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## Overtime Work, Overtime Compensation and the Distribution of Economic Well-Being: Evidence for West Germany and Great Britain

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Distribution of Economic Well-Being Evidence for  
the West Germany and Great Britain**

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June 2001

# Overtime Work, Overtime Compensation and the Distribution of Economic Well-Being Evidence for West Germany and Great Britain

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## ABSTRACT

# Overtime Work, Overtime Compensation and the Distribution of Economic Well-Being Evidence for West Germany and Great Britain<sup>\*</sup>

Using panel data for West Germany and Great Britain, we show that there are striking differences in overtime work and overtime compensation in the two countries in the 1990s. Our estimates reveal that the observed overtime patterns affect both the evolution of the monthly labour earnings distribution and individual economic well-being differently in West Germany and Great Britain. Besides varying labour market institutions in the two countries a higher incidence of a combination of performance-related pay and unpaid overtime in Great Britain is an important factor in explaining the observed differences. With regards to West Germany, we show that the current policy of transforming paid overtime in “working time accounts”, which is conducted in the spirit of “work-sharing”, is neither beneficial for employed workers in terms of income mobility, nor in terms of overall job satisfaction nor in terms of working time preferences.

JEL Codes: J22, J23, J31, J33

Keywords: Overtime, wage inequality, economic well-being, semi-parametric decomposition technique, panel data

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## **I Introduction**

Mandatory reductions in the number of actual hours worked per person are a very popular policy tool in the ongoing European debate on job creation and unemployment reduction. The underlying idea is that of “work sharing”, i.e. the notion that there is a certain total amount of actual working hours in a given period and therefore a cut of actual hours worked per person leads to an increase in overall employment.

For a long time the policy tool of choice in Europe was that of a reduction in the amount of standard hours per week, and this still appears to be the case in France.<sup>1</sup> Recently however, the public interest at least in Germany has shifted to another tool to induce work-sharing: reduction in the amount of paid overtime. Potential policy instruments for reducing paid overtime are mandatory overtime premiums or statutory restrictions on the maximum amount of legally allowed overtime hours per week on the one hand and bargained options for flexible working time arrangements at the firm level on the other hand.

In Germany both employers associations and unions are pushing so called individual ‘working time accounts’: Overtime hours are transferred into these accounts, when workers are required to work overtime due to short run fluctuations in product demand and overtime hours have to be drawn from these accounts within a given period when short-run product demand allows for a transitory reduction of individual working hours respectively. Employers certainly prefer ‘working time accounts’ over paid overtime to cope with short-run fluctuations of labour demand, since the transactions costs of a flexible working time scheme, once it is set up, are lower than costs due to paying overtime premiums. Therefore, employers associations propose ‘working time accounts’ with generous deposit limits and/or extended periods for balancing individual working hours accounts. In contrast, unions want to limit the maximum individual hours deposit to a certain amount. The underlying proposition here is that of work-sharing, i.e. transforming paid overtime into transitory overtime and allocating the remaining definite amount of overtime hours to unemployed workers.

Focussing on the potential employment effects of this policy tool, the current debate largely ignores two important economic issues. Firstly, there are important economic reasons as to why it might be efficient for workers, as well as for firms to stick to persistent amounts of paid and/or unpaid overtime. Secondly, reducing paid overtime affects individual income and consequently might have redistributive effects. Therefore, our study proceeds as follows. We start with outlining some theoretical reasons for persistent amounts of overtime (section II).

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<sup>1</sup> See Crepon/Kramarz (2000) or Hunt (1999) for current evaluations of work-sharing measures.

We then briefly describe the basic trends of overtime incidence and overtime compensation patterns in West Germany and Great Britain in the 1990s using individual panel data (section III). We choose Great Britain as a benchmark case, since overtime work is essentially unregulated in the British labour market in the period under consideration. In section IV we assess whether the observed overtime patterns are an important factor in explaining the rise in labour earnings inequality in both countries using a semi-parametric kernel density approach. Furthermore, we analyse whether the observed changes in overtime compensation patterns have an impact on indicators of individual economic well-being like income mobility, job satisfaction and working time preferences (section V). Section VI concludes with a discussion of our results.

## II Theoretical Background

From an employees' point of view, *paid* overtime is an important means of increasing monthly income, since the average overtime premium is roughly 1.3 (1.4)<sup>2</sup> times the straight-time hourly wage rate in West Germany (Great Britain). Within a life-cycle perspective it is therefore very likely – at least for blue-collar workers - that the substitution effect dominates the income effect in the early years of a working life, which leads to (persistent) supply of hours of work beyond the standard working week. Moreover, the notion of reciprocity might induce workers to persistently work *unpaid* overtime if the employer provides additional employee benefits such as company pensions for example. The main argument is that of 'gift exchange' (Akerlof 1982), i.e. existing social norms lead workers to offer *unpaid* overtime in exchange for employer-provided benefits.

Well designed compensation schemes might be another reason for the existence of persistent *unpaid* overtime. If output of workers can be easily monitored, compensation packages with performance-related pay such as discrete bonuses, commissions or profit-sharing schemes provide direct monetary incentives for workers to increase effort (Prendergast 1999), that is among others means to increase the amount of unpaid overtime. This also holds for tournament pay schemes, where individual income is linked to the relative performance of workers within a group (Prendergast 1999). Moreover, within a dynamic setting career concerns come into consideration. If firms use promotions to sort workers on the basis of their talents within hierarchies (Rosen 1986), workers exert effort to be promoted to better paid

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<sup>2</sup> See IW(1999), table 1 at <http://www.iw-koeln.de/TWD/I-Archiv/iwd09-99/i09-99-3.htm> for Germany, respectively Bell/Hart (1999b) for the UK.

positions in the future. These intertemporal linkages in contracts might also lead to persistent amounts of *unpaid* overtime provided by workers.

Along with inducing *unpaid* overtime by means of appropriate compensation schemes, employers certainly favour ‘working time accounts’ over paid overtime in the short run, since the transactions costs of a flexible working time scheme, once it is set up, are lower than costs due to paying overtime premiums for every hour worked beyond the standard workweek. However, if we observe qualifical mismatch between employed workers and unemployed job seekers, employers might have to pay for overtime to directly compensate workers with rare qualifications, but without future promotion prospects within the firm (Bauer/Zimmermann 1999, Pannenberg/Wagner 1999).

### **III Data and Basic Trends**

To bring the outlined theoretical arguments to the data, we conduct a cross-national study comparing West Germany and Great Britain for the years from 1991 to 1998. Both economies have quite different patterns of collective bargaining on actual hours worked. In Germany, powerful unions were successful in reducing the standard working week to 37,4 hours during the 1990s and there exists a legal framework which sets working time standards, e.g. restricts the maximum of allowed hours worked per day to 10 hours with further restrictions for guaranteeing the standard 8 hour day on average.<sup>3</sup> On the contrary, in Great Britain the number of overtime hours is essentially unregulated and is bargained between employer and employee during the period under consideration. Moreover, the U.K government has encouraged profit-related pay from 1991 up to 1997 by means of a tax exempt amount of up to 20% of total pay received in an approved profit-related pay scheme, which might affect the incidence of unpaid overtime.<sup>4</sup>

#### *Data*

Our analysis for West Germany is based on the German Socio-Economic Panel (GSOEP) for the years 1991 up to 1998. The GSOEP is a nationally representative longitudinal data set for Germany which was first conducted in 1984 (Wagner et al. 1993). Our analysis is restricted to full-time males working in the private sector in West Germany in the relevant years aged 18 up to 65. Information on overtime and overtime compensation stems from questions on the amount of overtime in the last month preceding the interview and on usual types of overtime compensation. The questionnaire allows us to differentiate between paid overtime, unpaid

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<sup>3</sup> The law can be found at <http://www.bma.de/>.

<sup>4</sup> See Booth/Frank (1999) for more details.

overtime, overtime compensated with hours or days off and a partly paid/partly compensated with extra time off category. The wage measure used is the monthly gross real labour earnings in the months preceding the interview including overtime payments as well as additional payments such as 13<sup>th</sup>/14<sup>th</sup> month salary, profit related pay or discrete bonuses.

With respect to Great Britain, our analysis is based on the British Household Panel Study (BHPS) for the years 1991 up to 1998. The BHPS consists of representative longitudinal data for Great Britain (see Taylor 1994). The analysis is restricted to full-time males aged 18 up to 65. Only private sector fulltime, non-agriculture, non-forestry and non-fishing regular wage or salary workers in dependent employment with valid information on overtime, wages and working hours are considered.

Information on overtime stems from a question on the usual amount of overtime in a usual week. Information on overtime compensation is generated from a subsequent question on the usual proportion of paid overtime. Since we observe only a tiny fraction of workers who usually work partly paid /partly unpaid overtime (roughly 2% per year), we can only distinguish between paid and unpaid overtime for Great Britain in the same way as other studies by using the LFS or the New Earnings Survey (Bell/Hart 1999a/b, Bell/Hart/Hübler/Schwerdt 2000). The wage measure used is the usual real gross pay per month at the current job including any overtime, bonuses, commissions, etc.

### *Basic Trends*

Tables 1 provides summary statistics for West Germany and Great Britain.<sup>5</sup> The remarkable incidence of overtime in the two countries is broadly similar while the average amount of hours of overtime for full-time male workers with overtime in Great Britain is roughly twice those in West Germany for all years. In both countries the amount of overtime for workers given their overtime incidence is relatively stable over time. In addition we do observe remarkable persistence in working overtime in the course of time in our data. In West Germany 35 % of all full-time employees worked overtime over the whole period under consideration and in Great Britain 50% of all workers did so.

With regards to overtime compensation patterns in West Germany for the period 1991 to 1998, we observe a striking decrease in the share of workers who work paid overtime, a significant increase in workers with overtime compensated with extra days off and a

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<sup>5</sup> For more detailed evidence on Germany see Pannenberg/Wagner (1999) for example. Additional evidence for the UK is given in Bell/Hart (1999a/b) or Kalwij/Gregory (2000) for instance.

remarkable amount of white collar workers with unpaid overtime (Table 2). In comparison, in Great Britain shares of workers with paid and unpaid overtime are quite stable over time.

#### IV Overtime Work and the Entire Labour Earnings Distribution

The figures above indicate that overtime incidence and the type of overtime compensation varies with the occupational status among other variables. Hence, changing overtime compensation patterns might affect monthly labor earnings differently over the entire earnings distribution. Standard aggregate measures of earnings inequality provide little evidence for what happens where in the distribution of earnings. Therefore, we apply a semi-parametric approach as suggested by DiNardo/Fortin/Lemieux (1996) (DFL) to the problem at hand. Their approach allows us to describe exactly where in the distribution of real monthly labour earnings paid overtime does have an impact. Basically, their decomposition methodology is a generalisation of the familiar Oaxaca decomposition (1973) to the entire density of wages. The aim is to generate simple counterfactual densities such as “the density in year  $t$  that would have prevailed if individual attributes had remained at their  $(t-\tau)$  level and workers had been paid according to the wage schedule observed in year  $t$ ”.

Following the notation of DFL(1996), the density of monthly labour earnings at one point in time,  $f_t(e)$ , can be written as the integral of the density of labour earnings conditional on the distribution of overtime incidence and overtime compensation in that year, aggregated in the variable OTC, and on individual characteristics  $X$  in year  $t$ :

$$\begin{aligned} f_t(e) &\equiv f(e; t_e = t, t_{OTC|X} = t, t_x = t) \\ &= \iint f(e | OTC, X, t_e = t) dF(OTC | X, t_{OTC|X} = t) dF(X | t_x = t) \end{aligned} \quad (1)$$

where  $F(\cdot)$  is the joint distribution of  $z=(OTC,X)$ , and  $F(z | t_t = t) = F(OTC | X, t_{OTC|X} = t) * F(X | t_x = t)$  holds.

The density that would have prevailed in  $t$  when OTC had remained at its  $(t-\tau)$  level, but  $X$  is at  $t$ , can be expressed as:

$$\begin{aligned} f_t(e) &\equiv f(e; t_e = t, t_{OTC|X} = t - \tau, t_x = t) \\ &= \iint f(e | OTC, X, t_w = t) \psi_{OTC|X}(OTC, X) dF(OTC | X, t_{OTC|X} = t) dF(X | t_x = t) \end{aligned} \quad (2)$$

where  $\psi_{OTC|X}(OTC, X) = dF(OTC | X, t_{OTC|X} = t - \tau) / dF(OTC | X, t_{OTC|X} = t)$ . DFL show that reweighting functions like  $\psi_{OTC|X}(OTC, X)$  can be estimated by means of simple parametric models, for example in their application by means of (binary) probit models.

With respect to our German data we have 5 unordered outcomes for OTC : 1 ~ no overtime, 2 ~ paid overtime, 3 ~ extra days off later on, 4 ~ partly paid /party leisure, 5 ~ unpaid overtime.<sup>6</sup> Hence,  $\psi_{OTC|X}(OTC, X)$  can be written as follows:

$$\begin{aligned} \psi_{OTC|X} &= dF(OTC | X, t_{OTC|X} = t - \tau) / dF(OTC | X, t_{OTC|X} = t) \\ &= \sum_{i=1}^5 I_i \frac{\Pr(OTC = i | X, t_{OTC|X} = t - \tau)}{\Pr(OTC = i | X, t_{OTC|X} = t)} \end{aligned} \quad (3)$$

where  $I_i$  is an indicator variable with  $I_i = 1$  if  $OTC = i$  and 0 otherwise. The conditional probabilities in (3) which we need to compute  $\psi_{OTC|X}$  can be obtained by means of multinomial logit models for each date.<sup>7</sup>

DFL furthermore show that the density that would have prevailed in  $t$  when both OTC and  $X$  had remained at their  $(t - \tau)$  level can be expressed as:

$$\begin{aligned} f_t(e) &\equiv f(e; t_e = t, t_{OTC|X} = t - \tau, t_x = t - \tau) \\ &= \iint f(e | OTC, X, t_e = t) \psi_{OTC|X}(OTC, X) dF(OTC | X, t_{OTC|X} = t) \psi_X(X) dF(X | t_x = t) \end{aligned} \quad (4)$$

where  $\psi_X(X) = dF(X | t_x = t - \tau) / dF(X | t_x = t)$ . This can be expressed as

$$\psi_X(X) = \frac{\Pr(t_x = t - \tau | X)}{\Pr(t_x = t | X)} * \frac{\Pr(t_x = t)}{\Pr(t_x = t - \tau)} \quad (5)$$

The conditional probabilities of being in period  $t$  ( $t - \tau$ ) given  $X$  can be estimated by means of standard logit models. The unconditional probabilities can be estimated by computing  $N_t / (N_t + N_{t-\tau})$  or  $N_{t-\tau} / (N_t + N_{t-\tau})$  with  $N$  = numbers of observations in  $t$  or  $t - \tau$ , respectively. The product of these reweighting functions and the sample weights provided in our data sets can be used within standard weighted kernel estimators to compute the counterfactual distributions.

<sup>6</sup> Please note that with respect to the BHPS we have only three unordered categories: 1 ~ no overtime, 2 ~ paid overtime and 3 ~ unpaid overtime.

<sup>7</sup> Hausman-Tests of the underlying IIA-assumption of the multinomial logit model do not provide any evidence that we have to reject the property of independence of irrelevant alternatives for both data sets.

Variables used in the regressions for Germany are: nationality, married, white collar worker (*qualified, unqualified*), blue collar worker (*qualified*), tenure, experience, firm size, required qualification at the job (*quick introduction in the work place, fairly lengthy training at the work place, taking certain courses, vocational training, university degree*), secondary job, expected job loss, additional variable pay (*13<sup>th</sup>/14<sup>th</sup> month salary, holiday money, profit related pay or profit sharing bonuses*) and seven industry dummies. Variables used in the regressions for Great Britain are: ethnic group (*non-white*), married, secondary job, highest educational qualification (*first or higher degree, other higher degree, A-level, O-level*), occupational status (*manager, foreman*), tenure, experience, firm size, member of a workplace union, bonus pay, six regional dummies and six industry dummies. Moreover, plots of the raw distributions for 1991 and 1998 for both countries are provided in Appendix A. The figures A1 and A2 reveal a considerable increase in monthly labour earnings inequality in the course of time for full-time male employees in the private sector in both countries.<sup>8</sup>

Figure 1 plots the counterfactual density if we adjust for changing overtime patterns between 1991 and 1998 against the raw distribution in 1998. The plot reveals moderate shifts in the upper tail of the earnings distribution. In particular, we observe a rise in the density mass within the range of roughly 8.6 up to 9.1 log gross real monthly labour earnings. Most of the increased density mass stems from monthly labour earnings around the median of the distribution. Therefore qualified blue collar workers and medium skilled white collar workers are most likely affected by changing overtime compensation patterns, i.e. the observed decrease in paid overtime in the 1990s leads to income losses for these groups.

We observe quite a different picture for Great Britain (Figure 2). Taking into account the relatively stable overtime patterns with respect to incidence and compensation in Great Britain over time, it comes as no surprise that we do not observe any changes in the overall distribution of labour earnings if overtime compensation patterns remain at their 1991 level.<sup>9</sup> Note however, that our result does not imply that changing overtime patterns of individual workers have no impact on their individual income mobility in Great Britain.

## V Individual Overtime Patterns and Economic Well-Being

The applied sequential decomposition methodology assumes that the conditional density of monthly labour earnings does not depend on the distribution of both overtime compensation

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<sup>8</sup> All kernel density estimates are obtained using a Gaussian kernel. The chosen bandwidth is 0.08 for Germany and 0.094 for Great Britain for all samples, respectively. Sample weights are used.

<sup>9</sup> However, we do observe a slight shift to the left holding other attributes at their 1991 level. This is in line with a study by Bell/Pitt (1998) and is mainly due to an upgrade in skills over the years.

patterns and of other individual attributes. However, due to general equilibrium effects the observed structure of labour earnings may depend on the changing distribution of overtime incidence and overtime compensation types, e.g. firms offer workers performance-related pay to circumvent paid overtime. In the following we therefore assess in a first step how different overtime patterns have affected individual labour earnings mobility, that is the relative earnings position over time. Changing overtime patterns might also influence the utility from working via increased intertemporal flexibility of working hours when ‘working time accounts’ are set up for example. As proxies for the utility from working we use overall job satisfaction and preferences over working hours.

### *Individual Income Mobility*

The purpose is to track workers’ position in the monthly labour earnings distribution over time and to predict the impact of changing overtime compensation on individual income mobility. We choose a three-year window for analysing income mobility. The following simple linear regression framework is employed:<sup>10</sup>

$$\begin{aligned}
P_{it} = & \alpha_0 + \beta_1 P_{i,t-3} + \beta_2 P_{i,t-3}^2 + \gamma_1 OTC_{i,t-3} + \gamma_2 OTC_{i,t} + \gamma_3 OTCPERC_i \\
& + \gamma_4 OTC_{i,t-3} * P_{i,t-3} + \gamma_5 OTC_{i,t-3} * P_{i,t-3}^2 + \delta_1 X_{i,t-3} + \delta_2 X_{i,t-3} * P_{i,t-3} \\
& + \delta_3 X_{i,t-3} * P_{i,t-3}^2 + \varepsilon_{it}
\end{aligned} \tag{6}$$

where  $P_{it}$  is the individuals percentile in the earnings distribution in year t,  $OTC_{i,t}$  captures a vector of dummies for the different types of overtime compensation,  $OTCPERC_i$  is a vector of variables which captures the proportion of different overtime compensation types between t and (t-3)<sup>11</sup>,  $X_{i,t-3}$  is a vector of control variables like education, firm size, job change, sum of job changes, occupational status, regional dummies and  $\varepsilon_{it}$  is a random error term. We start with the general specification (6), but use standard prediction criteria to reduce the amount of estimated parameters. We compute robust standard errors to take into account the fact that our dependent variable lies within the interval [1,100]. Sample weights are used in the regression and standard errors are robust to clustering due to repeated observations of workers. Moreover, our simple linear model might produce predictions that are greater than 100 or less

<sup>10</sup> Holtz-Eakin/Rosen/Weathers (2000) use a similar framework to analyse the impact of entrepreneurship on income mobility.

<sup>11</sup> Please note that the reference group for the OTC-measures are individuals with no overtime over all years.

then 1. However, for both data sets less than 1% of all predictions are outside the interval [1,100].

To summarise our estimation results<sup>12</sup> we produce earnings mobility tables in the following way: assume that an individual starts in the 10<sup>th</sup> percentile and had the mean characteristics of the group. Our simple model then allows us to predict his position in the income distribution in (t+3) depending on different patterns of overtime incidence and overtime compensation patterns. Since our model produces a ‘regression towards the mean’ effect, we analyse the relative effects of overtime incidence and overtime compensation patterns, i.e. compare the predicted percentiles for different patterns within the same starting quantile.

With regards to Germany, we observe that individuals with persistent paid or unpaid overtime over the whole period are significantly better off than individuals with no overtime incidence at all over the entire labor earnings distribution (Table 3). For example, someone with the mean characteristics of his group and starting at the 10<sup>th</sup> percentile will end up three years later at the 14<sup>th</sup> percentile, when he never works overtime over the whole period, but in the 20<sup>th</sup> percentile with either persistent paid or unpaid overtime. Moreover workers with overtime persistently compensated with leisure are worse off than workers with persistent (partly) paid or unpaid overtime, but better off than workers with no overtime at all though this is not significant at standard critical values.

If we look at the case where paid overtime is transformed into ‘working time accounts’ after the first year, we once again observe significant relative losses for workers affected by such a cut in paid overtime over the whole earnings distribution. For example, someone who starts in the 25<sup>th</sup> percentile and whose overtime hours are transferred into working time accounts after the first year, will end up at the 24<sup>th</sup> percentile, while he will end up at the 30<sup>th</sup> percentile if he sticks to paid overtime over the whole period. Hence our results indicate that transferring paid overtime into flexible working time schemes will lead to significant relative individual income losses over the whole earnings distribution in Germany. This result also significantly holds for (union) strategies to cut paid overtime completely.

The results for Great Britain provide a quite distinct picture (Table 4). First of all, similar to Germany we observe that workers with persistent paid overtime are better off than workers with no overtime incidence over the three years.<sup>13</sup> However, workers with persistent unpaid overtime in Great Britain are even better off than their colleagues with persistent paid over-

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<sup>12</sup> Means and standard deviations for all variables are provided in Appendix B.

<sup>13</sup> Also, we observe significant relative losses over the entire earnings distribution if a worker in Great Britain switches from paid overtime to no overtime.

time. For example, someone who starts at the 10<sup>th</sup> percentile will end up at the 17<sup>th</sup> percentile with persistent paid overtime but will find them self at the 22<sup>nd</sup> percentile with persistent unpaid overtime. This result might be driven by the fact that we observe a strong correlation between unpaid overtime and the incidence of additional bonus payments<sup>14</sup>, as well as a remarkable increase in the estimated marginal effect of bonus payments over time in the estimates underlying our reweighting function in chapter III.<sup>15</sup> Performance-related pay, which is heavily subsidised by the U.K. government in the period under consideration, combined with unpaid overtime and paid overtime might be substitutes. Hence, choosing the more risky combination of unpaid overtime plus uncertain bonus payment should yield on average a slightly higher reward if workers are risk-averse.

### *Job Satisfaction*

Since “working time accounts” increase the intertemporal flexibility of working hours they might influence workers utility from working. Therefore, we assess whether changes in overtime patterns have an impact on overall job satisfaction as a proxy for utility in the short run. We use the following simple job satisfaction regression model:<sup>16</sup>

$$JS_{i,t} = \alpha_0 + \beta_1(y_{i,t} - y_{i,t-1}) + \gamma_1OTC_{i,t} + \gamma_2OTC_{i,t-1} + \delta_1X_{i,t-1} + \varepsilon_{it} \quad (7)$$

where  $JS_{i,t}$  is a our job satisfaction dummy variable with (1) ‘satisfied’ and (0) otherwise<sup>17</sup>,  $(y_{i,t} - y_{i,t-1})$  is the first difference of monthly labour earnings and all the other variables are the same as in equation (6). Equation (7) is estimated by means of a probit model. Sample weights are used in the estimation and the variance-covariance matrix is robust to clustering due to repeated observations of workers. To summarise our results, we compute the predicted fraction of satisfied workers conditional on the individual starting position in the labour earnings distribution in (t-1) and their robust standard errors.<sup>18</sup>

With respect to Germany, Table 5 shows that we observe in the lower part of the initial earnings distribution that the fraction of satisfied workers without overtime is higher than the one

<sup>14</sup> 54% of all workers in our BHPS-subsample with unpaid overtime receive bonus payments, but only 38% of all workers with paid overtime do so.

<sup>15</sup> Estimated marginal effect in 1991: 0.040 (0.017) and in 1998: 0.065 (0.019).

<sup>16</sup> See Clark (1999) for a theoretical and empirical substantiation of an equation such as (7). See Hamermesh (2001) for an analysis of changes in the overall distribution of job satisfaction in West Germany.

<sup>17</sup> Note that the scales for job satisfaction are different in the two data sets. The BHPS has a scale from 1 to 7, the GSOEP from 0 to 10. We therefore convert the information to JS with JS=1 if JS\* >8 for the GSOEP and JS\*>5 for the BHPS. Within our selected subsamples (see Appendix C) both raw distributions of JS\* are unimodal.

<sup>18</sup> The delta method is used to compute the standard errors of the predictions (Greene 2000).

for workers with persistent paid overtime, which again is higher than the fractions for workers with any other persistent type of overtime.<sup>19</sup> If we compare movers from paid to any other form of overtime compensation with workers who switch to no overtime, movers without overtime in  $t$  are on average significantly better off. This result reveals that workers who have to switch to ‘working time accounts’ do not obtain any additional positive utility from an increase in intertemporal working hours flexibility at least in the short run.

In Great Britain (Table 6), workers with persistent unpaid overtime are on average significantly more satisfied with their job than their colleagues without overtime over the entire initial earnings distribution. Moreover, in the lower tail of the initial earnings distribution, workers with persistent unpaid overtime are significantly better off in terms of overall job satisfaction than their colleagues with paid overtime. This might be explained by the fact that the estimated parameter of bonus payments in equation (7) and the corresponding marginal effect is significantly positive. Hence, on average we observe a positive correlation of performance-related pay and overall job satisfaction in Great Britain. Consistent with this story is the fact that movers from paid to unpaid overtime are significantly more satisfied than their colleagues who move to unpaid overtime over most parts of the initial earnings distribution. In Germany we observe reverse patterns.

### *Preferences over working hours*

Differences in desired amounts of working hours and actual working hours in a given job signal (dis-)utility from working. Therefore we assess whether different overtime compensation patterns have an impact on preferences over working time. We use a simple preference regression model of the following form:

$$Ph_{i,t} = \alpha_0 + \beta_1(y_{i,t} - y_{i,t-1}) + \gamma_1OTC_{i,t} + \gamma_2OTC_{i,t-1} + \delta_1X_{i,t-1} + \varepsilon_{it} \quad (8)$$

where  $Ph_{i,t}$  is our ordinal preference variable with (1) ‘work fewer hours’, (2) ‘carry on working the same number of hours’, (3) ‘work more hours’<sup>20</sup>,  $(y_{i,t} - y_{i,t-1})$  is the first difference of monthly labour earnings and all the other variables are the same as in equation (7). Equation (8) is estimated by means of an ordered probit model. Sample weights are used in the estimation and the variance-covariance matrix is robust to clustering due to repeated ob-

<sup>19</sup> Though the effects are mostly not significant at the typical critical values.

<sup>20</sup> Note that this is asked with explicitly holding the hourly wage constant, i.e. the answer ‘work less’ implies a reduction in income. While the BHPS collects information as aggregated in  $Ph$ , the GSOEP provides the amount of desired working hours and the amount of actual working hours. We therefore recode the information for Germany as follows:  $\Delta(h\_desired - h\_actual) \leq -2 \sim Ph=1$ ,  $-2 < \Delta(h\_desired - h\_actual) < 2 \sim Ph=2$  and  $Ph=3$  otherwise.

servations of workers. To summarise our results, we compute the predicted fractions of workers who want to work fewer hours, respectively want to work more hours, conditional on the individual starting position in the labour earnings distribution in (t-1).

Table 7 shows the results for Germany. The fraction of workers without any overtime incidence, who want to work less (more), is significantly lower (higher) than the corresponding fraction for workers with any other type of persistent overtime over the entire initial earnings distribution. However, we do not observe significant differences between switchers from paid to any other type of overtime or to no overtime at all. Hence, we do not find any evidence that workers who switch from paid overtime to ‘working time accounts’ realise a better match of desired and actual working time than their colleagues with persistent paid overtime. in the short run.

Table 8 demonstrate that we cannot detect any significant relationships between overtime patterns and preferences over working hours for Great Britain.

## **VI Conclusions**

Our study shows that the observed changing overtime compensation patterns in West Germany in the 1990s are associated with changes in the entire labour earnings distribution as well as with changes in individual income mobility. In particular, the decrease in paid overtime in course of time negatively affects monthly labour earnings slightly above the median of the distribution. Moreover, workers who have to switch from paid overtime to “working time accounts” suffer from significant relative individual income losses over the whole earnings distribution and they do not yield any positive return from switching to more flexible working hours schemes in terms of overall job satisfaction or working time preferences. Taking our results at face value therefore leads to the conclusion that the current policy of unions and employer associations to transform paid overtime into “working time accounts” is not beneficial for employed workers.

Considering the results of our cross-national comparison of West Germany and Great Britain, we show among others that in the unregulated British labour market, workers with persistent unpaid overtime are significantly better off than their colleagues with persistent paid overtime in terms of income mobility and job satisfaction, while this does not hold for West Germany. Besides differences in labour market institutions the widespread incidence of performance-

related pay in Great Britain compared to West Germany might explain this result<sup>21</sup>. If unpaid overtime combined with performance-related pay and paid overtime are indeed close substitutes, working unpaid overtime should yield on average a slightly higher reward if workers are risk-averse. Future explorations of the link between unpaid overtime and performance-related pay are therefore surely of interest.

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<sup>21</sup> 50% of all workers in our BHPS-subsample, but only 15% of all workers in our GSOEP-subsample receive any type of performance-related payments (see Appendix B).



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Table 1: Incidence and amount of overtime (per week) 1991 - 1998

Year	1991	1992	1993	1994	1995	1996	1997	1998
<b>West Germany</b>								
Share of Employees with Overtime (in %)								
Blue collar	45,0	46,2	37,2	41,0	43,2	44,0	46,8	46,2
White collar	71,5	71,4	70,3	72,0	69,0	71,5	76,5	74,2
Amount of overtime hours (given overtime)								
Blue collar	4,7	4,7	4,5	4,3	4,6	4,2	4,4	4,5
White collar	5,7	4,8	5,5	5,4	5,8	5,4	5,6	5,6
<b>Great Britain</b>								
Share of Employees with Overtime (in %)								
Employee with no managerial duties	52,7	54,9	55,7	56,3	56,6	57,8	58,8	55,5
Manager/foremen/supervisor	64,7	68,0	69,7	69,5	67,7	71,9	69,4	69,2
Amount of overtime hours (given overtime)								
Employee with no managerial duties	9,5	8,8	9,0	9,3	10,1	9,7	9,3	9,1
Manager/foremen/supervisor	10,3	10,3	10,6	11,1	10,9	10,0	10,6	10,2

Sources: GSOEP 1991-1998, BHPS 1991-1998. Sample weights are used.

Table 2: Overtime compensation patterns 1991 - 1998

Year	1991	1992	1993	1994	1995	1996	1997	1998
<b>West Germany</b>								
<i>paid overtime (in %)</i>								
Blue collar	73,0	74,1	67,4	60,4	64,4	55,1	42,3	42,6
White collar	27,5	22,0	21,3	15,8	17,0	14,4	8,9	13,1
<i>leisure (in %)</i>								
Blue collar	13,1	8,8	9,2	14,0	8,9	23,1	27,8	27,49
White collar	20,2	24,9	26,1	25,8	25,1	24,9	26,5	29,26
<i>partly paid, partly leisure (in %)</i>								
Blue collar	12,2	15,1	20,6	22,1	23,9	19,8	27,5	26,2
White collar	20,1	23,0	17,9	22,2	23,4	28,0	27,0	22,5
<i>unpaid overtime (in %)</i>								
Blue collar	1,7	2,0	2,8	3,5	2,7	2,0	2,4	3,7
White collar	32,4	30,2	34,8	36,2	34,5	32,6	37,6	35,2
<b>Great Britain</b>								
<i>paid overtime (in %)</i>								
Employee with no managerial duties	84,4	84,6	82,4	86,0	83,0	85,7	83,5	82,2
Manager/foremen/supervisor	43,8	38,4	37,4	35,9	36,6	37,3	37,7	39,6
<i>unpaid overtime (in %)</i>								
Employee with no managerial duties	15,6	15,4	17,6	14,0	17,0	14,3	16,5	17,8
Manager/foremen/supervisor	56,2	61,7	62,6	64,2	63,4	62,7	62,3	60,4

Sources: GSOEP 1991-1998, BHPS 1991-1998. Sample weights are used.

Table 3: Overtime patterns and monthly labour earnings mobility  
West Germany

	All years no overtime	All years paid overtime	All years unpaid overtime	All years partly paid Overtime	All years compensated Overtime	Paid overtime (1st Year) to unpaid ot	Paid overtime (1st Year) to partly paid ot	Paid overtime (1st Year) to compensated overtime	Paid overtime (1st Year) to no overtime
10 <sup>th</sup>	13.681 (0.605)	19.978 (1.048)	20.101 (1.101)	19.034 (1.093)	17.270 (1.317)	17.027 (1.324)	16.548 (1.150)	14.784 (1.219)	10.975 (0.895)
25 <sup>th</sup>	23.393 (0.438)	29.690 (0.956)	29.812 (1.071)	28.746 (1.010)	26.981 (1.267)	26.739 (1.305)	26.260 (1.107)	24.496 (1.167)	20.687 (0.816)
50 <sup>th</sup>	41.953 (0.578)	48.250 (0.945)	48.372 (1.107)	47.306 (1.058)	45.541 (1.304)	45.299 (1.351)	42.284 (1.067)	43.055 (1.220)	39.246 (0.931)
75 <sup>th</sup>	64.366 (0.621)	70.663 (0.863)	70.785 (0.997)	69.719 (1.039)	67.954 (1.297)	67.712 (1.273)	67.232 (1.147)	65.468 (1.197)	61.660 (0.948)
90 <sup>th</sup>	81.517 (0.724)	87.814 (0.959)	87.936 (0.812)	86.870 (1.016)	85.105 (1.245)	84.863 (1.177)	84.383 (1.139)	82.619 (1.162)	78.811 (1.021)

Source: GSOEP 1988-1998.

Note: Table entry is predicted percentile in t; rows are starting percentile in (t-3). Numbers in parentheses are robust standard errors of predictions.

Table 4: Overtime patterns and monthly labour earnings mobility  
Great Britain

	All years no ot	All years paid ot	All years unpaid ot	Paid ot (1st Year) to unpaid ot	Paid ot (1st Year) to no ot
10 <sup>th</sup>	14.492 (0.590)	16.973 (0.672)	21.947 (0.916)	18.166 (1.088)	11.098 (0.864)
25 <sup>th</sup>	24.906 (0.538)	27.387 (0.559)	32.361 (0.844)	28.580 (1.031)	21.512 (0.820)
50 <sup>th</sup>	45.353 (0.648)	47.834 (0.604)	52.808 (0.815)	49.027 (1.013)	41.959 (0.869)
75 <sup>th</sup>	66.790 (0.683)	69.271 (0.627)	74.245 (0.681)	70.464 (0.936)	63.396 (0.891)
90 <sup>th</sup>	80.537 (0.780)	83.018 (0.735)	87.992 (0.668)	84.211 (0.949)	77.143 (0.966)

Source: BHPS 1991-1998.

Note: Table entry is predicted percentile in t; rows are starting percentile in (t-3).  
Numbers in parentheses are robust standard errors of predictions.

Table 5: Overtime patterns and job satisfaction  
West Germany

	Both years no ot	Both years paid ot	Both years unpaid ot	Both years partly paid ot	Both years compensated ot	Paid ot to unpaid ot	Paid ot to partly paid ot	Paid ot to compensated ot	Paid ot to no ot
10 <sup>th</sup>	0,246 (0,014)	0,219 (0,016)	0,168 (0,026)	0,170 (0,019)	0,173 (0,023)	0,162 (0,026)	0,167 (0,020)	0,171 (0,023)	0,251 (0,014)
25 <sup>th</sup>	0,222 (0,012)	0,202 (0,015)	0,163 (0,024)	0,160 (0,018)	0,161 (0,023)	0,147 (0,024)	0,152 (0,018)	0,156 (0,021)	0,232 (0,012)
50 <sup>th</sup>	0,213 (0,012)	0,203 (0,017)	0,181 (0,026)	0,168 (0,020)	0,166 (0,027)	0,148 (0,026)	0,153 (0,020)	0,157 (0,023)	0,233 (0,017)
75 <sup>th</sup>	0,207 (0,013)	0,206 (0,023)	0,202 (0,030)	0,179 (0,024)	0,174 (0,034)	0,151 (0,029)	0,156 (0,023)	0,160 (0,027)	0,237 (0,024)
90 <sup>th</sup>	0,208 (0,016)	0,212 (0,029)	0,219 (0,033)	0,190 (0,028)	0,182 (0,039)	0,156 (0,032)	0,161 (0,028)	0,165 (0,032)	0,243 (0,031)

Source: GSOEP 1988-1998.

Note: Table entry is predicted fraction of 'satisfied (>8)' workers in t; rows are monthly labour earnings starting percentile in (t-1).  
Numbers in parentheses are robust standard errors of predictions.

Table 6: Overtime patterns and job satisfaction  
Great Britains

	Both years no ot	Both years paid ot	Both years unpaid ot	Paid ot to unpaid ot	Paid ot to no ot
10 <sup>th</sup>	0.503 (0.017)	0.530 (0.016)	0.597 (0.021)	0.582 (0.022)	0.487 (0.017)
25 <sup>th</sup>	0.490 (0.015)	0.502 (0.018)	0.585 (0.020)	0.555 (0.024)	0.460 (0.019)
50 <sup>th</sup>	0.476 (0.015)	0.488 (0.018)	0.572 (0.021)	0.541 (0.025)	0.446 (0.021)
75 <sup>th</sup>	0.465 (0.015)	0.508 (0.021)	0.562 (0.023)	0.560 (0.026)	0.465 (0.023)
90 <sup>th</sup>	0.476 (0.017)	0.552 (0.034)	0.573 (0.023)	0.603 (0.036)	0.509 (0.036)

Source: BHPS 1991-1998.

Note: Table entry is predicted fraction of 'satisfied (>5)' workers in t; rows are labour earnings starting percentile in (t-1).  
Numbers in parentheses are robust standard errors of predictions.

Table 7: Overtime patterns and preferences over working hours  
West Germany

	Both years no ot	Both years paid ot	Both years unpaid ot	Both years partly paid ot	Both years compensated ot	Paid ot to unpaid ot	Paid ot to partly paid ot	Paid ot to compensated ot	Paid ot to no ot
10 <sup>th</sup> less	0,392 (0,056)	0,659 (0,060)	0,734 (0,063)	0,664 (0,067)	0,543 (0,058)	0,657 (0,060)	0,650 (0,060)	0,644 (0,057)	0,644 (0,061)
more	0,181 (0,046)	0,055 (0,021)	0,035 (0,017)	0,054 (0,022)	0,098 (0,024)	0,056 (0,021)	0,058 (0,021)	0,060 (0,020)	0,060 (0,022)
25 <sup>th</sup> less	0,383 (0,061)	0,651 (0,066)	0,726 (0,068)	0,656 (0,072)	0,534 (0,059)	0,649 (0,066)	0,641 (0,066)	0,635 (0,062)	0,636 (0,067)
more	0,187 (0,051)	0,058 (0,023)	0,037 (0,018)	0,056 (0,024)	0,102 (0,025)	0,058 (0,023)	0,061 (0,024)	0,063 (0,023)	0,063 (0,025)
50 <sup>th</sup> less	0,393 (0,063)	0,660 (0,066)	0,735 (0,067)	0,665 (0,072)	0,544 (0,060)	0,658 (0,066)	0,651 (0,066)	0,645 (0,063)	0,645 (0,067)
more	0,180 (0,050)	0,055 (0,023)	0,035 (0,018)	0,053 (0,024)	0,098 (0,025)	0,056 (0,023)	0,058 (0,023)	0,060 (0,022)	0,060 (0,024)
75 <sup>th</sup> less	0,406 (0,064)	0,673 (0,066)	0,746 (0,066)	0,678 (0,072)	0,558 (0,061)	0,671 (0,066)	0,664 (0,067)	0,658 (0,063)	0,658 (0,067)
more	0,171 (0,049)	0,051 (0,022)	0,032 (0,017)	0,050 (0,022)	0,092 (0,024)	0,052 (0,022)	0,054 (0,022)	0,056 (0,021)	0,056 (0,023)
90 <sup>th</sup> less	0,455 (0,066)	0,716 (0,062)	0,784 (0,060)	0,658 (0,067)	0,606 (0,061)	0,715 (0,062)	0,708 (0,063)	0,702 (0,060)	0,703 (0,064)
more	0,142 (0,043)	0,039 (0,017)	0,024 (0,013)	0,056 (0,023)	0,073 (0,021)	0,040 (0,017)	0,042 (0,018)	0,043 (0,018)	0,043 (0,019)

Source: GSOEP 1988-1998.

Note: Table entry is predicted fraction of workers who prefer to work either 'less hours' or 'more hours' in t (ordered probit model); rows are labour earnings starting percentile in (t-1). Numbers in parentheses are robust standard errors of predictions.

Table 8: Overtime patterns and preferences over working hours  
Great Britain

	Both years no ot	Both years paid ot	Both years unpaid ot	Paid ot to unpaid ot	Paid ot to no ot
10 <sup>th</sup> less	0,230 (0,078)	0,267 (0,088)	0,314 (0,097)	0,286 (0,092)	0,258 (0,085)
more	0,122 (0,052)	0,100 (0,047)	0,078 (0,040)	0,091 (0,044)	0,105 (0,048)
25 <sup>th</sup> less	0,287 (0,086)	0,328 (0,095)	0,379 (0,103)	0,349 (0,099)	0,318 (0,092)
more	0,090 (0,041)	0,072 (0,036)	0,055 (0,030)	0,065 (0,034)	0,077 (0,037)
50 <sup>th</sup> less	0,344 (0,092)	0,388 (0,100)	0,441 (0,106)	0,409 (0,103)	0,376 (0,097)
more	0,067 (0,032)	0,053 (0,028)	0,040 (0,023)	0,047 (0,026)	0,056 (0,029)
75 <sup>th</sup> less	0,352 (0,093)	0,396 (0,101)	0,449 (0,106)	0,417 (0,104)	0,384 (0,098)
more	0,064 (0,031)	0,051 (0,027)	0,038 (0,022)	0,045 (0,025)	0,054 (0,028)
90 <sup>th</sup> less	0,374 (0,093)	0,419 (0,101)	0,473 (0,104)	0,441 (0,102)	0,407 (0,098)
more	0,057 (0,028)	0,045 (0,024)	0,033 (0,019)	0,040 (0,022)	0,048 (0,025)

Source: BHPS 1991-1998

Note: Table entry is predicted fraction of workers who prefer to work either 'less hours' or 'more hours' in t (ordered probit model); rows are labour earnings starting percentile in (t-1). Numbers in parentheses are robust standard errors of predictions.

Actual monthly labour earnings distribution in 1998 and counterfactual with overtime at the level of 1991

Figure 1: West Germany

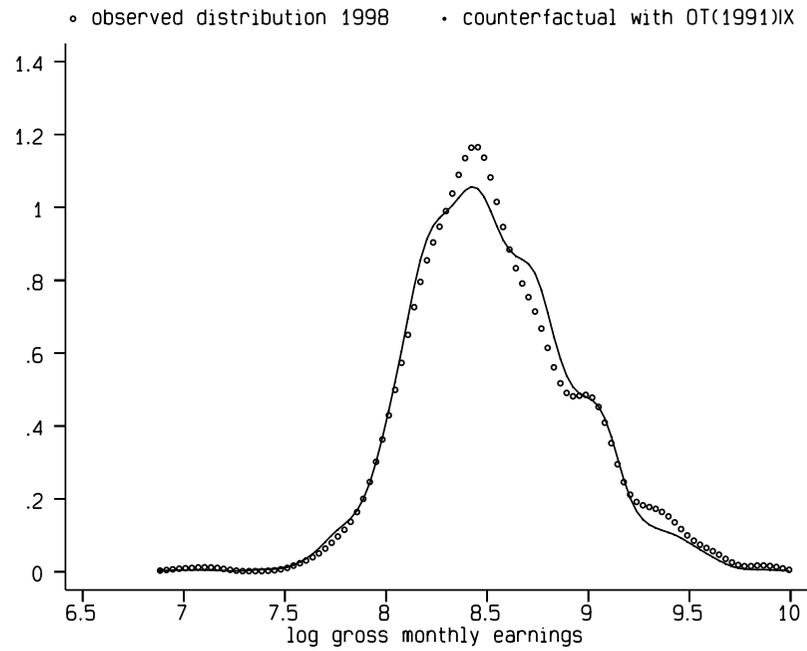
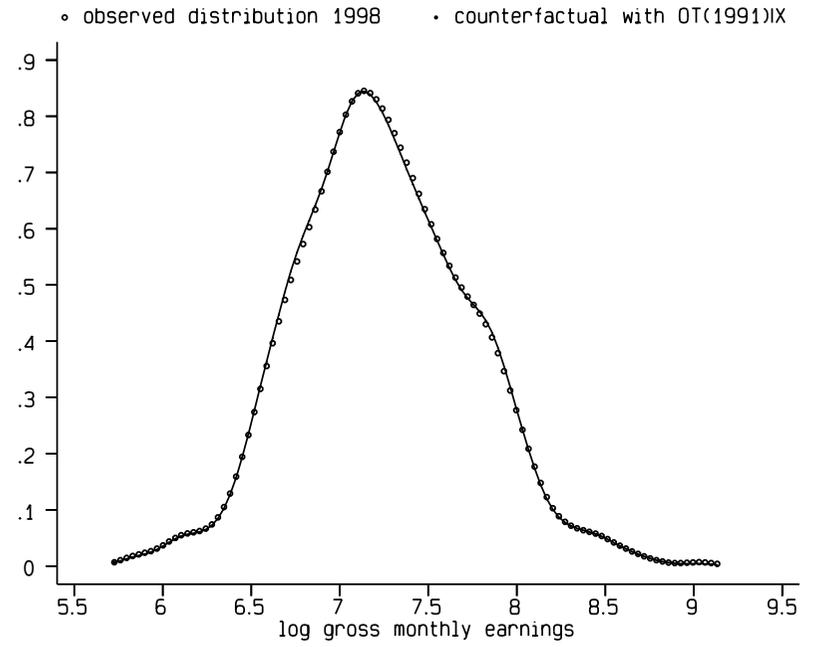


Figure 2: Great Britain



## Appendix A:

### Actual monthly labour earnings distributions in 1991 and in 1998

Figure A1: West Germany

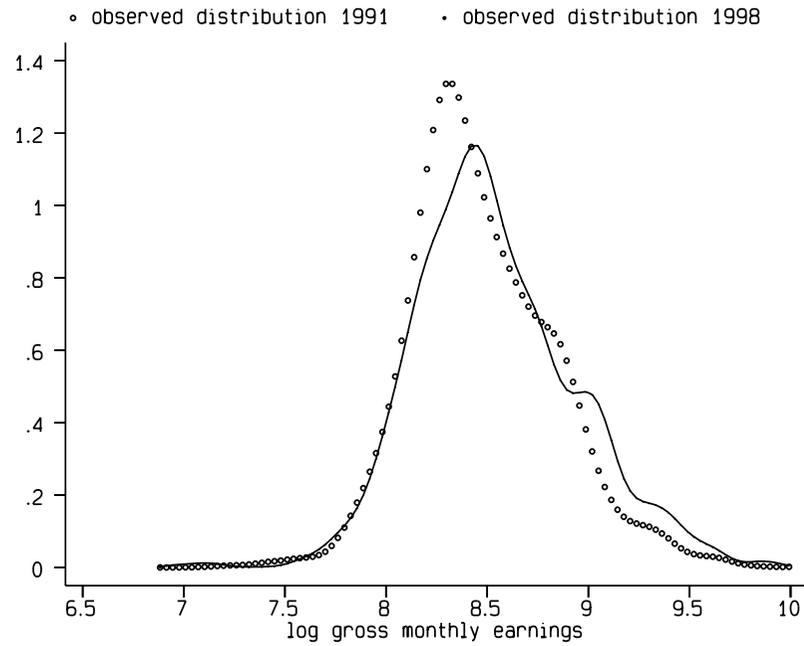
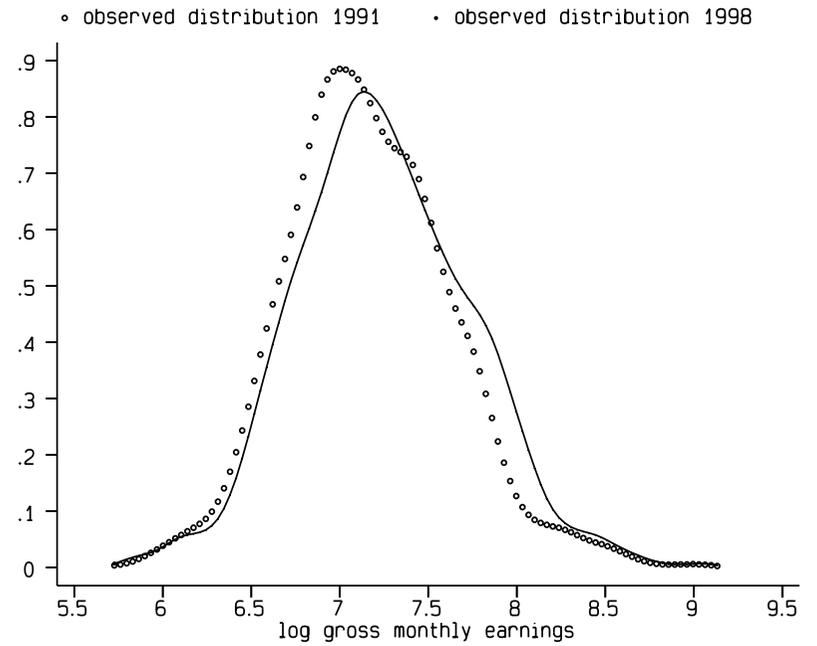


Figure A2: Great Britain



## Appendix B:

Table B1: Means and Standard Deviations: West Germany 1991 – 1998

<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
Log real monthly labour earnings	8,500	0,328
Log real monthly labour earnings (-3)	8,441	0,327
Paid overtime	0,193	0,395
Unpaid overtime	0,076	0,264
Partly paid overtime	0,114	0,318
Overtime with leisure later on	0,100	0,301
Paid overtime (-3)	0,240	0,427
Unpaid overtime (-3)	0,075	0,263
Partly paid overtime (-3)	0,095	0,293
Overtime with leisure later on (-3)	0,069	0,253
Percentage paid overtime in between	0,219	0,301
Percentage unpaid overtime in between	0,072	0,221
Percentage partly paid overtime in between	0,106	0,212
Percentage overtime with leisure in between	0,088	0,193
Bonuses	0,148	0,355
Bonuses (-3)	0,127	0,338
Tenure (-3)	11,446	9,089
Experience (-3)	21,558	10,628
Qualified blue-collar worker (-3)	0,385	0,487
Ordinary white-collar worker (-3)	0,023	0,149
Qualified white-collar worker (-3)	0,302	0,459
Job mobility	0,154	0,361
German	0,660	0,474
Occupational qualification: apprenticeship (-3)	0,690	0,462
Occupational qualification: university degr. (-3)	0,058	0,234
Firm size: 20 – 199 employees (-3)	0,266	0,442
Firm size: 200 - 1999 employees (-3)	0,289	0,453
Firm size: 2000 or more employees (-3)	0,302	0,459
Industry: energy (-3)	0,019	0,138
Industry: chemicals (-3)	0,096	0,294
Industry: construction/quarring (-3)	0,148	0,356
Industry: trade/bank/insurance (-3)	0,093	0,291
Industry: metal/electrical engineering (-3)	0,433	0,495
Industry: transport/traffic (-3)	0,029	0,168
Number of Observations	7695	
Job Satisfaction (N=10786)	0,21	0,41
Preferences over working hours (N=10566)	1,58	0,68

Table B2: Means and Standard Deviations: Great Britain 1991 – 1998

<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
Log real monthly labour earnings	7,307	0,446
Log real monthly labour earnings (-3)	7,204	0,461
Paid overtime	0,385	0,487
Unpaid overtime	0,262	0,440
Paid overtime (-3)	0,393	0,488
Unpaid overtime (-3)	0,244	0,429
Percentage paid overtime in between	0,392	0,412
Percentage unpaid overtime in between	0,255	0,374
Bonuses	0,506	0,500
Bonuses (-3)	0,459	0,498
Married	0,657	0,475
Manager	0,251	0,434
Foreman	0,187	0,390
Education: higher degree	0,117	0,322
Education: other higher qualification	0,242	0,428
Education: A-levels	0,165	0,371
Education: O-levels	0,209	0,407
Firm size: 25 - 49 employees	0,139	0,346
Firm size: 50 - 99 employees	0,137	0,344
Firm size: 100 - 199 employees	0,129	0,335
Firm size: 200 - 499 employees	0,167	0,373
Firm size: 500 - 999 employees	0,092	0,289
Firm size: 1000 or more employees	0,100	0,301
Tenure	5,104	0,906
Experience	18,358	0,593
Industry: energy	0,124	0,330
Industry: metal	0,228	0,419
Industry: construction	0,214	0,410
Industry: distribution	0,180	0,384
Industry: transport	0,074	0,261
Region: London	0,083	0,275
Region: South east	0,198	0,399
Region: South west	0,093	0,290
Region: Middle	0,229	0,420
Region: North	0,278	0,448
Job mobility	0,200	0,400
Number of observations	4332	
Job Satisfaction (N=8387)	0,51	0,50
Preferences over working hours (N=8262)	1,68	0,59

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