

LABOUR MARKET ADJUSTMENT ON THE INTENSIVE MARGIN:
A COMPARATIVE STUDY OF GERMANY AND THE UK

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ABSTRACT:

Many employees in industrial countries work more hours than their contractual stipulates. Such overtime work can either be paid or unpaid and is a possible form of labour market response to changing product market conditions. This research considers overtime working in Germany and the UK and shows that the quantitative significance of both paid and unpaid overtime is greater in the UK. Empirical work is based on the UK Labour Force Survey and the German Socio-Economic Panel in 1993. Overtime working affects the effective average hourly wage positively in the case where overtime is paid at premium rates and negatively where such hours are not remunerated. We demonstrate, via Mincer wage growth equations, that accounting for unpaid work leads to significantly revised estimates of returns to education, experience, and tenure. We estimate overtime hours equations, using these to test several of our theories that might explain the apparent irrationality of unpaid work.

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1 INTRODUCTION

The study of the effects of trade on labour market tends to concentrate on the extensive rather than the intensive margin. Yet the intensive margin is an important source of variation in total labour services both through time and across countries. It also influences companies' location or relocation decisions and hence trade patterns. Investment decisions made by mobile multinational companies are often contingent on collective agreements that incorporate working time arrangements. These arrangements are made against the relevant legal background that protects workers from working "excessive" hours. Within the European Union, the Working Time Directive has provided this framework since 1998.

Even so, there are still wide variations in working hours between different EU states. As well as reflecting different supply conditions, they result in differences in labour costs, which in turn depend on the relevant institutional framework and collective bargaining structure. In the UK, for example, as a result of previous attempts to improve competitiveness, unions are relatively weak and there are virtually no legislative controls over working time. In Germany, by contrast, it is estimated that about 70 per cent of the eligible workforce is covered by works councils, and there exists a legal framework setting working time standards that can only be modified by joint agreement between works councils and employers. Companies with 5 or more employees are expected to have a works council. These widely different environments for determining working time lead to a sharp contrast in working time patterns between Germany and the UK. In turn these may lead to relative changes in competitiveness and so affect investment flows.

Overtime hours come in two forms, those that are paid for and those that are unpaid. While attention has traditionally focused on the former, unpaid overtime is of comparable magnitude to paid overtime in the UK. Approximately x per cent of the total labour input in 1993 came from work in excess of employees basic or normal hours. In Bell and Hart (1998), we show that 12 per cent of male employees work more than 13 hours of paid overtime each week. In Germany, partly because of the legal restrictions on working time that are absent in the UK, extensive overtime working is much less common. Nevertheless, overtime it is an important labour market

phenomenon in both countries, with more than 20 per cent of German males and more than 30 per cent of UK males working some overtime in a typical workweek in 1993.

Differences in hours-worked affect measurement of variables such as the hourly wage rate and productivity. *Published* hourly wages relate only to paid-for hours - basic hours and paid overtime. The *actual* hourly wage rate should additionally take into account working time that is not being paid for. Similarly, the measurement of productivity should be based on hours actually worked. Some paid-for hours will not be productive¹, while some hours of productive work may not be paid for.

This paper deals with several issues. First it discusses why individuals may occasionally work without apparently being explicitly paid for their services. Second it considers how Germany and the UK compare in respect of overtime working - a key aspect of labour market flexibility. This section also shows that there can be substantial differences between the basic hourly rate of pay and the effective hourly rate. Third, the paper investigates whether the returns to characteristics are different when one uses alternative definitions of the hourly wage rate. Fourthly, based on the theory in the first section, the paper considers the factors that might influence overtime working. The final section concludes.

2 THEORY

Arguments as to why individuals may work additional hours for no pay are set out in Bell and Hart (1999). We briefly review all six of these here:

1 Uncertainty over task completion times

This argument is based on the notion that principal and agent frequently bargain not over the wage rate for the job but over the length of time the job will take, given the wage rate. The contract will have to satisfy the participation constraints of both parties, but as a result of the random noise associated with the time taken to complete any task, some workers may

¹ In the US, the Bureau of Labour Statistics calculates productivity based on hours spent in production. Hours paid for while not working such as paid holidays or paid sick leave are excluded.

have to provide more labour than allowed for by the contract. Such a worker is effectively undertaking unpaid work.

2 Auctions

Some firms will find it advantageous to allow workers to compete to perform certain tasks. This competition may take the form of an auction where workers bid to be allowed to undertake tasks. The bid takes the form of the length of time the employee estimates is necessary to complete the task. Less productive workers would find themselves at a competitive disadvantage if they bid honestly. However, so long as employers are indifferent to the hours that they actually work, such workers might win such auctions and be asked to do the task if they provide the employer with additional unpaid-for hours.

3 Team performance

Many enterprises now organise their workforce in teams with specific productivity targets. Where some workers are occasionally absent or are less productive, team leaders may compensate by working additional unpaid hours. They do so because they will suffer the greatest loss of reputation if targets are not met. Although not compensated at present, they may take the view that such additional effort may lead to greater reward in the future.

4 Gift exchange

Akerlof (1982) argues that social norms of behaviour may lead to workers and firms exchanging "gifts". The value of the gift from the firm is the margin between the actual wage and the outside wage. The worker's gift is "work in excess of the minimum standard" (p.544). The efficiency wage literature has usually interpreted this as a higher level of per-hour productivity. But an alternative form for the workers' gift might be additional hours worked without any change in work intensity. These additional hours are in a sense unpaid because they are in excess of contractual hours. This outcome may be Pareto optimal for both workers and the firm so long as employers are indifferent to the number of hours actually worked. Note, however, that if this work is indeed a gift to the firm, then the firm cannot dictate how and when the gift is to be made

5 Compensating differentials

Some conditions of work may be set exogenously to workers and firms. Legal constraints on paid-for working time and agreements set at a level above the individual enterprise may impose conditions different from those that would result from a standard bargaining framework. For example, a lower overtime premium may be Pareto optimal that one imposed externally. This could be achieved by workers agreeing to undertake a proportion of their overtime hours at the official rate and the remainder unofficially at a zero rate.

6 Exploitation

The final explanation of unpaid work is that workers are being exploited by monopsonistic

employers. If this is the case then one might expect that its incidence would be lower in unionised workplaces. Note however, that even in non-unionised workplaces, regularised use of unpaid overtime in a standard work context, as well as being illegal, would seriously damage an employer's reputation. Hence it might be less usual to observe unpaid overtime in firms where working arrangements are both closely organised and visible to other workers. For example, in large manufacturing firms work has to be formally organised around technological constraints.

We test some of these explanations of unpaid overtime using data for both Britain and Germany in Section 5. Most of these tests are indicative, rather than definitive. Nevertheless, they do lend qualified support to some of our theoretical arguments.

3 BACKGROUND

To investigate overtime working in the UK and Germany, we use the UK Labour Force Survey (LFS) and the German Socio-Economic Panel² (SOEP). Both these surveys ask questions about both paid and unpaid overtime working. Descriptions of them are included in Appendix 1. In this section, as background to our econometric estimates, we compare and contrast relevant features of these datasets.

Table 1 contains summary statistics for our combined dataset. Averaged across male workers, basic weekly hours for males in Germany are approximately the same as those in the UK, while those of British females are substantially lower, reflecting the greater incidence of part-time working in Britain. Participation rates among women are much higher in the UK. These higher rates exist in an environment where working hours vary much more widely. This may indicate a greater flexibility in the UK labour market, but is outside the bounds of this study. Not only is hours variation greater for women, it is also greater for men. Figures 1 and 2 compare the distribution of total weekly working hours in our surveys. In Germany, 87 per cent of male employees provide between 36 and 40 hours of work per week. In the UK, only 64 per cent of men's hours lie within this range, while 8 per cent work fewer than 32 hours and 12 per cent more than 44 hours. As with women, this variability is possibly indicative of greater flexibility in the UK labour market.

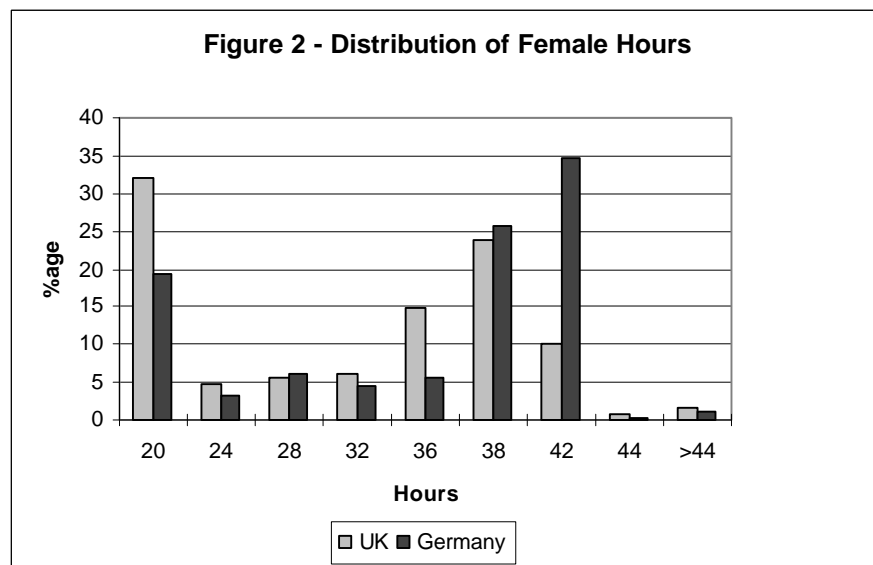
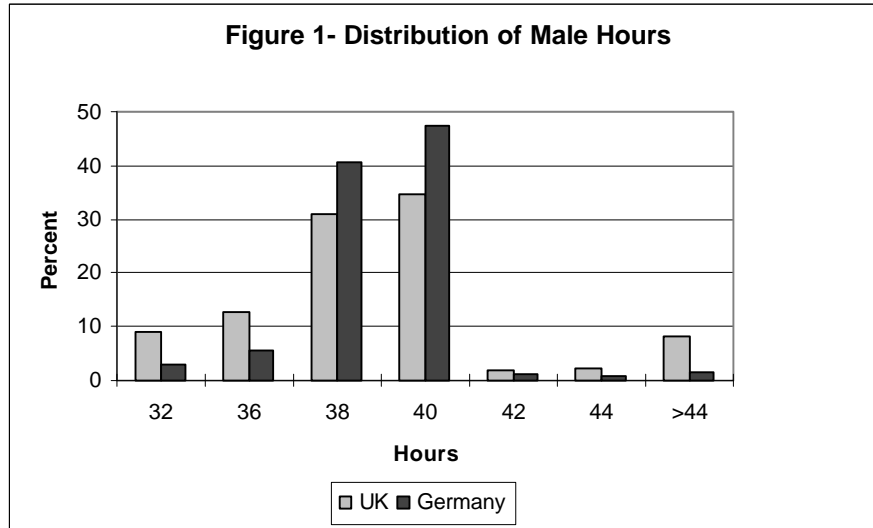
In contrast to basic working hours, the overtime component of working time differs greatly between Britain and Germany. Paid overtime working amongst UK males averages 2.38 hours per week averaged over all workers, while in Germany it averages only 0.99 hours. Paid and unpaid overtime comprise 10.04 per cent of the total labour input amongst males in the UK, but

² Details of these surveys are contained in Appendix A

only 4 per cent in Germany. Averaged over all females paid and unpaid overtime comprises 6.8 per cent of total labour input in the UK compared to only 1.5 per cent in Germany. If overtime does indicate greater flexibility, again one might argue that these statistics reflect a greater flexibility in the British labour market. However, this does not necessarily follow. Overtime that is guaranteed by collective bargaining does not indicate flexibility. In addition, flexible working patterns need not include overtime per se. For example, annualised working agreements, which are becoming increasingly popular, allow for substitution of hours between periods of high and low demand. To employers, these have the advantage that within limits, such substitution can take place without the need to make the premium payments that are normally associated with overtime.

TABLE 1: SUMMARY STATISTICS

	Males		Females	
	Germany	UK	Germany	UK
<i>All Workers</i>				
Normal Hours	38.02	37.06	32.40	27.74
Paid Overtime Hours	0.98	2.15	0.27	0.58
Unpaid Overtime Hours	0.59	2.04	0.20	1.36
Basic Hourly Wage Rate (BHR)	14.11	8.25	10.59	6.44
Effectively Hourly Wage Rate (EHR)	13.90	7.82	10.54	6.14
Proportion Working Paid Overtime	19.8%	22.4%	7.1%	9.0%
Proportion Working Unpaid Overtime	9.2%	23.6%	5.3%	21.0%
Proportion Working Overtime	29.0%	46.0%	12.4%	30.0%
<i>Working Paid Overtime</i>				
Normal Hours	38.45	37.97	30.19	27.20
Paid Overtime Hours	4.95	9.64	3.80	6.41
Basic Hourly Wage Rate (BHR)	12.63	5.90	9.24	4.50
Effectively Hourly Wage Rate (EHR)	13.06	6.32	9.56	4.81
<i>Working Unpaid Overtime</i>				
Normal Hours	38.06	37.73	35.11	33.17
Unpaid Overtime Hours	6.42	8.64	3.78	6.44
Basic Hourly Wage Rate (BHR)	23.06	11.78	13.17	8.78
Effectively Hourly Wage Rate (EHR)	19.92	9.57	11.90	7.22



The incidences of paid overtime for males in Germany and the UK are broadly similar, at just more than 15 per cent. A much lower proportion of females undertake paid overtime in both Britain and Germany, but the proportions in both countries are again comparable at 6.4 per cent and 7 per cent respectively. While similar proportions of the workforce undertake paid overtime in the UK and Germany, there are substantial differences in the incidence of unpaid overtime. More than twice as many workers in the UK claim to work non-contractual unpaid hours. This is true irrespective of gender. Indeed the proportion of UK females working unpaid overtime is higher than that of either gender group working paid or unpaid work.

Amongst those working paid overtime, UK males work an average of 10.8 hours a week, with German males working less than 5 hours. Even UK females that work paid overtime supply almost 50 per cent more than do German males each week. UK males that work unpaid overtime

claim to supply an average of 8.8 hours per week, while Germans work 6.35 hours. German females work 3.85 hours unpaid overtime, but British females supply 6.63 hours per week.

The SOEP question on overtime working is such that paid and unpaid overtime are assumed to be mutually exclusive. In the LFS, only a small proportion of workers claims to work both forms of overtime. Note that this precludes our testing of the compensating differentials explanation of unpaid overtime. However, two of the authors have already rejected this explanation of unpaid overtime (Bell and Hart (1999)).

How does overtime working affect hourly pay? Introducing working hours in addition to those stipulated in the employment contract implies that one can define hourly pay in two different ways. The first is the basic hourly rate (BHR), which measures the hourly rate excluding any the effects from overtime. The second is the effective hourly rate (EHR) which is the hourly rate averaged across all working hours. This is calculated by averaging gross weekly pay over standard hours and overtime hours, whether these were paid for or not.

Data on hourly pay is shown in Table 1. These are denominated in ECU, converted at the average rate of exchange for 1993. Both BHR and HER indicate higher rates of pay in Germany compared to the UK and for men compared with women. They also show the differential effects on hourly earnings of paid and unpaid overtime. Working paid overtime tends to increase the effective hourly wage rate above the basic contractual rate, whereas unpaid overtime pulls the effective hourly wage rate below the basic rate. The basic hourly rate of those working paid overtime is substantially less than that of those working unpaid overtime. Those working different forms of overtime are not randomly drawn from the population.

Note that the combined effects of paid and unpaid overtime is to reduce hourly wage differentials. Most studies of inequality are concerned with income measures that indicate the command over resources conferred on a particular household or individual. However, if one was concerned with differences in the incentives facing workers, then the use of the EHR would more accurately measure hourly wage differentials.

To give a further insight into the use of overtime, we now consider the distribution of overtime working across some major occupational groups within Germany and the UK. Thus in Table 2 we give information on **(i)** managers, **(ii)** professionals and **(iii)** craft, plant and machine operatives.

The first contrast to note is that managers in Germany work more unpaid overtime hours than their counterparts in the UK. However, managers account for only 2.6 of the workforce in Germany, compared with 19.7 per cent in Britain. Amongst professionals, who comprise 25.4 per cent and 15.3 per cent of the workforce in the UK and Germany respectively, unpaid overtime working is much more prevalent in the UK. Almost 19 per cent of British male professional workers claim to work more than 6 hours unpaid overtime per week. The proportion of British

females claiming to supply over 6 hours unpaid work is only slightly less, at 18.4 per cent. In contrast only 5.3 per cent of professional males and 2 per cent of professional females in Germany provide more than 6 hours unpaid overtime per week.

In contrast, the proportion of professional males in Germany and the UK working paid overtime is approximately equal, at just over 10 per cent. Approximately 7 per cent of British professional females compared with only 3 per cent of German professional females work paid overtime.

Very few craft, plant and machine operatives claim to work any unpaid overtime in either the UK or Germany, but the incidence of paid overtime amongst this group is higher in the UK. This is particularly true for males, where 36.7 per cent work paid overtime, compared with 28.3 per cent in Germany. Amongst females 11.5 per cent of UK plant and machine operatives work paid overtime compared with 8.2 per cent in Germany.

To summarise, our data suggest that:

- (a) overtime working, both paid and unpaid, is more prevalent in the UK than in Germany
- (b) paid overtime working is more common among manual workers, while unpaid overtime is more prevalent amongst managers and professionals
- (c) males generally work more overtime than their female counterparts, except that female professionals in the UK work almost as much unpaid overtime as their male equivalents.

How are these differences between occupations reflected in hourly wage rates? Basic and effective hourly wage rates for these occupations are shown in Table 3. But first we introduce precise definitions of these terms. BHR is defined as

$$\begin{aligned}
 BHR &= \frac{e}{\bar{h} + 1.39 o_p} \text{ if } o_p > 0 \text{ and country} = \text{UK} \\
 &= \frac{e}{\bar{h} + 1.32 o_p} \text{ if } o_p > 0 \text{ and country} = \text{Germany} \\
 &= \frac{e}{\bar{h}} \text{ otherwise}
 \end{aligned}$$

where e is weekly gross earnings, \bar{h} is standard hours, o_p is paid overtime hours and o_u is unpaid overtime hours. BHR is the basic hourly rate – the rate at which an individual is paid for the basic hours that they are contractually obliged to provide. To calculate these, we require to correct for any overtime premium that the individual might receive for working any paid overtime. The factors used here are based on research by Bell and Hart (1999). In contrast with BHR, EHR is simply the average hourly rate for all working hours whether basic, paid overtime or unpaid overtime and is defined as follows:

$$\begin{aligned}
EHR &= \frac{e}{h + o_u} \text{ if } o_u > 0 \\
&= \frac{e}{h + o_p} \text{ if } o_p > 0 \\
&= \frac{e}{h} \text{ otherwise}
\end{aligned}$$

Table 3 again demonstrates generally higher wage rates in Germany compared with the UK. More importantly for our purposes there are smaller differentials between basic and effective hourly rates in Germany compared to the UK. The effective hourly wage of male professionals in the UK is more than 8 per cent below the basic rate, while this margin is less than 3 per cent less for the equivalent group in Germany. Amongst females, the differentials are even more marked: more than 10 per cent in the UK, but only 1.3 per cent in Germany. For plant and machine operatives, basic and effective rates differ little because the relatively small amount of unpaid overtime hours is offset by paid overtime hours.

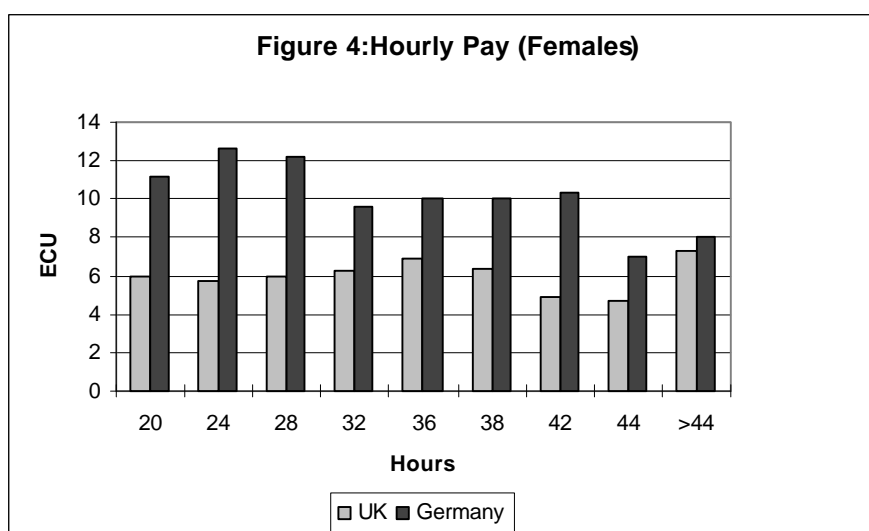
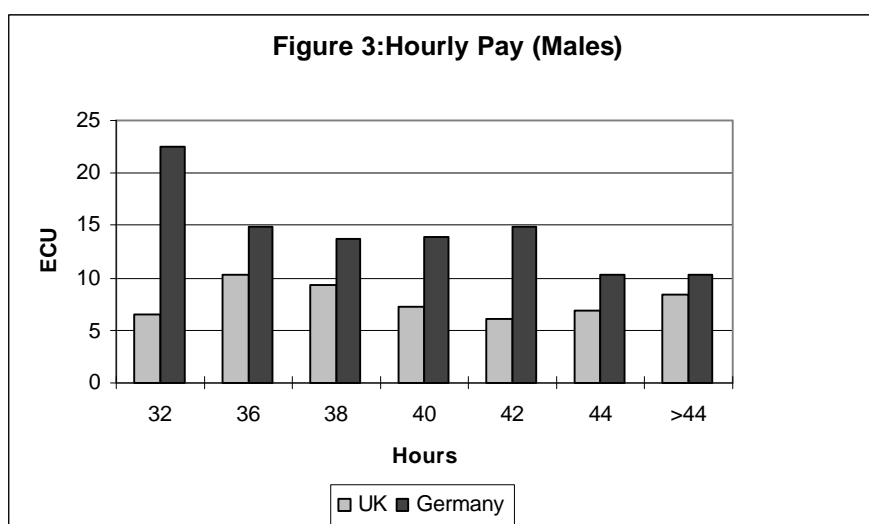
Another perspective on UK/German earnings differentials in effective hourly rates can be gained by considering how these vary with total working hours as shown in Figures 3 and 4. Both figures show that UK/German differentials fall as working hours increase. This is consistent with the relatively poorly paid in Germany and the UK being at opposite ends of the hours spectrum. If the poorly paid in the UK work rather less than average hours, while those in Germany provide well above average hours, then differentials between Germany and the UK should narrow as hours increase. This finding is also consistent with greater inequality of weekly earnings in the UK than in Germany.

TABLE 2: OVERTIME HOURS BY OCCUPATION

Hours of Overtime	Percent working unpaid overtime					Percent working paid overtime					No.	Percent
	0	1-6	7-12	13-20	21-40	0	1-6	7-12	13-20	21-40		
U.K. Males												
Managers and Administrators	50.1	22.8	15.3	8.5	2.9	91.1	3.6	3.2	1.1	1.1	281	18.9
Professional	61.3	19.5	11.6	5.0	2.6	88.7	5.8	4.0	0.5	1.1	380	25.5
Craft, plant and machine operatives	96.3	2.9	0.2	0.2	0.4	63.5	13.9	11.4	8.1	3.1	455	30.6
Germany Males												
Managers and Administrators	45.8	20.8	14.6	12.5	6.3	83.3	4.2	12.5	0	0	48	2.6
Professional	77.2	17.4	4.3	0.7	0.4	89.7	8.2	1.8	0	0.4	281	15.3
Craft, plant and machine operatives	98.8	0.7	0.3	0.2	0	71.8	21.4	5.1	0.8	0.9	969	53.0
UK Females												
Managers and Administrators	59.0	26.4	11.2	3.4	0	96.6	2.3	1.1	0	0	178	11.23
Professional	57.8	23.7	9.1	6.0	3.4	93.3	3.1	1.7	1.4	0.5	417	26.31
Craft, plant and machine operatives	96.7	3.3	0	0	0	88.5	1.6	4.9	4.9	0	61	3.85
Germany Females												
Managers and Administrators	82.35	17.65	0	0	0	94.1	0	5.9	0	0	17	1.22
Professional	91.47	6.64	1.42	0	0.5	97.2	1.0	1.9	0	0	211	15.19
Craft, plant and machine operatives	100	0	0	0	0	91.8	7.2	1.0	0	0	208	14.97

TABLE 3: EARNINGS BY MAJOR OCCUPATION

	U.K.			Germany		
Males	BHR	EHR	EHR/BHR (%)	BHR	EHR	EHR/BHR (%)
Managers and Administrators	11.2	10.0	89.3	25.0	22.0	88.0
Professional	10.8	10.0	92.6	20.7	20.2	97.4
Craft, Plant and machine operatives	6.1	6.2	101.6	11.7	11.8	100.9
Females	BHR	EHR	EHR/BHR (%)	BHR	EHR	EHR/BHR (%)
Managers and Administrators	7.5	7.0	93.3	17.4	16.9	97.1
Professional	9.2	8.3	90.3	14.8	14.6	98.8
Craft, Plant and machine operatives	4.1	4.1	100.2	9.1	9.1	100.2



4 EFFECTS OF UNPAID OVERTIME ON RETURNS TO CHARACTERISTICS

From the previous section, it is clear that overtime working differentially affects workers effective hourly wage rate. In this section, we examine how the determinants of hourly wages are affected by the inclusion or exclusion of overtime working in the definition of the hourly wage rate. We use a standard Mincer equation to determine whether returns to tenure, experience and schooling are affected by the choice between effective and basic hourly wage rates as dependent variable. The form of the estimating equation is:

$$\ln(w) = f(\text{exp}, \text{ten}, \text{duredu}, \text{fsize}, \text{marital}, \text{industry}) \quad (1)$$

where $w = \text{BHR}$ or EHR , $\text{exp} = \text{experience}$, $\text{ten} = \text{tenure}$, $\text{duredu} = \text{years of schooling}$, $\text{marital} = \text{marital status}$, fsize is firm size and industry is self-explanatory.

There are four sets of results to take account both of gender and the definitions of the hourly wage rate. As described above, a dataset pooled over Germany and the UK that reflects the relative size of their respective labour forces is used. To take account of possible intercountry differences, we include interactive dummies in our specifications. Given possible heterogeneity in the other factors influencing the distribution of earnings in both countries, we also make allowance for a form of groupwise heteroskedasticity in our estimates. We

specify the disturbance distribution as follows:

$$u_i \sim N(0, s^2) \quad \forall i \in \text{Germany}$$

$$\sim N(0, l s^2) \quad \forall i \in \text{UK}$$

We then form maximum likelihood estimators of $\ell(w, x; \mathbf{b}, s^2, l; \cdot)$ and $\ell(w, x; \mathbf{b}, s^2)$

where a likelihood-ratio test of the null $H_0 : l = 1$ provides a test for the equality of the variance of the disturbance across countries.

Results are shown in Tables 5 and 6 for males and females respectively. Returns to experience and tenure are modelled using quartic functions. Their signs follow a pattern that is consistent with wages increasing with the acquisition of both general and specific human capital, but at a decreasing rate. The size and significance of the interactive terms suggest a different pattern of returns in Germany, particularly in respect of general labour market experience.

Education, which is measured by years of schooling, has the expected sign and its coefficient is close to other estimates of UK returns to schooling. Converting coefficients into rates of return in the usual way³, an additional year of schooling has a return of 7.6 per cent in the UK and 6.5 per cent in Germany when measured in relation to basic hourly rates. But these rates fall to 6.4 per cent and 6.1 per cent when overtime hours are taken into account. This implies that for males using BHR, seemingly higher returns to schooling in the UK than in Germany are considerably reduced when EHR is used. Better-educated males in the UK provide more non-contractual hours to their employers than do German males, reducing their returns to education. For females a similar pattern emerges.

Comparisons of EHR and BHR returns to tenure and experience for both the UK and Germany are shown in Figures 5 and 6 for males and females respectively. The returns are based on an individual with 12 years of schooling that accumulates experience and tenure at the same rate over a 35 year working period. Returns generally follow the standard pattern, with those in Germany larger than the UK, reflecting in part the higher hourly rates of pay in Germany. Differences in institutional arrangements may also be reflected in the differential returns to characteristics. For example, returns to an additional year of schooling between the UK and Germany may reflect the considerable differences in the educational systems. Differences in returns to tenure may depend on differing organisational structures within enterprises.

In addition to differences in returns between countries, it is clear that there are differential returns when the dependent variable is the log of the *effective* hourly wage rate rather than the equivalent for the *basic* hourly rate. The results for German males indicate that unpaid overtime gradually reduces returns to effective hours of work compared with contracted hours. However, in the UK, these effects are more marked and begin earlier. For German females with small amounts of experience and tenure, overtime working has virtually no effect on returns. However, for British females as with males, the negative effects on returns are evident throughout the full range of experience and tenure. The overall conclusion is that the net effect of paid and unpaid overtime is to reduce returns to tenure and experience by a greater amount in the UK compared to Germany.

³ If β is the estimated coefficient, then the rate of return is given by $100 * (\exp(\beta) - 1)$.

TABLE 4 MALE EARNINGS EQUATIONS

Equation	BHR		EHR	
	Coefficient	t-statistic	Coefficient	t-statistic
Variable				
Experience	0.1044	7.701	0.1024	7.833
Experience ²	-0.0058	-4.889	-0.0059	-5.154
Experience ³ *10 ⁻²	0.0144	3.668	0.0148	3.915
Experience ⁴ *10 ⁻⁴	-0.0133	-3.152	-0.0136	-3.357
Tenure	0.0535	4.549	0.0536	4.720
Tenure ²	-0.0045	-3.392	-0.0046	-3.554
Tenure ³ *10 ⁻²	0.0158	2.992	0.0159	3.126
Tenure ⁴ *10 ⁻⁴	-0.0169	-2.584	-0.0170	-2.686
Germany*experience	0.1384	6.871	0.1375	6.996
Germany*experience ²	-0.0062	-3.935	-0.0060	-3.913
Germany*experience ³ *10 ⁻²	0.0107	2.180	0.0100	2.099
Germany*experience ⁴ *10 ⁻⁴	-0.0057	-1.115	-0.0051	-1.031
Germany*tenure	-0.0181	-1.234	-0.0158	-1.110
Germany*tenure ²	0.0010	0.609	0.0009	0.589
Germany*tenure ³ *10 ⁻²	-0.0031	-0.488	-0.0030	-0.491
Germany*tenure ⁴ *10 ⁻⁴	0.0029	0.365	0.0028	0.373
Duration of Education	0.0721	16.688	0.0590	14.146
Germany*Duration of Education	-0.0122	-1.960	-0.0042	-0.691
Company Size	0.2168	8.321	0.2071	8.239
Germany*Company Size	-0.0730	-2.162	-0.0581	-1.769
Marital status	0.1176	2.003	0.1400	2.436
Germany*Marital status	0.0801	0.879	0.0951	1.062
Mills	0.2064	0.980	0.2638	1.272
Constant	-0.3029	-2.360	-0.2738	-2.168
Sigma	0.0949	30.430	0.0920	30.430
Lambda	1.8592	20.604	1.7860	20.604
Number of observations	3420		3420	
F(43,3376)	154.50		156.06	
R-squared	0.6631		0.6653	
Adj. R-squared	0.6588		0.6610	
Root MSE	0.33619		0.35606	
Log Likelihood	1830.05141		1916.04213	

(plus industry dummies)

TABLE 5 FEMALE EARNINGS EQUATIONS

Variable	BHR		EHR	
	Coefficient	t-statistic	Coefficient	t-statistic
Experience	0.0526	3.908	0.0525	4.020
Experience ²	-0.0027	-2.227	-0.0029	-2.450
Experience ³ *10 ⁻²	0.0066	1.594	0.0074	1.818
Experience ⁴ *10 ⁻⁴	-0.0062	-1.338	-0.0069	-1.536
Tenure	0.0695	4.888	0.0651	4.717
Tenure ²	-0.0069	-3.404	-0.0059	-3.026
Tenure ³ *10 ⁻²	0.0292	3.027	0.0237	2.536
Tenure ⁴ *10 ⁻⁴	-0.0395	-2.848	-0.0312	-2.315
Germany*experience	0.2068	8.852	0.2087	9.029
Germany*experience ²	-0.0116	-6.039	-0.0116	-6.090
Germany*experience ³ *10 ⁻²	0.0260	4.265	0.0257	4.277
Germany*experience ⁴ *10 ⁻⁴	-0.0204	-3.145	-0.0201	-3.150
Germany*tenure	-0.0513	-2.449	-0.0483	-2.338
Germany*tenure ²	0.0050	1.712	0.0042	1.449
Germany*tenure ³ *10 ⁻²	-0.0193	-1.370	-0.0142	-1.022
Germany*tenure ⁴ *10 ⁻⁴	0.0241	1.144	0.0161	0.776
Duration of Education	0.1016	18.867	0.0871	16.646
Germany*Duration of Education	-0.0521	-6.730	-0.0390	-5.111
Company Size	0.1877	7.568	0.1975	8.198
Germany*Company Size	0.0357	1.021	0.0287	0.832
Marital status	-0.4126	-3.290	-0.4070	-3.258
Germany*Marital status	0.7270	3.312	0.7198	3.290
Mills	-0.8369	-3.047	-0.8241	-3.009
Constant	0.4341	1.787	0.4348	1.794
Sigma	0.1418	26.438	0.1413	26.439
Lambda	1.4337	19.320	1.3565	19.320
Number of observations	3000		3000	
F(43,2956)	83.52		85.18	
R-squared	0.5485		0.5534	
Adj. R-squared	0.5420		0.5469	
Root MSE	0.42149		0.4137	
Log Likelihood	1141.85		1191.04	

(plus industry dummies)

Figure 5: Effects of Tenure, Experience and Schooling on Male Hourly Earnings in Germany and UK

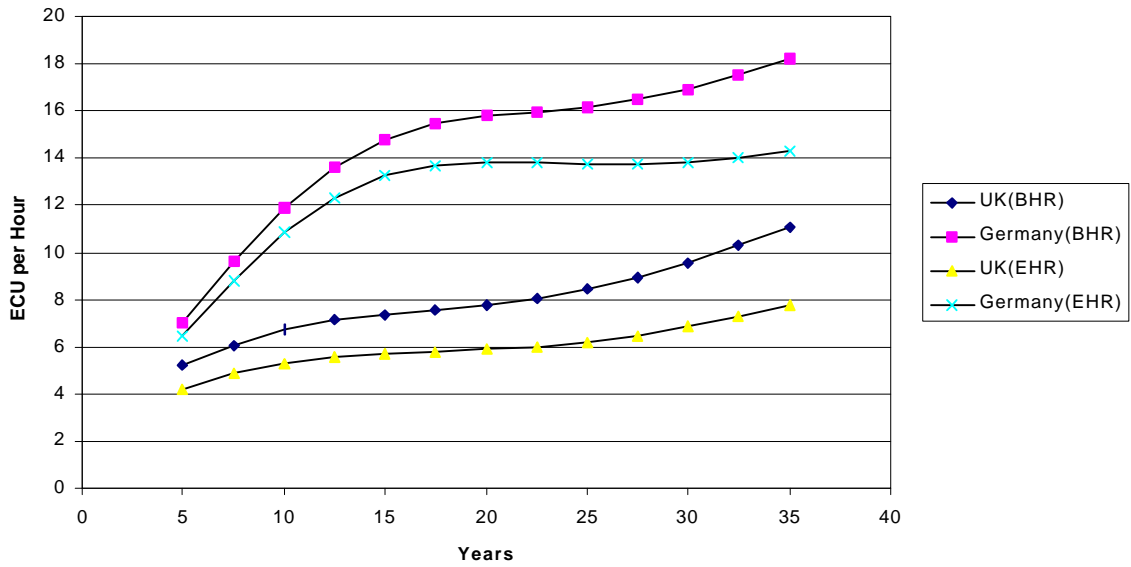
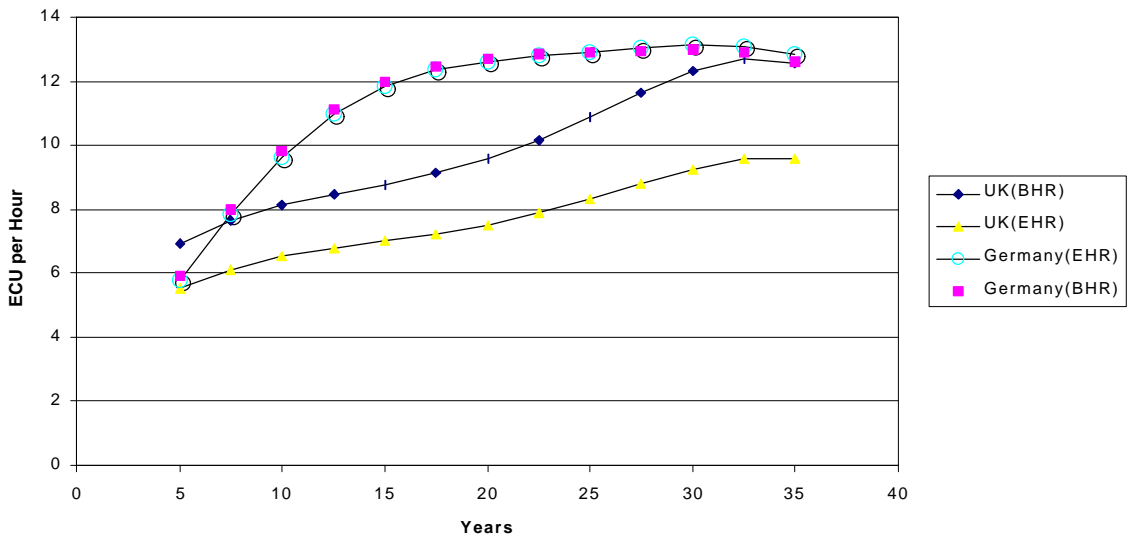


Figure 6: Effects of Tenure, Experience and Schooling on Female Hourly Earnings in Germany and UK



5 DETERMINANTS OF OVERTIME HOURS

In this section, we consider some of the theories that we developed in relation to overtime working in Section 2 and try to explain the extent of overtime hours in Germany and the UK. We estimate equations to explain paid and unpaid overtime by gender in our pooled dataset. Our formulation is

$o\text{hours} = f(\text{predicted wage, company size, managerial status, productivity residual, union})$,
where $o\text{hours}$ is hours of paid or unpaid overtime. We use a Tobit estimating procedure since many of the respondents work no overtime during the survey week. The arguments for our specification is as follows:

1 Predicted wage.

This variable is included for standard supply-side reasons in the paid overtime hours equations. The fitted rather than the actual wage is used to avoid the endogeneity problem caused by joint determination of hours and wages. In the unpaid overtime equation the fitted wage is likely to capture aspects of leadership and responsibility that are likely to be positively correlated with unpaid overtime.

2 Company size

One would expect larger firms to invoke formalised work arrangements to reduce the transactions costs of their operation. It may also be the case that production in larger firms is constrained to take place in the presence of capital equipment and/or of other personnel. With formalised work arrangements, it is more likely that paid rather than unpaid overtime will be used as a response to unforeseen fluctuations in demand.

3 Managerial status

In Section 2, we argued that for reasons of team performance, team leaders might be willing to supply unpaid overtime hours. Both surveys inquire whether workers have managerial status in the sense that they control other workers, rather than having the occupational classification of manager. Given this leadership role, we would expect that such workers would be more likely to work unpaid overtime.

4 Productivity residual

Our arguments with respect to *both* auctions *and* the roles of individuals within work teams, suggest that unpaid work should be negatively associated with worker productivity. We cannot measure productivity directly from our surveys. Instead we form a proxy, using the deviation of the individual's standard hourly wage from the mean occupational wage

5 Union

Our last variable is union status. This is perhaps more meaningful in the UK where, as stated in the introduction, working arrangements are largely determined by collective bargaining and there is no formal equivalent to the works councils which cover the majority of German workplaces. Our argument is that both of these institutional structures will reduce the incidence of unpaid work that might be attributable to exploitative employers.

Results are shown in Tables 6 and 7. Four of our key economic variables to explain unpaid hours are supported by the results. As predicted, *company size* is strongly positive in the paid hours equations, but negative in the unpaid hours equivalent. Managerial status plays a consistently positive role in the unpaid hours equations and is either negative or insignificant in the paid hours relationship. The productivity residual is significantly negative in all but one of our four equations, implying that lower productivity is indeed associated with greater amounts of unpaid work. It is also associated with less paid overtime, which may be a reflection of selectivity of the part of employers when deciding which workers should be offered paid overtime. The last variable, *union status* is only available for a subsample of the UK data and hence separate equations, based on a newly drawn but still representative sample of the UK and German workforce are used in equations (2) and (4). The variable performs in the expected manner, tending to reduce unpaid overtime working. In the paid overtime equations union status has a positive effect which is consistent with the results of Bell and Hart (1998) using the New Earnings Survey, but contrasts with Trejo's (1993) findings for the US.

TABLE 6 MALE OVERTIME HOURS EQUATIONS

Equation 1

	Paid Overtime		Unpaid Overtime	
	Coef.	t-stat	Coef.	t-stat
Predicted wage	-5.6123	-2.808	22.7768	10.704
Company Size	3.9394	2.889	-2.3871	-1.916
Germany*Company Size	-3.0714	-1.660	-3.9563	-1.920
Managerial Status	-0.2214	-0.190	3.8716	3.960
Germany*Managerial Status	0.6378	0.361	3.4587	2.174
Productivity residual	-4.6697	-5.424	-2.9227	-3.615
Constant	-15.1511	-3.670	-66.3924	-11.229

Equation 2

	Paid Overtime		Unpaid Overtime	
	Coef.	t-stat	Coef.	t-stat
Predicted wage	-6.8845	-3.628	20.5170	9.375
Company Size	5.0826	4.168	0.0234	0.018
Germany*Company Size	-6.1484	-4.100	-6.0012	-2.864
Managerial Status	-3.3217	-2.802	2.2505	2.155
Germany*Managerial Status	4.6429	2.819	5.6619	3.616
Union	3.5290	3.688	-7.4201	-6.891
Productivity residual	-3.4302	-4.483	-2.4181	-3.060
Constant	-7.9575	-2.628	-54.4092	-9.275

TABLE 7: FEMALE OVERTIME HOURS EQUATIONS

Equation 3

	Paid Overtime		Unpaid Overtime	
	Coef.	t-stat	Coef.	t-stat
Predicted wage	-1.7006	-0.736	18.3372	11.113
Company Size	6.7212	4.450	-3.1924	-3.461
Germany*Company Size	-8.3578	-4.107	-5.2367	-3.195
Managerial Status	-2.7614	-1.772	2.8112	3.407
Germany*Managerial Status	4.3125	1.156	-3.8465	-1.690
Productivity residual	-5.0891	-4.566	-2.6567	-3.497
Constant	-20.6477	-4.097	-38.7409	-8.139

Equation 4

	Paid Overtime		Unpaid Overtime	
	Coef.	t-stat	Coef.	t-stat
Predicted value	-0.3032	-0.125	18.2525	9.585
Company Size	5.7472	3.888	-3.0049	-2.958
Germany*Company Size	-8.7693	-4.442	-5.4643	-3.235
Managerial Status	-1.3325	-0.906	3.1028	3.656
Germany*Managerial Status	2.5554	0.702	-4.2426	-1.825
Union	0.1828	0.137	-2.1172	-2.270
Productivity residual	-4.6563	-4.416	-1.9296	-2.468
Constant	-17.0416	-3.438	-36.9088	-7.393

6 CONCLUSIONS

It has been commonly argued in British government circles, though perhaps more apparently during the Conservative administrations of the 1980s and early 1990s, that one British comparative advantage in the areas of industrial competition and trade has been a comparatively flexible and non-interventionist approach to labour markets. The issue of working time lies at the core of this sentiment. Within its relatively unregulated conditions of hours supply and demand, it is perhaps not surprising to observe higher levels of paid overtime in the UK compared to Germany. But this paper has revealed that the contrast is somewhat more stark than that portrayed by the conventional measure of paid overtime. It is clear that British workers offer significantly higher levels of unpaid overtime than their

German counterparts. The net results would appear to be that the UK offers more flexibility on the intensive margin in that more overtime hours are available and, additionally, those hours are relatively cheap since a significant proportion of them are supplied at zero cost.

In German industry in 1992, about 14 percent of total labour costs consisted of statutory welfare costs (EC Eurostat, Labour Cost Survey). Such costs comprise, mainly, industrial funding of state pensions, health and unemployment. Germany's labour market, like that of France (where non-statutory costs were 21.7 percent of total costs in 1992), suffers competitively from these add-on non-wage costs of employment. These percentages compare to 7.5 percent in the UK. It is in against this background that the overtime cost advantages in the UK compared to Germany become especially significant.

At the outset, we offered a number of economic explanations as to why workers may be willing to offer unpaid hours of work. To the extent that such behaviour can be explained by rationale economic paradigms, it is perhaps surprising that two advanced industrialised countries – in close proximity and of relatively similar sizes – should display such quantitatively amounts of unpaid work. Indirectly, our observations may reflect the relatively stronger, and more broadly based, collective bargaining institutions in Germany. Works Councils facilitate information transfer throughout German organisations in a way that is generally not matched in the British labour market. Unpaid work may be less commonly practiced on the German scene because it is more effectively monitored as between workers and management.

This stated, however, there are regularities between the two countries. We have shown that the significant determinants of paid and unpaid hours of work and related pay are similar in Germany and the UK. Again, differences tend to be ones of magnitude rather than direction.

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APPENDIX 1

UK LABOUR FORCE SURVEY

The Labour Force Survey (LFS) is a survey of households living at private addresses in Great Britain. Its purpose is to provide information on the UK labour market which can then be used to develop, manage, evaluate and report on labour market policies. It is carried out by the Social Survey Division (SSD) of the Office for National Statistics (ONS) in Great Britain and by the Central Survey Unit of the Department of Finance and Personnel in Northern Ireland on behalf of the Department of Economic Development. It is a quarterly survey of around 40000 households that uses a panel design in which households remain part of the survey for five periods. It is only in the last wave that individuals are asked questions about their earnings. The data used here for 1993 are based on all households that experienced their "fifth wave" during 1993.

GERMAN SOCIO-ECONOMIC PANEL

The German Socio-Economic Panel (GSOEP) was started with the first wave in 1984. It is a representative longitudinal dataset on income, transfer payments, labour market experience, family composition, housing for individuals and families. In addition the dataset contains information on time spending, level of satisfaction, various aspects of life, hopes and fears, political involvement. Questions on the labour market include those to education and training, labour force participation, job changing, working time, wages, non-wage costs, tenure, position, firm size, distance between work place and home, unemployment.

The sample is representative of the whole population in Germany including foreigners. All household members 16 years and older are interviewed. The head of the household answers the household questionnaire which concentrates on housing quality, income, and transfer payments at the household.

The initial sample included 5921 households and 12245 individuals. From 1984 to 1989 the sample was restricted to West Germany. While attrition has reduced the sample, panel children who became older than 15 as well as new members of panel households have increased the sample. After eight waves the West German sample still included 9467 respondents. In 1990 separated samples for East and West Germany were conducted. The first wave for East Germany had 2179 households and 4453 individuals. With the beginning of 1991 we have a joint sample started with 6699 households and 13669 adult respondents.