Engineering, electric, precision engineering, light industry	2.44	100.00	6.02	7.50	1.48	24.58
Textile, food industry	18.58	100.00	6.45	7.50	1.05	16.28
Wholesale and retail trade	15.04	100.00	5.71	7.50	1.79	31.35
Railways, postal service, transportation	13.80	100.00	6.41	7.50	1.09	17.00
Public services	5.94	100.00	5.97	7.50	1.53	25.63
Private services	15.06	100.00	5.94	7.50	1.56	26.26
Missing, not assignable	14.48	100.00	6.02	7.50	1.48	24.58
Firm size						
< 5 employees	21.80	100.00	5.74	7.50	1.76	30.66
5-10 employees	18.08	100.00	6.04	7.50	1.46	24.17
20-100 employees	11.13	100.00	6.14	7.50	1.36	22.15
100-200 employees	8.26	100.00	6.05	7.50	1.45	23.97
200-2000 employees	4.49	100.00	5.56	7.50	1.94	34.89
> 2000 employees	3.36	100.00	6.02	7.50	1.48	24.58
Missing, not assignable	19.12	100.00	5.82	7.50	1.68	28.87

Notes: Wage data for 2007 are extrapolated to 2008 using average growth rates (see text), weighted using SOEP personal sample weights to obtain population means.

Source: Own calculations based on SOEP, wave 2007.

Table A2 Wage distribution before and after the introduction of a legal minimum wage of 7.50 € / hour, 2008 (wage projections based on estimated individual growth rates)

	Total		Men				Women			
	Germany		West		East		West		East	
	No MW	MW	No MW	MW	No MW	MW	No MW	MW	No MW	MW
1st-10th percentile	5.59	7.50	7.16	8.01	6.01	7.50	5.02	7.50	5.09	7.50
	(1.91; 34.17)		(0.85; 11.87)		(1.49; 24.79)		(2.48; 49.40)		(2.41; 47.35)	
1st-5th percentile	4.71	7.50	5.81	7.50	5.40	7.50	4.31	7.50	4.24	7.50
	(2.79; 59.24)		(1.69; 29.09)		(2.10; 38.89)		(3.19; 74.01)		(3.26; 76.89)	
6th-10th percentile	6.49	7.50	8.53	8.53	6.66	7.50	5.73	7.50	5.94	7.50
	(1.01; 15.56)		(0.00; 0.00)		(0.84; 12.61)		(1.77; 30.89)		(1.56; 26.26)	
11th-15th percentile	7.61	7.69	10.24	10.24	7.23	7.50	6.85	7.50	6.62	7.50
	(0.08; 1.05)		(0.00; 0.00)		(0.27; 3.73)		(0.65; 9.49)		(0.88; 13.29)	
16th-25th percentile	9.07	9.07	11.97	11.97	8.24	8.24	8.15	8.15	7.16	7.50
	(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.34; 4.75)	
Median	14.17	14.17	16.87	16.87	11.91	11.91	12.79	12.79	11.85	11.85
	(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)	
Mean	15.74	15.93	18.80	18.89	13.68	13.85	13.80	14.08	12.81	13.14
	(0.20; 1.27)		(0.09; 0.48)		(0.17; 1.24)		(0.28; 2.03)		(0.32; 2.50)	
MW as % of										
median		52.93		44.46		62.97		56.64		63.29
mean		47.65		39.89		54.82		54.35		58.55
People affected (%)										
overall		10.15		4.27		12.62		12.99		21.02
within 1st decile		100.00		49.18		100.00		100.00		100.00
Δ wage bill (1000 € / month)	457,310.82		108,744.04		52,756.05		220,219.89		75,590.84	
% of wage sum		0.87		0.38		1.18		1.40		2.08

Notes: Only employed people aged 18-65 are included. Percentiles are defined for the wage distribution without the minimum wage. Means are calculated within the range of given percentiles.
Δ wage bill is the difference between the wage sum with and without the minimum wage, with wage sum = Σ (hourly wage×weekly working hours×4.2). The wage sum does not include employers' social security contributions.
The numbers in parentheses refer to absolute and relative differences in the two wage measures.

Source: Own calculations based on SOEP, wave 2007.

Table A3 Wage distribution before and after the introduction of a legal minimum wage of 7.50 € / hour, including "secondary jobs", 2008 (wage projections based on average growth rates)

	Total Germany		Men West		Men East		Women West		Women East	
	No MW	MW	No MW	MW	No MW	MW	No MW	MW	No MW	MW
1st-10th percentile	5.38	7.50	6.61	7.80	5.70	7.50	4.95	7.50	4.72	7.50
	(2.12; 39.41)		(1.19; 18.00)		(1.80; 31.58)		(2.55; 51.52)		(2.78; 58.90)	
1st-5th percentile	4.37	7.50	5.17	7.50	4.78	7.50	4.20	7.50	3.61	7.50
	(3.13; 71.62)		(2.33; 45.07)		(2.72; 56.90)		(3.30; 78.57)		(3.89; 107.76)	
6th-10th percentile	6.40	7.50	8.05	8.10	6.58	7.50	5.77	7.50	5.86	7.50
	(1.10; 17.19)		(0.05; 0.62)		(0.92; 13.98)		(1.73; 29.98)		(1.64; 27.99)	
11th-15th percentile	7.65	7.72	9.86	9.86	7.31	7.51	6.92	7.50	6.69	7.50
	(0.07; 0.92)		(0.00; 0.00)		(0.20; 2.74)		(0.58; 8.38)		(0.81; 12.11)	
16th-25th percentile	9.10	9.10	11.83	11.83	8.42	8.42	8.30	8.30	7.42	7.58
	(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.16; 2.16)	
Median	14.22	14.22	17.10	17.10	12.01	12.01	12.86	12.86	11.67	11.67
	(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)		(0.00; 0.00)	
Mean	15.87	16.09	19.00	19.12	13.76	13.95	13.99	14.28	12.71	13.04
	(0.22; 1.39)		(0.12; 0.63)		(0.20; 1.45)		(0.29; 2.07)		(0.34; 2.68)	
MW as % of										
median		52.74		43.86		54.51		58.32		64.27
mean		47.26		39.47		58.28		53.61		59.01
People affected (%)										
overall		11.98		5.99		17.09		15.12		22.00
within 1st decile		100.00		59.85		100.00		100.00		100.00
Δ wage bill (1000 € / month)	515,425.76		140,961.37		54,692.51		237,204.08		82,567.80	
% of wage sum	0.83		0.42		1.05		1.26		1.94	

Notes: Only employed people aged 18-65 are included. Percentiles are defined for the wage distribution without the minimum wage. Means are calculated within the range of given percentiles.
Δ wage bill is the difference between the wage sum with and without the minimum wage, with wage sum = Σ (hourly wage×weekly working hours×4.2). The wage sum does not include employers' social security contributions.
The numbers in parentheses refer to absolute and relative differences in the two wage measures.

Source: Own calculations based on SOEP, wave 2007.

Table A4: a) Distribution of households among hours categories for couple households, both spouses with flexible hours

	Weekly hours	Men								Total	
		0		1-20 (12.5)		21-40 (36.5)		>40 (47.0)			
Women	0	101	(3.86%)	11	(0.42%)	296	(11.32%)	266	(10.18%)	674	(25.78%)
	1-12 (8.5)	13	(0.50%)	6	(0.23%)	114	(4.36%)	108	(4.13%)	241	(9.22%)
	13-20 (15.5)	20	(0.77%)	2	(0.08%)	235	(8.99%)	182	(6.96%)	439	(16.79%)
	21-34 (25.5)	31	(1.19%)	8	(0.31%)	253	(9.68%)	224	(8.57%)	516	(19.74%)
	35-40 (38.0)	62	(2.37%)	11	(0.42%)	278	(10.64%)	173	(6.62%)	524	(20.05%)
	>40 (45.5)	19	(0.73%)	8	(0.31%)	90	(3.44%)	103	(3.94%)	220	(8.42%)
	Total	246	(9.41%)	46	(1.76%)	1,266	(48.43%)	1,056	(40.40%)	2,614	(100.00%)

Source: Own calculations based on SOEP, wave 2007.

Table A4: b) Distribution of households among hours categories for couple households, one spouse with fix and one spouse with flexible hours

Men (Women fix)			**Women** (Men fix)		
Weekly hours			Weekly hours		
0	44	(11.61%)	0	191	(30.08%)
1-20 (12.5)	11	(2.90%)	1-12 (9.0)	62	(9.76%)
			13-20 (15.0)	81	(12.76%)
21-40 (36.5)	161	(42.48%)	21-34 (26.5)	112	(17.64%)
			35-40 (38.5)	131	(20.63%)
>40 (46.5)	163	(43.01%)	>40 (44.5)	58	(9.13%)
Total	379	(100.00%)	Total	635	(100.00%)

Source: Own calculations based on SOEP, wave 2007.

Table A4: c) Distribution of households among hours categories for single households

Men			**Women**		
Weekly hours			Weekly hours		
0	205	(20.81%)	0	384	(29.95%)
1-20 (12.5)	62	(6.29%)	1-12 (9.0)	85	(6.63%)
			13-20 (15.0)	89	(6.94%)
21-40 (36.5)	359	(36.45%)	21-34 (26.5)	177	(13.81%)
			35-40 (38.5)	345	(26.91%)
>40 (46.5)	359	(36.45%)	>40 (44.5)	202	(15.76%)
Total	985	(100.00%)	Total	1,282	(100.00%)

Source: Own calculations based on SOEP, wave 2007.

Table A5: Conditional logit labor supply models

Variable	Couples, both flexible		Couples, women fix		Couples, men fix		Sigles, men		Singles, women	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
income	1.209	6.426	-1.722	5.940	-8.408	2.763	-2.283	3.468	-7.426	2.505
income squared	0.711	0.379	0.764	0.259	0.721	0.146	0.409	0.103	0.583	0.076
income × husband's leisure	-1.462	0.350	-1.910	0.684			-0.344	0.594		
income × wife's leisure	-0.676	0.312			-0.139	0.342			0.400	0.444
husband's leisure	63.947	7.032	41.493	11.052			15.520	9.857		
husband's leisure squared	-4.980	0.381	-2.500	0.896			-1.142	0.786		
wife's leisure	35.908	6.435			-8.743	6.372			-5.570	6.820
wife's leisure squared	-1.702	0.370			1.394	0.642			0.961	0.603
husband's leisure × wife's leisure	-2.414	0.960								
husband's leisure × dummy1	-4.628	4.221	-0.182	0.615			-0.364	0.618		
wife's leisure × dummy1	-4.307	3.894			-1.580	0.333			-0.608	0.474
husband's leisure × wife's leisure × dummy1	1.163	1.002								
income × dummy1	-2.692	5.512								
income squared × dummy1	0.235	0.376								
husband's leisure × dummy2	-6.838	2.592	0.212	0.383			0.673	0.285		
wife's leisure × dummy2	-8.106	2.430			-0.643	0.615			0.249	0.276
husband's leisure × wife's leisure × dummy2	1.389	0.638								
income × dummy2	4.216	1.549								
income squared × dummy2	-0.378	0.124								
husband's leisure × husband's age	-0.267	0.078	-0.399	0.106			-0.211	0.082		
husband's leisure squared × husband's age squared	0.411	0.085	0.517	0.119			0.313	0.096		
wife's leisure × wife's age	-0.411	0.081			-0.086	0.110			-0.258	0.077
wife's leisure squared × wife's age squared	0.611	0.095			0.212	0.115			0.402	0.091
husband's leisure × husband's health status	2.255	0.560	2.573	1.666			0.662	0.701		
wife's leisure × wife's health status	0.939	0.748			2.012	1.123			-1.148	0.888
wife's leisure × dummy 3	3.272	0.478			3.240	0.929			2.451	1.030
wife's leisure × dummy 4	2.595	0.338			2.063	0.610			2.204	0.516
wife's leisure × dummy 5	2.490	0.209								
husband's leisure × dummy 3			1.039	0.843			3.081	2.131		
husband's leisure × dummy 4			-0.670	0.770			0.475	0.796		
Number of observations	63,792		1,864		1,864		3,367		6,733	
Log Likelihood	-6,960.14		-525.65		-1,363.56		-992.23		-1,834.18	
LR chi² (28)	2,974.25		240.73		222.11		349.96		354.03	

Notes: Dummy 1: Head of household (person answering the GSOEP household questionnaire) is German
Dummy 2: Household is living in East Germany
Dummy 3: Children under the age of 3 in household
Dummy 4: Children between 3 and 6 in household
Dummy 5: Children between 7 and 16 in household
× indicates an interaction term

Source: SOEP, wave 2007.

Table A6: Labor supply effects of the introduction of a legal minimum wage of 7.50 € / hour, 2008

	West Germany		East Germany	
	Men	**Women**	**Men**	**Women**
Change in labor force participation rate (in percentage points)				
Couple, both spouses flexible	0.03	0.04	0.07	0.08
Couple, one spouse flexible	0.03	0.11	0.03	0.14
Singles	0.08	0.07	0.12	0.16
Change in average working hours (in percent)				
Couple, both spouses flexible	0.13	0.62	0.42	0.69
Couple, one spouse flexible	0.09	0.40	0.12	0.46
Singles	0.33	0.33	0.47	0.75
Additional labor supply (in 1,000 persons)				
Couple, both spouses flexible	2.1	2.1	0.8	0.8
Couple, one spouse flexible	0.2	1.7	0.9	0.6
Singles	2.7	2.4	0.9	1.0
Additional working hours (in 1,000 full-time equivalents)				
Couple, both spouses flexible	5.8	15.5	3.5	5.0
Couple, one spouse flexible	0.6	1.8	1.9	1.3
Singles	6.1	5.8	2.1	3.0

Source: SOEP, wave 2007.

Table A7 Effects on net household incomes for those households affected by a minimum wage of 7.50 € / hour, 2008 (income projections based onaverage growth rates)

	Households affected by MW	No MW	MW of 7.50 € / hour			
			Δ average income		Δ total income	
	%	€ / month	€ / month	%	1000 € / month	%
West Germany, overall	8.52	2,686.99	47.14	1.75	88,983.62	100.00
without children	5.05	1,669.18	70.88	4.25	47,205.33	53.05
with children	13.62	3,241.86	34.20	1.05	41,778.29	46.95
West Germany, couples						
without children	7.19	2,289.34	61.62	2.69	20,909.74	23.50
with children	14.54	3,449.18	34.54	1.00	36,733.65	41.28
both spouses work	14.98	3,407.28	46.08	1.35	50,105.11	56.31
one spouse works	6.09	2,652.59	13.72	0.52	2,288.05	2.57
West Germany, singles						
without children	3.86	1,024.99	80.49	7.85	26,295.59	29.55
with children	9.56	1,849.34	31.86	1.72	5,044.63	5.67
East Germany, overall	14.02	2,183.81	52.99	2.43	36,414.97	100.00
without children	12.02	1,624.40	59.56	3.67	22,326.79	61.31
with children	17.53	2,855.26	45.11	1.58	14,088.17	38.69
East Germany, couples						
without children	13.83	2,139.75	82.99	3.88	11,668.65	32.04
with children	19.54	2,994.09	50.20	1.68	13,332.20	36.61
both spouses work	19.20	3,017.58	83.40	2.76	23,814.09	65.40
one spouse works	15.7	2,310.49	18.25	0.79	928.77	2.55
East Germany, singles						
without children	11.14	1,315.07	45.50	3.46	10,658.14	29.27
with children	11.06	2,066.25	16.18	0.78	755.97	2.08

Notes: Households affected by the minimum wage as percentage of all households in each group. Percentage changes of average income refer to households within the respective group, percentage changes of total income are calculated relative to the whole population.

Source: Own calculations based on SOEP, wave 2007.

Table A8 Effects on net household incomes for those households affected by a minimum wage of 7.50 € / hour, taking into account labor demand adjustment, 2008 (income projections based on average growth rates)

| | Households affected by MW | No MW | MW of 7.50 € / hour | | | |
| | | | Δ average income | | Δ total income | |
	%	€ / month	€ / month	%	1000 € / month	%
West Germany, overall	8.52	2,686.99	29.25	1.09	55,212.79	100.00
without children	5.05	1,669.18	52.55	3.15	35,000.17	63.39
with children	13.62	3,241.86	16.54	0.51	20,212.61	36.61
West Germany, couples	11.66	3,168.60	21.97	0.69	30,813.61	55.81
without children	7.19	2,289.34	41.16	1.80	13,966.66	25.30
with children	14.54	3,449.18	15.84	0.46	16,846.95	30.51
both spouses work	14.98	3,407.28	24.69	0.72	26,845.60	48.62
one spouse works	6.09	2,652.59	7.50	0.28	1,251.45	2.27
West Germany, singles	4.79	1,294.08	50.31	3.89	24,399.18	44.19
without children	3.86	1,024.99	64.38	6.28	21,033.51	38.10
with children	9.56	1,849.34	21.26	1.15	3,365.67	6.10
East Germany, overall	14.02	2,183.81	45.10	2.07	30,988.90	100.00
without children	12.02	1,624.40	52.49	3.23	19,677.18	63.50
with children	17.53	2,855.26	36.22	1.27	11,311.72	36.50
East Germany, couples	17.1	2,698.35	51.15	1.90	20,774.83	67.04
without children	13.83	2,139.75	71.80	3.36	10,095.88	32.58
with children	19.54	2,994.09	40.21	1.34	10,678.94	34.46
both spouses work	19.2	3,017.58	71.56	2.37	20,433.25	65.94
one spouse works	15.7	2,310.49	9.78	0.42	497.99	1.61
East Germany, singles	11.13	1,440.00	40.90	3.11	9,581.29	30.92
without children	11.14	1,315.07	37.21	2.83	4,707.45	31.06
with children	11.06	2,066.25	12.01	0.58	302.98	2.00

Notes: Households affected by the minimum wage as percentage of all households in each group. Percentage changes of average income refer to households within the respective group, percentage changes of total income are calculated relative to the whole population.

Source: Own calculations based on SOEP, wave 2007.

Table A9 Effects of a minimum wage of 7.50 € / hour on net equivalent incomes of households affected by minimum wage (€ per month) by region, 2008 (income projections based on average growth rates)

Decile	Persons affected by MW	No MW	MW of 7.50 € / hour Δ average equivalent income	
	%	€ / month	€ / month	%
West Germany				
1st	8.48	728.67	18.76	2.57
2nd	19.15	931.36	46.50	4.99
3rd	14.12	1,165.47	17.98	1.54
4th	12.33	1,372.51	19.13	1.39
5th	10.14	1,557.18	52.01	3.34
6th	9.62	1,784.39	16.93	0.95
7th	3.70	2,018.53	70.61	3.50
8th	4.05	2,227.05	45.16	2.03
9th	2.72	2,789.75	17.47	0.63
10th	0.84	4,459.72	3.31	0.07
Total	8.52	1,387.91	32.00	2.31
Inequality measures × 100	No MW	MW	Δ absolute	Δ %
Gini coefficient	27.97	27.90	-0.072	-0.26
MLD	13.66	13.60	-0.059	-0.43
Atkinson ($\varepsilon = 2$)	27.84	27.78	-0.062	-0.22
East Germany				
1st	4.68	663.37	74.79	11.27
2nd	1.80	770.17	6.65	0.86
3rd	25.29	900.77	36.12	4.01
4th	32.74	1,062.09	28.18	2.65
5th	13.25	1,275.91	44.49	3.49
6th	22.43	1,427.69	37.48	2.63
7th	16.17	1,640.76	29.67	1.81
8th	7.99	1,813.88	47.47	2.62
9th	5.43	2,174.25	8.79	0.40
10th	10.00	2,649.00	63.98	2.42
Total	14.02	1,361.22	36.98	2.72
Inequality measures × 100	No MW	MW	Δ absolute	Δ %
Gini coefficient	26.60	26.52	-0.078	-0.29
MLD	11.90	11.85	-0.048	-0.40
Atkinson ($\varepsilon = 2$)	23.32	23.29	-0.029	-0.12

Notes: Deciles for the overall equivalent net income distribution are calculated for the wage structure in 2008 (without minimum wage) in the respective region. People affected refer to people within a given decile of this distribution affected by the minimum wage. % of Δ average income refer to average equivalent income in the respective decile and region.

The Gini coefficient is sensitive to changes in the middle of the income distribution. MLD is the mean log deviation of equivalent income which is a "bottom-sensitive" inequality measure. The Atkinson inequality measure is calculated for a high degree of inequality aversion ($\varepsilon = 2$). For the exact definition and properties of these inequality measures, see, e.g., Cowell (1995) or Atkinson, A.B. (1987).

Source: Own calculations based on SOEP, wave 2007.

Table A10 Effects of a minimum wage of 7.50 € / hour on net equivalent incomes of households affected by minimum wage (€ per month) by region, taking into account labor demand adjustment, Inequality measures, 2008 (income projections based on average growth rates)

Decile	Persons affected by MW %	No MW € / month	MW of 7.50 € / hour Δ average equivalent income € / month	 %
West Germany				
1st	8.48	728.67	14.70	2.02
2nd	19.15	931.36	32.96	3.54
3rd	14.12	1165.47	11.32	0.97
4th	12.33	1372.51	10.63	0.77
5th	10.14	1557.18	37.13	2.38
6th	9.62	1784.39	10.66	0.60
7th	3.7	2018.53	34.68	1.72
8th	4.05	2227.05	32.67	1.47
9th	2.72	2789.75	15.35	0.55
10th	0.84	4459.72	-0.27	-0.01
Total	8.52	1387.91	21.47	1.55
Inequality measures × 100	**No MW**	**MW**	**Δ absolute**	**Δ %**
Gini coefficient	27.97	27.93	-0.042	-0.15
MLD	13.66	13.63	-0.030	-0.22
Atkinson ($\varepsilon = 2$)	27.84	27.82	-0.022	-0.08
East Germany				
1st	4.68	663.37	73.96	11.15
2nd	1.80	770.17	6.35	0.82
3rd	25.29	900.77	32.22	3.58
4th	32.74	1062.09	25.96	2.44
5th	13.25	1275.91	35.36	2.77
6th	22.43	1427.69	33.50	2.35
7th	16.17	1640.76	21.20	1.29
8th	7.99	1813.88	44.18	2.44
9th	5.43	2174.25	7.60	0.35
10th	10.00	2649	50.36	1.90
Total	14.02	1361.22	32.02	2.35
Inequality measures × 100	**No MW**	**MW**	**Δ absolute**	**Δ %**
Gini coefficient	26.60	26.53	-0.065	-0.24
MLD	11.90	11.86	-0.039	-0.33
Atkinson ($\varepsilon = 2$)	23.32	23.30	-0.018	-0.08

Notes: Deciles for the overall equivalent net income distribution are calculated for the wage structure in 2008 (without minimum wage) in the respective region. People affected refer to people within a given decile of this distribution affected by the minimum wage. % of Δ average income refer to average equivalent income in the respective decile and region.

The Gini coefficient is sensitive to changes in the middle of the income distribution. MLD is the mean log deviation of equivalent income which is a "bottom-sensitive" inequality measure. The Atkinson inequality measure is calculated for a high degree of inequality aversion ($\varepsilon = 2$). For the exact definition and properties of these inequality measures, see, e.g., Cowell (1995) or Atkinson, A.B. (1987).

Source: Own calculations based on SOEP, wave 2007.