

Unpaid Overtime in Germany: Differences between East and West

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Abstract

Although the standard work week is longer in East than in West Germany, there is a higher incidence and average amount of unpaid overtime worked in the new states. We try to explain the striking differences in unpaid overtime by analyzing the labor supply side. We focus on the investment character of overtime and examine whether workers use unpaid extra hours to signal higher productivity so as to reduce the risk of losing their job. Using panel data from the SOEP and approximating the risk of unemployment with regional unemployment rates we find partial evidence for the unemployment-overtime hypothesis.

Key words: unpaid overtime, labor supply, signaling, unemployment, panel data

JEL classification: J22, D80, C23

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1. Introduction

Although the standard work week in East Germany is by about two hours longer than in the West, the new states have a higher incidence and average amount of unpaid overtime that refers to the time actually worked in excess of the contractual hours which is neither paid nor compensated with time off. This raises the question as to what causes the different allocation of time between the two parts of Germany. Do West Germans simply have a higher preference for leisure or are there other underlying reasons? Taking the demand for overtime work as given, we focus on one of the possible explanations why individuals might want to work more than their contractual hours and even offer them for free: they might regard overtime work as an investment and therefore voluntarily increase their labor supply to get a pay off in the future. Therefore, the question is whether unpaid overtime can be interpreted as a means of a worker to signal that he is productive in order to get some future benefit which might be larger or more rapid salary increases, a higher probability of promotion, and also a lower probability of lay-off. In this study we investigate whether workers use unpaid extra hours to signal higher productivity so as to reduce the risk of losing their job.

Among the sparse literature on unpaid overtime work, there is almost none focusing on the investment character of extra hours. One of the recent studies on unpaid overtime is by Bell and Hart (1998) who find that adjusting wages for unpaid hours leads to a decrease in returns to education, experience and tenure in Great Britain. In a continuative study Bell, Hart, Hübler, and Schwerdt (2000) show that in Germany less overtime and far less unpaid overtime is worked than in the UK and that the wage gap between the two countries is widened, when effective hourly wage rates are compared. Hübler (2002) finds that managers who use a computer work more unpaid extra hours than others in Germany.

A first evidence on the investment character of working hours is given by Bell and Freeman (2001). They compare actual working hours in the US and in Germany, and conclude that the greater hours worked by Americans can be explained in terms of forward-

looking labor supply responses to differences in earnings inequality. Booth, Francesconi, and Frank (2002) show that the amount of overtime correlates with subsequent promotions in a significantly positive way. Supportive evidence for the investment character of unpaid extra hours is given by Pannenberg (2004). He finds that workers with some incidence of unpaid overtime experience the highest wage growth, which is evidence for the importance of investing in current working hours beyond the standard work week to enhance real earnings prospects. In this paper we test the forward looking labor supply model by investigating the relationship between the perceived risk of job loss, which we proxy with regional unemployment rates, and unpaid overtime. Using data from the SOEP for the years 1993 to 2002 we find a significant effect of regional unemployment on the supply of unpaid overtime for West German men, while the effect in the estimations for East German men and women is not significant.

2. Data

The data used in this study were made available by the German Socio-Economic Panel Study (SOEP) which is a representative longitudinal micro-database (see Haisken-DeNew and Frick, 2003). We use data from 1993 to 2002 for male and female East and West German full-time employees aged between 20 and 65, excluding foreigners, civil servants, self-employed persons, and the agricultural sector. Our unbalanced panel includes respondents who participate in at least two waves of the survey in order to be able to control for individual unobserved heterogeneity. In total, the sub-sample consists of 25,237 person-observations.

The SOEP provides detailed information on overtime work, which is combined to obtain the amount of unpaid overtime hours per week, the dependent variable in our study.¹

¹ The original questions in the SOEP read as follows: "Do you work overtime?" [Yes/No/Not applicable because I am self-employed]; "If you work overtime, is the work paid, compensated with time-off, or not compensated at all?" [Compensated with time-off/Partly paid, partly compensated with time-off/Paid/Not compensated at all]; "How was your situation with regards to overtime last month? Did you work overtime? If yes, how many hours?" [Yes, ____ hours/No].

As independent variable we use regional unemployment rates provided by the Federal Statistical Office in Germany which are available on the state level and used to proxy a worker's risk of losing his job. Furthermore, we include unemployment rates by employment office district ("Arbeitsamtbezirk") that we assign to the households according to their zip codes, which are available since 1993.² Due to the limited mobility of workers these are better suited to represent the perceived unemployment situation. Therefore, district unemployment rates are more appropriate to proxy an individual's risk of dismissal.

Furthermore, we add monthly gross earnings to the covariates and include also extra payments, such as holiday pay and income from profit sharing. Since monthly labor income overstates the remuneration of workers with excessive hours, it would be appropriate to use the effective hourly wage rate by dividing earnings by actual working hours. However, hourly wages might understate the earnings of workers who work long hours. Furthermore, using a wage measure which includes actual working hours would cause an endogeneity problem, since actual weekly hours is the sum of the contractual work week plus overtime. Therefore, this study uses the wage rate obtained by dividing gross earnings by contractual hours plus paid overtime hours. To take into account the distortion of labor supply caused by fiscal policy, we include a proxy for each individual's tax rate. We use the ratio of the tax burden, which is the difference between gross and net earnings, to the gross labor income.³ In addition, the SOEP provides information on the income of a person's partner as well as on dependent children living in the household, which we also include as control variables. Further independent variables are job tenure, recent job change, whether a worker holds a temporary job, and desired working hours. All regressions include control variables such as education, experience, age, marital status, and firm size, occupation, industry, and year dummies. All regressions are run separately for men and women as well as for East and West German workers.

² Due to the sensitivity of the data analysis at the zip code level, all concerning analyses have been conducted at the German Institute for Economic Research (DIW), Berlin, under special data protection requirements.

3. Descriptive Evidence

The contractual weekly working hours for the workers in our sample was about 38.7 hours in 1991 in West Germany, and it decreased only slightly during the 90ies to 38.5 hours in 2002.⁴ In the same period the standard work week in the East was reduced from 40.6 hours to 39.5 hours which lead to a slight narrowing of the gap. However, not only contractual hours differ between East and West Germany, but also the amount of overtime work. Despite their longer weekly contractual hours, there is a slightly higher number of overtime hours worked by East German workers in most of the years. Both differences in standard hours and the amount of overtime work lead to a substantial gap in working hours. Average actual working time per week in East Germany exceeds the average time worked by West German employees by almost 2 hours a week.

When considering unpaid overtime it is important to have a closer look at the subgroups of workers, since it has already been shown by other studies that unpaid overtime is particularly worked by white collar workers (Bauer und Zimmermann, 1999). This is clearly because blue collar workers are more strongly affected by binding wages and working hours that result from collective bargaining. The percentage of white and blue collar workers supplying unpaid overtime as well as the amount of unpaid overtime hours are shown in Table 1. As percentage of the total number of employees, about 20 percent of the white collar workers in the West work extra hours for free, while this incidence is up to 25 percent in the East. In both East and West Germany a much lower percentage of blue collar workers is working unpaid hours. However, while this percentage is around 2 percent in the West, it is about 2 percent higher in the East. With regard to the amount of overtime, both blue and white collar workers from East Germany work more unpaid overtime hours on average than their West German counterparts over almost all of the observed years. The differences seem

³ Here, tax does not only refer to direct taxes to the government, but also to social security payments.

⁴ All descriptive statistics are weighted using the cross-sectional sample weights.

to be small, but one has to be aware of the fact that without those extra hours the standard work week is already almost two hours longer in the Eastern part of Germany.

Table 1: Unpaid overtime incidence (in percent) and amount of unpaid overtime hours (average weekly hours)

| Year | White collar workers | | | | Blue collar workers | | | |
|------|----------------------|--------------|--------------|--------------|---------------------|--------------|--------------|--------------|
| | West Germany | | East Germany | | West Germany | | East Germany | |
| | Incidence | Weekly hours | Incidence | Weekly hours | Incidence | Weekly hours | Incidence | Weekly hours |
| 1991 | 20.0 | 4.92 | 22.6 | 4.45 | 1.2 | 3.69 | 1.1 | 10.85 |
| 1992 | 18.4 | 4.41 | 21.2 | 5.62 | 0.9 | 5.04 | 3.6 | 2.21 |
| 1993 | 21.3 | 4.79 | 23.5 | 5.20 | 2.0 | 3.93 | 3.5 | 2.45 |
| 1994 | 19.9 | 5.41 | 24.2 | 5.42 | 2. | 4.24 | 4.6 | 2.80 |
| 1995 | 20.3 | 5.06 | 23.2 | 5.51 | 1.6 | 2.61 | 3.7 | 3.01 |
| 1996 | 21.0 | 5.33 | 24.7 | 5.61 | 1.2 | 2.20 | 4.8 | 2.89 |
| 1997 | 22.6 | 5.32 | 24.5 | 6.27 | 0.5 | 1.67 | 2.8 | 3.57 |
| 1998 | 20.3 | 6.48 | 19.6 | 5.90 | 1.7 | 3.58 | 4.1 | 4.58 |
| 1999 | 20.2 | 5.41 | 23.2 | 6.38 | 3.0 | 4.31 | 3.5 | 4.50 |
| 2000 | 17.6 | 6.71 | 22.2 | 5.86 | 1.5 | 4.93 | 5.0 | 4.30 |
| 2001 | 21.1 | 6.92 | 23.9 | 5.54 | 3.4 | 3.72 | 4.4 | 5.38 |
| 2002 | 21.4 | 5.31 | 17.2 | 6.25 | 2.3 | 4.25 | 5.4 | 8.39 |
| ∅ | 20.3 | 5.51 | 22.5 | 5.67 | 1.8 | 3.68 | 3.9 | 4.58 |

Source: SOEP, 1991-2002 (own calculations)

Sample: German male and female full-time employees, age 20-65, civil servants and self-employed persons excluded. The incidence refers to the percentage of all employees, the amount of weekly hours is averaged on all workers with unpaid overtime. Data are weighted using the cross-sectional sample weights.

4. Theoretical Considerations and Econometric Analysis

We investigate the investment character of unpaid overtime and suggest a forward looking labor supply model. Our explanation is analogue to that of the signaling theory by Spence (1973), arguing that even after the hiring process the firm has no full information on the productivity of a worker. This information asymmetry leads to the phenomenon that decisions on promotions, pay rises or layoffs are taken on the basis of characteristics, which are easier to observe than productivity. Workers know about this decision-taking process and might use unpaid extra hours to signal higher productivity. By working longer hours and

providing them even for free they might try to decrease the probability of being laid off in recessions, when the least productive workers have to leave the firm.⁵ An equivalent reasoning is found in rat-race models (Landers, Rebitzer, and Taylor, 1996), where unequal outcome in success versus failure provokes a positive relationship between future pay off and current effort. Our hypothesis is that the risk of losing the job acts as one of the driving forces of higher labor supply in form of more unpaid overtime hours worked. Therefore, we proxy perceived job insecurity by regional unemployment rates and investigate their effect on the supply of unpaid overtime. Given the much higher unemployment rates in the Eastern part of Germany, this hypothesis would help to explain the discrepancy in unpaid overtime between the East and the West as reaction to differing unemployment risks.

Since a relatively large proportion of workers report zero overtime hours, we estimate the effect of the perceived job losing risk on the supply of unpaid overtime hours by using a Tobit model (Greene 2000) of the following structure:

$$ov_{it}^* = \alpha_i + \beta' x_{it} + \gamma' u_{regt} + \varepsilon_{it}, \quad (1)$$

where ov_{it}^* is the latent number of weekly unpaid overtime hours worked by the individual i at time t , x_{it} is a vector of individual and employer characteristics, and u_{regt} the regional unemployment rate at that time. α_i is the individual specific effect, β and γ are parameters to be estimated, and ε_{it} denotes the error term which is distributed with mean 0 and variance σ_ε^2 .

As ov_{it}^* is a latent variable, it is not observable. What one observes is:

$$ov_{it} = \begin{cases} ov_{it}^* & \text{if } ov_{it}^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

The model will be estimated with two different specifications: a pooled Tobit model and a random effects Tobit model. In this paper we only include unemployment rates by

⁵ One might argue that the firm's decision to dismiss the least productive worker is restricted by the German protection against dismissal which regulates by law that an employer has to choose the dismissal under social criteria. However, out of workers with similar social characteristics, the firm will try to keep the more productive ones.

employment office district, which are more considered to be more appropriate to proxy an individual's risk of dismissal, whereas state unemployment rates are additionally used in an extended version of this paper.

5. Results

The following tables show pooled and random effects Tobit estimates with the coefficients and marginal effects of the regional unemployment rate on unpaid overtime. The marginal effects are evaluated at the mean of the independent variables. When unpaid overtime hours are regressed on the regional unemployment rate and other exogenous variables, the control variables have the expected signs.⁶ A strong positive impact on the probability and amount of unpaid overtime comes from the coefficients on net wage, education and desired working hours. Furthermore, there is a positive relationship between holding a temporary job and unpaid overtime, and also a positive effect of increasing work experience for male workers. A statistically significant negative effect on unpaid overtime arises from working in the public sector, and from job tenure.

Table 2 shows pooled Tobit estimations of the amount of unpaid overtime hours with the district unemployment rate and control variables for East and West German, male and female workers, and additionally for white collar employees.⁷ The unemployment coefficient is positive in all estimations except for the ones for West German women. However, it is highly statistically significant only in the estimations for West German males and for East German females. In all the estimations, a rise in the district unemployment rate by 1% point is associated with an increase in the probability to work unpaid hours of less than 1%. The highest marginal effects are found in the estimation for East German white collar women: An

⁶ The coefficients are not reported here, but are available from the author on request.

⁷ We only show estimates with the unemployment rate at the district level, which is expected to be more appropriate to proxy a worker's perceived risk of dismissal. Estimates with state unemployment rates are available in a longer version of the paper.

increase in the district unemployed rate by 1% point entails an overall increase in unpaid hours of 5.2%, and a 1.6% increase for those who worked already unpaid overtime.

Second, a random effects Tobit model is estimated to capture unobserved individual characteristics, as for example intrinsic differences in tastes to unpaid overtime work or to labor supply in general. Results are shown in Table 3, which presents estimates with the district unemployment rate. Using the likelihood-ratio test to check the pooled against the random effects model supports the random effects Tobit model in all estimations. When controlling for unobserved heterogeneity of the workers, the sign of the unemployment coefficient does not change except for East German men. However, it is statistically significant at the 1% level only for West German men, and insignificant for all others. For West German white collar men the probability to work unpaid overtime resulting from a 1%

Table 2: Pooled Tobit Model: Unpaid Overtime Incidence and Hours with District Unemployment Rates

| | West sample | | | | East sample | | | |
|---------------------------|-----------------------------|------------------|--------------|-----------|-----------------------------|------------------|--------------|-----------|
| | Pooled Tobit Coefficient | Marginal effects | | | Pooled Tobit Coefficient | Marginal effects | | |
| | | E(Ov) | E(Ov Ov>0) | Pr (Ov>0) | | E(Ov) | E(Ov Ov>0) | Pr (Ov>0) |
| Men | | | | | | | | |
| U_District | 0.2796** (0.0643) | 0.0148 | 0.0392 | 0.0033 | 0.0984 (0.1150) | 0.0054 | 0.0139 | 0.0011 |
| Log-Likelih. | -5516.6 | | | | -3032.8 | | | |
| Observations | 9316 | | | | 4831 | | | |
| Women | | | | | | | | |
| U_District | -0.1052 (0.0892) | -0.0052 | -0.0145 | -0.0013 | 0.3580** (0.1061) | 0.0220 | 0.0523 | 0.0052 |
| Log-Likelih. | -2053.0 | | | | -2169.5 | | | |
| Observations | 4328 | | | | 3763 | | | |
| White collar men | | | | | | | | |
| U_District | 0.2659** (0.0660) | 0.0430 | 0.0533 | 0.0074 | 0.2019 (0.1344) | 0.0525 | 0.0497 | 0.0070 |
| Log-Likelih. | -4991.8 | | | | -2432.2 | | | |
| Observations | 5061 | | | | 1756 | | | |
| White collar women | | | | | | | | |

| | | | | | | | | |
|--------------|----------|---------|---------|---------|----------|--------|--------|--------|
| U_District | -0.1645 | -0.0114 | -0.0248 | -0.0027 | 0.4247** | 0.0336 | 0.0667 | 0.0075 |
| | (0.0873) | | | | (0.1146) | | | |
| Log-Likelih. | -1986.0 | | | | -2003.6 | | | |
| Observations | 3681 | | | | 3038 | | | |

Source: SOEP, 1991-2002 (own calculations)

Sample: German full-time employees, age 20-65, civil servants and self-employed persons excluded

Note: The regression model is full-specified, independent variables include additional individual and job characteristics as well as year dummies.

*significant at the 5% level. **significant at the 1% level. Robust standard errors in parentheses.

For all estimations: Prob>Chi²=0.0000.

point increase in unemployment rises to 1% in the random effects Tobit model. While this change in unemployment implies an overall increase in weekly unpaid overtime hours of 4.7% for this group, the increase is only of 3.2% for all West German male workers. In contrast, women and East German male workers do not seem to adjust their unpaid overtime supply to the perceived unemployment situation. As a result, only partial support is found for the unemployment-overtime hypothesis. While it seems to be true for West German men that a higher risk of job loss leads workers to increase unpaid extra hours, the hypothesis does not seem to hold for East Germans and female workers.

6. Conclusion

The objective of our study is to analyze the discrepancy in unpaid overtime work between East and West Germany. Taking the demand side as given, we focus on the investment character of unpaid overtime which might lead to the voluntary supply of unpaid extra hours. The future pay off this study concentrates on is not being laid off, and the higher the perceived risk of losing the job, which is approximated by regional unemployment, the more extra hours a worker is expected to invest. Using data from the SOEP for the years 1993 to 2002 we find empirical evidence for a positive relationship between the regional unemployment rate and the supply of unpaid overtime hours for male workers in West Germany, but no statistically significant effect in the estimations for women and male workers in East Germany. The results of the pooled and random effects Tobit estimations

reveal that only for West German male workers unpaid overtime might be instrumented as a means to signal productivity as reaction to high unemployment risk. We conclude that the fact that East Germans work more unpaid hours than their West German colleagues seems to be only partially driven by the much higher unemployment rates in the new states.

A number of extensions to the model are necessary to check the robustness of the empirical results and to reveal some more evidence on the functioning of unpaid overtime hours as a signal within firms. First, a worker's perceived risk of unemployment can be approximated by his expectation of losing his job, a variable which is provided by the SOEP for some years only. Therefore, evidence on the effect of the subjective risk of dismissal on the supply of unpaid overtime work can be found. As a next step, it should be investigated whether unpaid overtime serves as a signal for both sides of the labor market, i.e. whether the supply of extra hours is in fact used by firms to take decisions on dismissals. This requires an analysis of the effect of unpaid overtime on the subsequent probability of job loss.

Table 3: Random Effects Tobit Model: Unpaid Overtime Incidence and Hours with District Unemployment Rates

| | West sample | | | | East sample | | | |
|-------------------------|----------------------|------------------|--------------|-----------|---------------------|------------------|--------------|-----------|
| | RE Tobit | Marginal effects | | | RE Tobit | Marginal effects | | |
| | Coefficient | E(Ov) | E(Ov Ov>0) | Pr (Ov>0) | Coefficient | E(Ov) | E(Ov Ov>0) | Pr (Ov>0) |
| Men | | | | | | | | |
| U_District | 0.4361** (0.0845) | 0.0261 | 0.0632 | 0.0051 | -0.0082 (0.1576) | -0.0005 | -0.0012 | -0.0001 |
| Log-Likelih. | -5032.9 | | | | -2817.3 | | | |
| Observations | 9316 | | | | 4831 | | | |
| Women | | | | | | | | |
| U_District | -0.1042 (0.0856) | -0.0051 | -0.0143 | -0.0013 | 0.1778 (0.1416) | 0.0117 | 0.0265 | 0.0026 |
| Log-Likelih. | -2052.0 | | | | -2010.6 | | | |
| Observations | 4328 | | | | 3763 | | | |
| White collar men | | | | | | | | |
| U_District | 0.3978** (0.0791) | 0.0674 | 0.0812 | 0.0100 | 0.0054 (0.1911) | 0.0013 | 0.0013 | 0.0002 |
| Log-Likelih. | -4543.1 | | | | | | | |

| | | | | | | | | |
|--------------------|----------|---------|---------|---------|----------|--------|--------|--------|
| Observations | 5061 | | | | 1756 | | | |
| White collar women | | | | | | | | |
| U_District | -0.1608 | -0.0110 | -0.0242 | -0.0027 | 0.2639 | 0.0221 | 0.0422 | 0.0046 |
| | (0.0846) | | | | (0.1463) | | | |
| Log-Likelih. | -1982.4 | | | | | | | |
| Observations | 3681 | | | | 3038 | | | |

Source: SOEP, 1991-2002 (own calculations)

Sample: German full-time employees, age 20-65, civil servants and self-employed persons excluded

Note: The regression model is full-specified, independent variables include additional individual and job characteristics as well as year dummies.

*significant at the 5% level. **significant at the 1% level. For all estimations: Prob>Chi²=0.0000.

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