Wolff:

Unemployment Benefits and the Duration of Unemployment in East Germany

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Unemployment Benefits and the Duration of Unemployment in East Germany[*]

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Abstract

This paper studies the impact of unemployment benefits on unemployment duration for East Germany using data from the German Socio-Economic Panel. It concentrates on exit from unemployment into employment. Estimation results of a discrete-time hazard rate model imply that moderate cuts in the replacement rate raise the hazards by little. The effect of the replacement rate on the hazards becomes weaker the longer people are unemployed. The threat of periods of benefit sanction could explain this. The hazards are not generally declining in time until exhausting unemployment insurance (UI) benefits, but rise just prior to exhausting UI.

JEL classification: C41, J64 and J65
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1   Introduction

This study investigates in how far unemployment compensation influences the duration of unemployment in East Germany after the introduction of the German Economic, Monetary and Social Union in July 1990. I analyse this question using microdata on unemployment spells drawn from the German Socio-Economic Panel (GSOEP) for the observation period August 1990 to December 1999. The focus is on exits from unemployment into employment. The length of the unemployment spells is measured in months, so the parameters of covariates characterising the benefit system are estimated by maximizing the likelihood of a discrete-time proportional hazards model. I account for unobserved heterogeneity, assuming that it follows a gamma-distribution.

There are two types of unemployment benefits in Germany. Unemployment insurance (UI) benefits are paid only for a limited period. The potential length of UI receipt depends positively on the work-history in insured employment in the seven years prior to a benefit claim. It also increases with the age of an unemployed person. E.g., workers who are younger than 42 years could receive UI benefits for no longer than 12 months, while prior to April 1997 it was 18 months for those aged 42 to 43 years. The highest possible entitlement length of 32 months applied only to workers who were older than 53 years. A benefit reform that came into force in April 1997 reduced the potential length of UI benefit receipt for some of the elder age-groups. When people run out of UI benefit, they may receive unemployment assistance (UA) benefits, provided that they pass a means-test. There is no time-limit for UA benefit receipt and the formal replacement rates of UA are somewhat lower than those of UI benefit.

The implication of a limited entitlement to unemployment benefits on the transition rates from unemployment into employment were discussed by Mortensen (1977) in a dynamic search framework. A higher benefit level or replacement rate as defined by the benefit level relative to the expected wage would reduce the transition rate (disincentive effect). Yet the closer a job-seeker's unemployment spell is to the end of his/her benefit entitlement, the higher should be the transition rate (entitlement effect). Once job-seeker's lost their benefit entitlement, the transition rate from unemployment into employment should be highest and stable, provided that there are no other factors that lead to variation of the transition rates with the length of the spell.

This study estimates such effects for the East German labour market. Some previous studies on unemployment duration in East Germany did not investigate at all the effects of unemployment compensation (e.g. Steiner (1993) and Hunt (1999)). Only Schneider (1996) controlled for receiving UI and receiving UA benefits. There are a number of potential reasons why these studies neglected the effects of time until exhausting UI benefits and the replacement rate.

First of all, the type of benefit and its level are available in the GSOEP but not the potential length of UI entitlement. It has to be computed from the age information

and the past work-history record of the respondents. So, the variable will be measured with error. Another reason is that the previous studies, and particularly the one of Steiner (1993) with a sample of about 1,200 spells, relied on a relatively small number of observations. As a consequence it would have been difficult to find coefficients for time-until exhausting UI benefit, which are well-determined. Moreover, at the early stage of the East German transition process, a large percentage of people had a work-history with few interruptions. Thus, it was likely that most of the workers, who became unemployed were entitled to UI benefits for the maximum length of their age-group. Hence, variation of the potential length of the UI receipt would have mainly been due to the age differences of workers.

This study exploits the fact that, at a later stage of the East German transition process, there are other sources of variation of the potential duration of UI receipt. One source of variation is the benefit reform that came into force in April 1997. The reform lead to a considerable cut of the potential duration of UI receipt for some groups of elder workers.[1] Another source of variation are more frequent interruptions of the employment record as well as the history of UI benefit receipt in the seven years prior to a new benefit claim. Both tends to reduce a claimant's potential duration of UI receipt below the maximum.

As far as the denominator of the replacement rate is regarded, it is certainly difficult to determine what is the prospective wage of unemployed workers in an economy in transition. The skills of a worker that determined his wage in a past job may become less important in determining the wage in future jobs in such an economy. It is hence no easy task for unemployed people to know the relevant distribution of wage offers. Additionally, wage inflation was relatively high (more than 20 %) in the first years of the East German transition process. The relevant net wages of workers in the GSOEP though are only known for the calendar month prior to the interview.[2] Hence, one cannot precisely account for wage inflation over a calendar year with these data. But this would be important to compute the replacement rate for each month in which a person is unemployed.

This study will deal with the effects of the remaining entitlement length of UI benefits on the transition rates into employment in East Germany as well as a replacement rate. I approximate the expected monthly net wage by predictions that result from a gross wage regression for East Germany and a simple tax function. Both were estimated with data from the GSOEP-East. The potential length of UI receipt is computed from the information on work-history, age and history of UI receipt of the individuals.

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[1]However, this benefit reform did not immediately cut the entitlement lengths for all workers in specific age-groups, which I discuss later.

[2]Gross wages are also known for this month. Additionally, the GSOEP collects retrospectively information on the annual average monthly gross wage of the respondents in the calendar year prior to the interview. This wage information much more likely to be subject to errors of recall than the gross wage that respondents provide for the month prior to the interview.

Some empirical studies on unemployment duration in Britain found that the effect of unemployment benefits on the hazards declines with the spell length (see Nickell (1979), Narendranathan and Stuart (1993), and Arulampalam and Stuart (1995). An explanation for this may be that the unemployed benefit recipients become increasingly desperate for a job, the longer they are unemployed. Therefore, the disincentive effect of unemployment receipt matters less, the longer a person is already unemployed. Thus additionally, I will study whether this is the case in East Germany. Note, that such an effect may also be due to an increased threat of periods of benefit sanction.

The paper is structured as follows. Section 2 discusses the economic background of the East German economy in transition, while section 3 describes the benefit system and its changes during the 1990s. Previous studies on the effects of unemployment compensation on unemployment duration in West Germany are summarised in section 4. The econometric methods and the specifications of the transition rates into employment, for which parameters are estimated, are presented in section 5. The data from the GSOEP-East and in particular the main variables of the analysis are discussed in section 6. It presents descriptive statistics on the dependent variable and the most important covariates. The estimation results are discussed in section 7, while section 8 draws conclusions from these preliminary results.

2   Background

With the introduction of the German Economic, Monetary and Social Union in July 1990 the East German economy adopted the West German institutional framework. The transition from socialism to a more market-oriented economy very quickly led to high unemployment. Already in 1991 the unemployment rate reached a level of more than 10 %. By 1993 it exceeded already 15 % and in 1999 it was even 19 % and more than seven percentage points higher than in West Germany. The outflow rates from unemployment were relatively low at the beginning of the transition process. The monthly average outflow rate from unemployment in East Germany was near 10 % from 1991 to 1993, while in West Germany it ranged between 14.9 and 18 %.[3] From 1995 to 1999 though the East German outflow rate from unemployment ranged most of the time from 14 % to 15 % and did not differ much from that in West Germany.

There are many potential explanations for this pattern of low outflow rates in East Germany at the beginning of the transition process but higher ones since the mid of the 1990s. One explanation is that initially new employers preferred to hire their staff directly from the old firms, considering unemployment at the beginning of the transition process as a bad signal (see Wolff (2003). A second explanation could be that initially most of the unemployed job-seekers were entitled to UI benefits for the maximum possible entitlement periods. The reason is that many workers who

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[3]The statistics presented in this paragraph result from official data of the German Federal Labour Office. The outflow rates were computed from such data by dividing the monthly average outflow from the unemployment register by the annual average unemployment stock

became unemployed had a particularly long work-history record as unemployment under socialism was negligible and the labour force participation rates were extremely high. Compared with the start of the 1990s, at a later stage of the East German transition process gaps in the work-history in the seven years prior to unemployment were longer for many workers. Hence, in the second as opposed to the first half of the 1990s a larger share of the inflow into unemployment should not have been eligible for UI or should be entitled to UI for a potential length that falls below the maximum.

Statistics of the Federal Labour Office show that in 1991 more than 90 % of the total inflow into registered unemployment were people who received some UI benefit. In 1999 instead this number was only about 61 %, yet 14 % of the inflow was entitled to UA benefits.[4] So, indeed the percentage of unemployed people who received UI benefits at the start of their spell was very high at the beginning of East German transition process but declined considerably.

3   Unemployment compensation in Germany

The studies of Hunt (1995), Hujer and Schneider (1995) and Steiner (1997) already discussed the German unemployment compensation system and studied its effects on unemployment duration in West Germany.[5] In particular they described reforms of the benefit system in the 1980s and 1990s that were important to quantify the effects of unemployment compensation and the remaining length of entitlement to UI benefits on unemployment duration in West Germany. I will describe the German unemployment benefit system during the period of review from 1990 to 1999. The information I present relies on these previous studies, a publication of German Federal Labour Office (1995) and some additional pieces of information in particular the Employment Promotion Act, which contains the regulation on unemployment compensation over most of the 1990s as well as its more recent version in the "Sozialgesetzbuch" (SGB) .

The discussion focuses on eligibility, the formal replacement rates and the length of entitlement to unemployment benefits. I will highlight the main changes of the benefit system at the beginning of 1994 and in April 1997 (Arbeitsförderungsreformgesetz). As mentioned before, in Germany there are two forms of unemployment compensation: Unemployment insurance (UI) benefits and unemployment assistance (UA) benefits. Let us start with UI benefits, which are funded by contributions from employers and workers.

UI benefits: Eligibility and sanctions

To be eligible for UI benefits people need to have worked at least 12 months in contributory employment in the previous three years prior to the benefit claim. Let me

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[4]See Amtliche Nachrichten der Bundesanstalt für Arbeit: Arbeitsstatistik 1993 - Jahreszahlen and Arbeitsmarkt 2000.

[5]A detailed documentation of changes of the Employment Promotion Act is provided by Steffen (2003)

label this three year period "base period 1". An exception are workers in seasonal jobs. They must have paid contributions to the UI system for at least 6 instead of 12 months in base period 1. The claimant must not have reached the retirement age of 65 years and has to be available for a suitable job or a training course offered by the local labour offices. He/she also has to be available on short notice to the labour office. Of course, the claimant has to register as unemployed at the local labour office.

The definition of a suitable job changed several times. Oschmiansky, Kull, and Schmid (2001) provide a discussion of these changes: Before 1997 workers were classified into five different levels of occupational qualification. In the first four (six) months of unemployment the labour offices regarded as a suitable job only those jobs with the same occupational qualification as in the previous job.[6] Thereafter a job with a lower qualification could be regarded as suitable.

Not accepting a suitable job offer once may lead to a temporary loss of the UI entitlement for eight weeks. In 1994 this period of benefit sanction was raised to 12 weeks. A complete loss of the UI receipt is possible if the recipient refuses suitable job offers repeatedly. The reform of the Employment Promotion Act in 1997 changed the definition of a suitable job considerably. In the first three months of unemployment a job was defined as suitable if it paid at least 80 % of the previous wage of the UI benefit recipient. This percentage declines to 70 % in the forth month unemployment. After the sixth month of UI benefit receipt any job with a wage that exceeds the UI benefit is regarded as suitable. A suitable job is also defined by the time needed to travel to work. Since April 1997 a job with a travel to work time of three or less hours a day is classified as suitable while prior to this date the limit was 2.5 hours.

UI benefit level:

The level of the UI benefits is defined relative to the net earnings in the previous job.[7] Before the start of 1994, the formal replacement rates were 68 % for a parent and 63 % for a childless person. For all benefit recipients from January 1994 onwards these replacement rates became slightly lower (67 % for parents and 60 % for childless people). There is an upper cap to the benefit level, which depends on the upper threshold for gross earnings up to which contributions to the social insurance system have to be paid (Beitragsbemessungsgrenze). The benefits are indexed to wage inflation, though the adjustment takes place only once a year. In East Germany until the end 1993 this adjustment took place twice a year, due to high wage inflation (see German Federal Labour Office (1994)).

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[6]The higher sixth month period is relevant for those unemployed workers who in the eight years prior to unemployment worked at least for six years in a job with the same occupational qualification level as in their last job

[7]Before 1994 the relevant average net earnings were those of the three months prior to unemployment. In 1994 this period was prolonged to six month and thereafter (see Council of Economic Advisors (1993) p. 117. Finally, it was raised to one from 1998 onwards

Length of UI benefit entitlement:

The potential duration of UI benefit receipt depends positively on the past work-history of workers in the seven years prior to the benefit claim. Let us label this as "base period 2". It also increases with the age of workers. Table 1 displays the possible entitlement lengths for the period before and after the benefit reform that came into force in April 1997. Column one shows the four monthly work-history intervals over which the entitlement length is constant. In all there are 14 such intervals. The lowest entitlement length to UI benefits was six month for workers characterised by 12 to 15 months of contributory employment. Reaching the next higher interval implies two additional months of UI benefit receipt, so that for the last interval of more than 64 months of work-history UI benefits are paid for a maximum of 32 months.

However, the maximum entitlement length is not only determined by work-history but also by age. Table 1 shows the age at which workers can receive specific entitlement lengths. Before April 1994 workers younger than 42 years could not receive UI benefits for longer than 12 months. So for them a work-history record of more than 27 months would not pay in terms of an increase in the entitlement length. Workers aged 42 to 43 years could reach an entitlement length of up to 18 months. For the next two age-groups 44 to 48 years and 49 to 53 years the maximum entitlement length increases to 22 and 26 months respectively. The highest entitlement length of 32 months may only be reached by workers who are older than 53 years.

TABLE 1
ENTITLEMENT LENGTHS BEFORE AND AFTER THE REFORM ACT OF 1997

work-history in base period 2	Length of UI entitlement	
(months)	July 1987 to March 1997	since April 1997
$12 - 15$	6	6
$16 - 19$	8	8
$20 - 23$	10	10
$24 - 27$	12	12
$28 - 31$	14 (age $\geq$ 42)	14 (age $\geq$ 45)
$32 - 35$	16 (age $\geq$ 42)	16 (age $\geq$ 45)
$36 - 39$	18 (age $\geq$ 42)	18 (age $\geq$ 45)
$40 - 43$	20 (age $\geq$ 44)	20 (age $\geq$ 47)
$44 - 47$	22 (age $\geq$ 44)	22 (age $\geq$ 47)
$48 - 53$	24 (age $\geq$ 49)	24 (age $\geq$ 52)
$54 - 55$	26 (age $\geq$ 49)	26 (age $\geq$ 52)
$56 - 59$	28 (age $\geq$ 54)	28 (age $\geq$ 57)
$60 - 63$	30 (age $\geq$ 54)	30 (age $\geq$ 57)
≥ 64	32 (age $\geq$ 54)	32 (age $\geq$ 57)

The benefit reform that came into force in April 1997 did not generally reduce the length of UI entitlement. However, it increased all the age limits for reaching a duration of the UI receipt of more than 12 months by three years. This implied for some workers a substantial cut in the entitlement length. A worker aged 42 to 43 years who prior to the reform would have been entitled to his maximum of 16 months would receive

the benefit for no longer than 12 months. For a worker aged 44 the reform cut the maximum entitlement length even from 22 to 12 months.

However, the benefit reform was grandfathered, i.e., it applied only to new benefit claims. It was even more than grandfathered. A special regulation of the reform implied that many workers who claimed their UI benefit between April 1997 and April 1999 were still entitled to UI according to the old benefit rules. The requirement for this exemption was a work-history record of at least one year prior to April 1994 in the three year period before the current benefit claim. E.g., a worker who became unemployed in April 1998, but worked for at least one year between April 1995 and March 1997, would not be affected by this reform. Only after April 1999 all new benefit claims lead to an entitlement to UI according to the new rules as displayed in the last column of Table 1.

There is a further regulation of interest with respect to the calculation of the potential length of entitlement to UI benefits. For people who already received UI in the seven year period prior to a new benefit claim, the entitlement length to UI benefits is calculated in a somewhat different way (SGB III § 127). For them their work-history between the end of the last and start of the present unemployment spell is relevant. If according to this work-history since the end of the last UI receipt such people are again eligible for UI, the potential duration of UI receipt is determined according to Table 1. But then the remaining length of UI entitlement at the end of the last unemployment spell is added. If this sum exceeds an individual's maximum length of UI entitlement, the potential length of UI receipt is set to this maximum.

UA benefits:

Unemployed people may receive UA benefits if they either run out of their UI entitlement or are not eligible for UI benefits as their work-history in base period 1 is too short. Prior to 1994 the formal replacement rates were 58 % for parents and 56 % for childless people. In 1994 these replacement rates were cut to 57 % and 53 % respectively. However, to receive UA benefits people have to pass a means-test that takes into account income of all the members of the unemployed person's household. Due to the means-test, the UA benefit can be lower than the formal replacement rates suggest. Additionally, since the benefit reform of April 1997, the past wage, from which the UA benefit level results, is reduced by 3 % after each year of UA benefit receipt. Though after an initial UA claim, its receipt is first limited to one year, UA may be prolonged without any time limit. Only if the claimant reaches the retirement age, UA cannot be received any longer.

4 Previous empirical research for Germany

Past studies on unemployment duration in East Germany did not analyse the impact of unemployment benefits levels, replacement rates or the time until exhausting UI benefits on exit rates into employment. However, there are a number of studies which

carried out such research for the West German labour market. Steiner (1997) already provides an extensive discussion of the literature. Therefore, I only would like to discuss the more recent studies, which extended the research that was carried before 1995 considerably.

Hunt (1995) studied the effects of several benefit reforms in West Germany over the 1980's on the duration of unemployment using unemployment spell data drawn from the GSOEP for the period of January 1983 to December 1988. She used a difference-in-difference approach to quantify the impact of each benefit reform that affected only sub-groups of unemployment benefit recipients - the treatment group, but not other groups which form a control group. Hence, the difference of the difference between the hazard rates of the treatment and the control group after and before such a benefit reform measure the effect of the reform on the treatment group. She estimated these effects using the Cox partial likelihood proportional hazards model.

One reform cut the formal replacement rates for childless people. In 1984 their replacement rates were reduced by five percentage points in the case of UI benefits and by two percentage points in the case of UA benefits. She found no clear evidence that this altered the hazard rates into employment or out of the labour forces for childless people. The other reforms that she focused increased the potential entitlement length to UI benefits for some age-groups only. For some of these age-groups she found considerably lower exit rates from unemployment. E.g., for people aged 44 to 48 years a reform raised their potential duration of UI receipt from 12 to 22 months. As a consequence their transition rate into employment became 46 % lower.

Hujer and Schneider (1995) analysed the impact of the German unemployment compensation in West Germany with data of the GSOEP for the period from 1983 to 1992. They estimated a discrete-time proportional hazards rate model for men and women as well as people who receive unemployment compensation and people who receive no unemployment benefits separately. Unobserved heterogeneity was assumed to follow a gamma-distribution. For males they only consider the exit rates into employment, while for females they additionally considered the exit rates into non-participation. The covariates that characterised the unemployment benefit system were the replacement rate, a dummy for receiving UA benefits, the potential length of UI receipt as well as a set dummy variables that characterise different intervals of time until exhausting UI receipt. Additionally they estimated coefficients for dummy variables that were supposed to measure the impact of the different reforms of the unemployment compensation system during the 1980s.

The replacement rate was computed by the amount of benefit that people reported relative to their last past net wage.[8] The length of potential UI receipt was computed

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[8]They computed the last past net wage as follows. First they calculated for the individuals the ratio of the monthly net wage and gross wage in the month prior to an interview, provided that such information is available at the interview prior to an unemployment spell. Then they multiplied this

as follows: It was set to the maximum of the potential duration of UI receipt, provided that a person did not run out of the UI benefit. For people who ran out of the UI benefit, their potential length of UI receipt is observed. Several reforms of the Employment Promotion Act in the 1980s prolonged the potential duration of UI receipt for different age-groups. Hence, variation in the potential entitlement length is not only determined by work-history and age.

Their preferred estimation results for males are not easy to interpret as their set of covariates included potential and remaining UI entitlement lengths, dummies for a base-line hazard as well as dummies for several benefit reforms that raised the length of UI entitlement for specific age-groups. For females their preferred specification for the employment hazard is much simpler as the covariates that characterise the benefit system are only the replacement rate, two dummies for time until exhaustion and the UA receipt. They report a positive effect of the replacement rate and a decrease in the female employment hazard just prior to exhausting UI benefits. Both is not in line with the implications of search theory.

Schneider and Hujer (1999) extended their previous work by distinguishing between the effects of the value of the replacement rate at a start of an unemployment spell and the effect of changes of the replacement rate over the spell on the exit rates from unemployment into employment. Again they used unemployment spell data from the GSOEP-West. The period under review is 1990 to 1994. They find no significant effect of changes in the replacement rate over the spell on the employment hazard. In contrast the hazards are negatively and significantly related to the replacement rate at a start of an unemployment spell. Hence, to speed up exit into employment they conclude that reforms of the benefit system should reduce the initial level of unemployment compensation.

Steiner (1997) pointed out that Hujer and Schneider (1995) did not consider that the potential duration of the UI benefit receipt varies not only with age but also according to the work-history of the UI claimants. Setting the length of UI entitlement to its maximum for each age-group implies for some individuals potential UI entitlement lengths that are too high. The reason is that their work-history may be below the requirement for achieving the maximum entitlement length. So, there is also some misclassification of time until exhausting UI benefit. Steiner (1997) therefore extended the previous studies by computing the potential duration of UI receipt differently. He uses data from the GSOEP for the West German economy over the period of 1983 to 1994. The coefficients of covariates of the benefit system were estimated by a discrete-time competing-risks model for men and women separately. The study accounts for unobserved heterogeneity by discrete mass points. He analyses the exit rates into employment for both sexes, while for women non-participation is considered as a second

ratio with the average monthly gross wage for the year prior to unemployment. Respondents provide this average gross wage retrospectively for the calendar year before the interview.

competing-risk.

For people who run out of UI benefits, he calculates the UI entitlement length by the actual number of months of benefit receipt. But for people who do not run out of their UI benefit, he does not assume that they receive UI for the maximum possible duration. Instead, where sufficient information on a respondent's work-history is available[9], he computed the potential duration of UI receipt according to the observed work-history. The work-history record over the seven years prior to the UI benefit claim stems from information of the monthly labour force status calendarium and additionally from information on job tenure, that respondents provide at their interview. If there was no sufficient information on a respondents's work-history, the potential duration of UI receipt was set to the relevant maximum.

To estimate the effects of benefit reforms during the 1980s, Steiner first proceeded in the same way as Hunt (1995). I want to focus here on results, where Steiner used a different specification. He estimated hazard rate models controlling for the unemployment compensation by two dummy variables for receiving UI and UA benefits and the income replacement rate. The replacement rate is defined by the unemployment benefit amount relative to an estimated net wage. Results of gross wage regressions and a simple tax function were used to predict this net wage. He also controlled for no entitlement to unemployment benefits at the beginning of the unemployment spell and a set of dummy variables for intervals of time until exhausting UI and time after exhausting UI benefits. With respect to these benefit variables, it is somewhat unclear what type of individual represents the reference group. For time until exhaustion the reference group is more than 18 months of remaining UI receipt. However, Steiner controls at the same time for receiving no benefits at the start of the spell and receiving UI generally.

As far as the employment hazards are regarded he finds no statistically significant effect of the income replacement rate for men but a significant positive one for women. His results do not imply that the hazard rates generally decline with the remaining entitlement to UI benefits, but for people who run out of UI benefits and receive no UA benefit thereafter, the hazards become higher than prior to the end of the UI receipt. This latter effect is considerable for the transition rates into non-participation of women.

5 Econometric methods

5.1 The discrete-time proportional hazards model

Let S be the random variable *duration of unemployment* and J be the *destination state employment* which will be the only destination considered in this study. The transition

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[9]Work-history was regarded as sufficient, if for a respondent labour force status information is available for more than 80 % of the months in the seven year period prior to the start of an unemployment spell.

rate from unemployment into employment for a small duration interval $[s, s + \Delta s[$ is defined as

$$\theta(s|\boldsymbol{x}(s)) = \lim_{\Delta s \to 0} \frac{P(s \leq S < s + \Delta s|S \geq s, \boldsymbol{x}(s))}{\Delta s}, \tag{1}$$

where $\boldsymbol{x}(s)$ represents a vector of covariates that may vary over the spell length. In the Cox Proportional Hazards model (Cox (1972)) it is specified as

$$\theta(s|\boldsymbol{x}(s)) = \theta_0(s) \cdot \exp(\boldsymbol{x}(s)'\boldsymbol{\beta}), \tag{2}$$

where $\theta_0(s)$, the base-line hazard, represents variation of the transition rate with the spell length and hence the duration dependence pattern. $\boldsymbol{\beta}$ represents the parameter vector of the covariates. This specification of the hazard rate is adequate when the spell length is measured in continuous time, e.g., when the duration of unemployment is measured in days. In this study unemployment duration is measured in months, so the unit of measurement is rather discrete. Prentice and Gloeckler (1978) present the discrete-time formulation of the proportional hazard rate model above; the resulting discrete-time hazard is:

$$h(s|\boldsymbol{x}(s)) = 1 - \exp[-\exp(\gamma_s + \boldsymbol{x}(s)'\boldsymbol{\beta})], \tag{3}$$
$$\text{where } \gamma_s = \int_s^{s+1} \theta_0(\tau)d\tau.$$

The probability of survival, i.e., of remaining unemployed up to the start of the monthly interval s would then be

$$S(s|\boldsymbol{x}(s-1), ..., \boldsymbol{x}(0)) = \prod_{\tau=0}^{s-1} \left[1 - h(\tau|\boldsymbol{x}(\tau)\right] \tag{4}$$

This specification assumes that covariates do not change their value during a monthly interval, but they may change from month to month. The resulting parameters of the base-line hazard, γ_s, may either be specified by a parametric function of duration or non-parametrically, e.g., as separate parameters for each monthly interval of spell length that is available in the data. Spells that end with an exit contribute to the likelihood function with their hazard times the probability of survival. Spells that are right-censored, i.e., where by the observed end of a spell no exit did occur, contribute to the likelihood function only by their survival probability.

The formulation of the transition rate above does not consider unobserved heterogeneity which determines the hazard rates, but at the same time is independent of the covariates. Neglecting such heterogeneity tends to bias duration dependence towards a negative duration dependence pattern. Moreover, for the case of gamma-distributed

unobserved heterogeneity the response of the hazard to a covariate will become lower than its true value (Lancaster (1990), p.67). In the following specification unobserved heterogeneity, v, is assumed to be multiplicative

$$h(s|\boldsymbol{x}(s), v) = 1 - \exp[-\exp[\gamma_s + \boldsymbol{x}(s)'\boldsymbol{\beta} + ln(v)]]. \tag{5}$$

Following Meyer (1990) the unobserved heterogeneity is assumed to be gamma distributed with $E(v) = 1$ and $V(v) = \sigma^2$. The likelihood function for this case may be found in Meyer (1990) or Hujer and Schneider (1995).[10] If there is more than one potential exit state (competing-risks), provided that the risks are independent, the parameters of a transition rate to a specific exit state may be estimated by maximizing the likelihood of a single-risk model. In this case spells that end by an exit to another state would are treated as right-censored and contribute to the likelihood function by the probability of survival.

5.2 Specifications

There are various ways to identify effects of the unemployment benefits on a transition rate. A standard specification would make the employment hazard conditional on the replacement rate, b/w, where b is either the level of the UI benefit or the UA benefit and w is the prospective wage. It would further condition on a vector of dummy variables characterising different intervals of time until exhausting UI benefits, $\boldsymbol{remdurUI}$, including a dummy that indicates that a person ran out of UI.[11] Some interval of time until exhausting UI could then be a reference category. The estimated coefficients of such intervals should be higher, the closer an interval is to the date of UI exhaustion. This would indicate an entitlement effect. So the specification of the hazard would be

$$h = h(s, b/w, \boldsymbol{remdurUI}, \text{never received UI}, \boldsymbol{x}), \tag{6}$$

where $\boldsymbol{x}$ represent a vector of control variables. One could extend the specification in equation 6 by adding interaction terms of the replacement rate with duration ($(b/w) * s$):

$$h = h(s, b/w, (b/w) * s, \boldsymbol{remdurUI}, \text{never received UI}, \boldsymbol{x}). \tag{7}$$

This latter specification should reveal whether the disincentive effect of the benefit receipt declines the longer people already received their benefit.

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[10]Maximum likelihood estimation of the parameters of the discrete-time proportional hazards model with gamma-distributed unobserved heterogeneity can be carried out in STATA using the "pgmhaz" procedure written by Stephen Jenkins.

[11]Time until exhausting UI results from the difference of the potential duration of UI receipt and the elapsed spell length (s). The effects of time until exhausting UI and the duration dependence effects and of the baseline hazard can be identified, when unemployed individuals differ with respect to the potential duration of UI receipt.

To identify such effects one needs variation of these covariates in the data. The formal replacement rates differ between UI recipients and UA recipients. In each case they also differ for people with and without children. Additionally, in 1994 for both types of benefits, the formal replacement rates were reduced by one percentage point for parents and three percentage points for people without any dependent children. Moreover, the replacement rates differ among individuals and over time due to variation in the prospective wages. Variation of the remaining duration of UI benefit receipt depends on the work-history and age of the individuals. It also depends on past UI benefit receipt as described in section three. Additional variation of the entitlement lengths is achieved by the benefit reform in April 1997. However, as I discuss later the reform affected only very few spells in the sample.

As the measure of the replacement rate available for this study is far from ideal, I additionally consider the following specification:

$$h = h(s, \text{receives UA}, \boldsymbol{remdurUI}, \text{never received UI}, \boldsymbol{x}). \tag{8}$$

Again an entitlement effect would be implied if the estimated parameters of remaining duration of UI receipt increase the closer an interval is to the exhaustion point. The coefficient, the variable receives UA helps to measure the difference between the hazards of people who ran out of UI benefit but either receive no UA or do receive UA benefit.

6 Data

6.1 The GSOEP and information on benefit variables

The GSOEP is the data used for the analysis of the problems under consideration. Its first wave for East Germany was carried out in June 1990, just before the German Economic, Monetary and Social Union came into force. The resulting GSOEP-East, which is referred to as sample C in the GSOEP data, is a representative sample of the East German resident population of German nationality on a household basis.[12] [13] The sample started with 2,179 private households. 4,453 people of at least 16 years of age responded to the interview. In the years 1998 and 2000 the GSOEP started to sample additional households both in West- and East Germany, which are labelled as the samples F and E. From these samples additional observations of people living in East Germany are available. However, the monthly labour force status information of these new respondents is quite short. As I want to control for past unemployment experience in the four years prior to a current unemployment spell, I do not include such respondents in the sample.[14]

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[12]For a general description of the GSOEP-East see Wagner, Burkhauser, and Behringer (1993).

[13]People who leave a household are followed and re-interviewed in the successive waves, so long as they do not leave German territory. The same applies for households that migrate within Germany.

[14]Of course this argument on past unemployment history also applies to respondents to the GSOEP-East in the first waves. However, under socialism people were rarely unemployed. Thus, I assume

The interviews provide retrospective monthly calendar information on the labour force status of the individuals over the previous calendar year. This makes the data appropriate for the analysis of unemployment duration with discrete-time duration models. The labour force calendarium distinguishes between more than ten different states[15] of which one is registered unemployment. Additionally until the year 1993 such calendar information is available with respect to the receipt of UI and UA benefits.

For the period after 1993, the GSOEP questionnaire no longer collected information on UI and UA receipt by a monthly calendarium. Instead for each type of benefit the respondents have to quantify the number of months in which it was received in the calendar year prior to the interview. Therefore, for each calendar year from 1994 onwards one has to match this latter piece of information to the unemployment spell data. I proceeded as follows: People are assumed to be entitled to UI benefits until the number of months of reported unemployment since the start of the calendar year equals the number of months of UI benefit receipt. If they additionally reported some months of UA benefit receipt, I assume that UA is received immediately after the end the UI entitlement. If they reported only a positive number of months of UA receipt, again it is assumed that this receipt begins in the first month of unemployment reported for a calendar year.

Additionally, respondents have to provide the average monthly amount of the UI and of the UA benefit. Hence, I cannot determine by the data by how much this amount changed over a calendar year. The benefit levels once a year and in East Germany until 1993 even twice a year are adjusted according to the past wage inflation.[16] Assuming that the benefit levels are constant over a calendar year implies that the covariate benefit level exceeds its true value at the beginning of the year, while the opposite is true by the end of the year. Naturally this error is only important for respondents who are registered as unemployed for a considerable period during a calendar year. Moreover, if a person receives unemployment benefits during two different spells of unemployment, the past net wage that underlies the calculation of the benefit amounts may differ for these two spells. This is a further reason why the reported average benefits amounts measure the true benefit levels with error.

Some of the previous studies on unemployment compensation and unemployment duration in West Germany compute a replacement rate by dividing the unemployment benefits by the past net wage of an individual. This net wage information available from the GSOEP is the monthly net wage prior to the month of the interview. It is unlikely to be a good proxy for the wage that an unemployed individual may currently expect to earn. As mentioned before, Steiner (1997) attempted to resolve this problem using predictions of the net wage that result from wage regressions and a simple

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that if for some respondent in the period prior to the German Economic, Monetary and Social union no monthly labour force status information is available, then this individual was not unemployed.

[15]Not all of these states are standard, some are sampled only in particular years.

[16]However, this adjustment did not always take place in the year 1997.

tax-function. However, in East Germany there is another problem that needs to be addressed. Wage increases during the first years of the transition process were particularly high. From the GSOEP net wage information, it can be inferred that the net monthly wages in March 1991 were about 30 % higher than in May 1990. In February 1992 they were about 23 % higher than in March 1991 and finally the average net monthly wages in January 1993 exceeded those of February 1992 by about 20 %. Only thereafter did the annual wage inflation decline to levels below 10 %.

Due to this initial high wage inflation I proceeded as follows to predict the wages of the unemployed. I estimated the parameters of determinants of the gross monthly wages, with the gross wage data of the GSOEP in the month prior to the interview. The parameters were estimated by maximizing the likelihood of a Heckman selection model. The estimation was carried out for each wave from 1990 to 2000 separately. As determinants of the wages I considered only some broad skill categories, experience and the sector of the workers. The results from this analysis were used to determine for each unemployed individual an expected gross wage in the month prior to the modal interview month of each wave. From this information I then computed the monthly wage growth between two waves for the individuals. This information was used to index the gross wages to wage inflation and hence to compute for each calendar month an expected gross wage.

To compute an expected net wage, a tax function is needed. I estimated the parameters of a simple tax function for the period under review. This analysis relies on the monthly net and gross wage data provided by the GSOEP. Its results were used to predict for each individual and each year an average tax rate and then an expected net wage. As the unemployment benefits are monthly averages over a calendar year, I also computed such averages of the predicted monthly net wage. This variable in turn is used to compute the replacement rates. Appendix D provides some more details on these estimation of the gross wages equation and the tax function.

The potential duration of the UI benefit receipt needs to be calculated. The exact procedure is described in Appendix A. In my calculation, I follow the approach of Steiner (1997) by computing the work-history in base period 2 of the individuals from both the monthly labour force status calendarium and from tenure information provided at the interview. From this information I infer whether an unemployed person is eligible to UI. Together with the age at the start of unemployment this information determines the potential duration of the UI benefits as described in Table 1. I also use this information to determine whether people who became unemployed between April 1997 and April 1999 receive their UI according to the rules of the Employment Promotion Act before or after its reform of April 1997. In my sample there are only 182 spells that could have been affected by reductions of the entitlement length due to the reform. 73 of these spells started before May 1999 and met the conditions described in section three, so that their entitlement length is still determined according to the rules prior

to the reform.

I extend Steiner's approach by taking into, that the regulations on the length of UI receipt differ somewhat from those displayed in Table 1, if people already received UI benefits in the seven years prior to a new benefit claim. As mentioned in section three, if, after a previous UI receipt, such people became again eligible to UI, for them the potential length of UI entitlement is the sum of the entitlement length that they gained due to their work-history record since the end of the last UI receipt plus the remaining length of the last UI receipt. If this sum exceeds the maximum entitlement length of an individual, the entitlement length is set to this maximum.

6.2   Sample sizes and descriptive statistics

I regard the period from August 1990 to December 1999. The reason for not starting in July 1990, when the German Economic, Monetary and Social Union came into force, is that one covariate, the regional vacancy-unemployment ratio at the beginning of a month is only available from August 1990 onwards.[17] During the observation period the number of completed and right-censored unemployment spells in the GSOEP-East is 1,844 for men and 2,024 for women.

The analysis, however, will be concerned with East Germany, so I dismiss first of all spells of people who either live in West Germany at the start of their spell or where the information on the federal state is missing. This reduces the sample by 94 male and 97 female spells. There are extremely few foreigners in the GSOEP-East, so I dismiss also the spells of people who are not of German nationality. Additionally women who are older than 59 are excluded as women may retire earlier than men. This leaves us with 1,699 spells for men and 1,883 spells for women. Due to missing values of the covariates the sample sizes are further reduced to 1,321 for men and 1,438 for women. Spells that last for longer than 48 months will be treated as right-censored at this spell length. The resulting sample sizes in terms of the number of months people are unemployed are 8,557 for the male sample and 13,965 for the female sample.

Table 2 presents for men and women separately the exit states and their duration of unemployment. Nearly 86 % of the male spells and about 83 % of the female spells are completed. The modal exit state is employment at about 68.4 % for the male sample and roughly half of the female sample. Training and other exits have a much lower importance. Therefore, I will focus in the analysis on exit into employment. The last two rows of Table 2 also display some descriptive statistics on the duration of unemployment, which represent Life-Table estimates. The median duration of unemployment for men is 4 months, while for women it is twice as high. By and large the same is true for the probability of remaining at least 12 months unemployed, which is 16.5 % for men and 29.9 % for women.

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[17]This information stems from statistics of the Federal Labour Office.

TABLE 2

SHARE OF EXIT, COMPLETED AND RIGHT-CENSORED SPELLS

	Total	Spells of men	Spells of women
Number of spells	2,759	1,321	1,438
Right-censored spells	15.7	14.2	17.2
Completed spells	84.3	85.8	82.8
Exit into:			
Employment	59.3	68.4	51.0
Training	12.8	7.8	17.4
Other	12.2	9.7	14.5
Median duration	6.0	4.0	8.0
Survival prob. (12 months or more)	23.6	16.5	29.9

The analysis of the employment hazards controls for a large number of covariates. I concentrate the discussion on covariates associated with the unemployment benefit system. Additionally to such covariates, I control for disability, marital status, several age-groups, number of children and whether the household owns the dwelling. A further set of control variables represent the occupational qualification and the industry. Moreover, I control for the situation of an unemployed person prior to unemployment by the labour force status in the month prior to unemployment (entry state), the past unemployment history as well as the position of the unemployed person in the distribution of equivalent household income in East Germany. Finally, a polynomial of calendar time, seasonal dummies, regional dummies and the regional vacancy-unemployment ratio control for heterogeneity in labour demand. Descriptive statistics on these control variables are presented in Appendix B.

TABLE 3

UNEMPLOYMENT BENEFIT RECEIPT AND REMAINING ENTITLEMENT LENGTH

	Men		Women	
	Share of spells	Share of exits into jobs	Share of spells	Share of exits into jobs
Number of spells/exits	1,321	903	1,438	733
Benefit receipt				
Received some UI benefit	85.5	88.3	85.0	86.6
Received some UA benefit	11.4	7.6	19.1	16.0
Received some UA but never UI	5.1	3.7	5.7	5.0
Received neither UI nor UA benefit	9.4	8.1	9.3	8.3
Remaining length of UI benefit (months)				
32 to 19	24.9	14.7	18.2	7.5
18 to 13	15.5	7.9	18.0	7.0
12 to 9	50.6	31.5	54.9	24.3
8 to 7	27.3	10.7	39.9	7.2
6 to 5	22.2	6.0	40.1	8.0
4 to 3	18.5	5.2	35.1	8.2
2 to 1	15.9	4.8	28.4	8.2
≤ 0	10.6	7.5	19.7	16.2

Let me now turn to some descriptive statistics of the covariates that characterise the unemployment benefit system which are presented in Table 3. Its first row shows for men and women separately the number of spells and the number of exits into employment. The next row displays the share of spells (first and third column) and of employment exit of spells (second and fourth column) of people who were entitled to UI benefits at least for one month. About 85 % of the spells in the male and female sample received some UI benefit. Their share of exit is somewhat higher for both men and women.

The third row of Table 3 shows the proportion of spells that were entitled to UA benefits for at least one month. 11.4 % of the male spells were entitled to UA benefits for at least one month, while for women this figure is considerably higher at 19.1 %. This is not surprising. Table 2 showed that females tend to be unemployed for much longer than males. Hence more frequently than males they run out of their UI benefit, so that they may become eligible for UA benefit. It is unlikely that this reflects that unemployed women more frequently pass the means-test for UA than unemployed men. Indeed, the share of spells that receive some UA benefit is quite similar for men and women who from the start of their unemployment were not eligible for UI benefits. This is displayed in the fourth row. At less than 6 % such spells make up for a very small part of the sample. The share of spells of both gender who never received any of the two benefits (fourth row) is about 9 % of the sample.

The final rows of Table 2 present the share of spells that reach different intervals of remaining duration of UI benefit receipt. Note that these figures add up to more than 100 % as a spell may reach all of these intervals. I distinguished between eight intervals. Only spells of unemployed workers who are older than 43 years may reach the first interval of two 32 to 19 months, while the second of 18 to 13 months is also relevant for workers who are older than 41 years. The remaining intervals may be reached by all age-groups. This explains the high share of spells that entered the interval 12 to 9 months at more than 50 % for men and more than 54 % for women. 31.5 % of all male exits and 24.3 % of all female exits take place in the interval 12 to 9 months. Naturally, for the remaining intervals the share of spells that reaches them declines. The last interval is "≤ 0", i.e., when people ran out of their UI benefit during their current unemployment spell. Only about 11 % of men and nearly 20 % of women run out of their UI benefit prior to leaving unemployment.

Table 4 shows the mean and standard deviation of the level of unemployment benefits, the predicted monthly net wage and the replacement rate. The figures are shown only for the subset of monthly observations, for which both the benefit level and predicted wages are available. As the previous set of benefit characteristics, these variables may change during a spell. The benefit levels change when people run out of UI benefits and then receive UA benefits. As benefit levels are reported as a monthly average for the months of benefit receipt in each calendar year, they may change from one year to

TABLE 4
BENEFIT LEVELS, PROSPECTIVE WAGES AND THE REPLACEMENT RATE[a]

	Men		Women	
	Mean	Std. Dev.	Mean	Std. Dev.
Unemployment benefit level	1,283.4	556.7	1,021.9	542.7
Predicted prospective net wage	2,194.0	469.1	1,553.5	427.1
Replacement rate	0.591	0.241	0.670	0.342

[a] The statistics are displayed for the monthly observations of people who received UI or UA benefit and valid information on both benefit levels and wages is available. This is the case for $7,068$ months of the male sample and $10,822$ months of the female sample.

another, the same is true for the wage as I take into account wage inflation. Benefit levels and prospective wages of men are, on average, substantially higher than those of women. The opposite is true for the average replacement rate which is 0.591 for men and 0.67 for women.

In the analysis that follows, I will not dismiss spells where the replacement rate could not be computed because either the unemployment benefit level was not reported or no past net wage information is available. For such individuals a covariate replacement rate is missing will be used as a control variable. Moreover for all people who do not receive any UI or UA benefit, the replacement rate is set to zero.

7   Estimation results

The first set of specifications that I present regards the effects of time until exhausting UI benefits and the replacement rate. Table 5 presents three specifications for men. For these specifications, a likelihood-ratio test cannot reject the hypothesis of a zero variance of gamma-distributed unobserved heterogeneity.[18] The same is true for women. Hence, the results presented stem from maximizing the log-likelihood of a discrete-time proportional hazards model without unobserved heterogeneity. Table 5 displays the coefficients of the base-line hazard and various covariates of the benefit system together with their t-values. The first and most simple specification represents the benefit system by the replacement rate, a binary variable for having exhausted the UI receipt, and a binary variable that indicates that an individual was never entitled to UI benefits during a spell. Even for these latter two categories of individuals, the replacement rate may be positive, since they could receive UA benefits.

Let me first provide an impression of the size of the monthly transition probability into employment of the reference male. The constant term implies that it is about 9.5 % for specification one at an elapsed duration of 2 months or less. In contrast after more than 19 months of unemployment it would be only about half as high. Now turn to the effects of the benefit variables in the first specification. The coefficient of the

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[18]I do not display the test-statistics. They are available on request.

TABLE 5
ESTIMATION RESULTS FOR THE COEFFICIENTS OF TIME UNTIL EXHAUSTION AND THE
REPLACEMENT RATE - MEN[a],[b]

Covariates	Specification (1)		Specification (2)		Specification (3)	
	Coef.	$\|t\|$	Coef.	$\|t\|$	Coef.	$\|t\|$
Constant	-2.304	6.8 ***	-2.624	7.0 ***	-2.551	6.7 ***
Baseline hazard (months)						
≤ 2 (Ref. group)						
3 to 4	0.082	0.9	0.069	0.8	0.003	0.0
5 to 6	-0.187	1.7 *	-0.296	2.4 **	-0.439	2.8 ***
7 to 8	-0.176	1.4	-0.152	1.1	-0.294	1.6
9 to 12	-0.081	0.7	-0.148	1.1	-0.291	1.6
13 to 18	-0.533	2.9 ***	-0.646	3.4 ***	-0.785	3.5 ***
≥ 19	-0.689	3.1 ***	-0.850	3.7 ***	-0.991	3.8 ***
Replacement rate	-0.387	2.4 **	-0.347	2.1 **	-0.514	2.7 ***
Interaction Terms						
Repl. rate * 4th to 6th month unemployed					0.323	1.6 *
Repl. rate * > 6 months unemployed					0.323	1.2
Replacement rate missing	0.205	1.4	0.234	1.6	0.218	1.5
Time until exhausting UI receipt (months)						
32 to 19 (Ref. group)						
18 to 13			0.193	1.2	0.178	1.1
12 to 9			0.267	1.7 *	0.267	1.7 *
8 to 7			0.539	3.0 ***	0.529	2.9 ***
6 to 5			0.124	0.6	0.113	0.6
4 to 3			0.248	1.2	0.237	1.1
2 to 1			0.468	2.2 **	0.461	2.1 **
≤ 0	-0.270	1.8 *	0.069	0.3	0.068	0.3
never entitled to UI	-0.054	0.4	0.232	1.2	0.211	1.1
Number of observations			8,557			
Pseudo-R^2 (McFadden)	0.0742		0.0762		0.0768	
Log. of the likelihood	-2,670.1		-2,664.4		-2,662.8	
LR-test statistic			Spec. 1 against 2		Spec. 2 against 3	
			11.4* ($\chi^2(6)$)		3.3 ($\chi^2(2)$)	

[a] The additional control variables are the ones described in section 6. Their coefficients and
t-values are displayed in the Appendix Tables C1 I and C1 II
[b] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

replacement rate is -0.387 and is highly significant. In terms of size one may judge its
effect by a hazard ratio, which results from the exponentiated coefficient. For a cut of
the replacement rate by 0.05 or 5 percentage points, we have to multiply the coefficient
of the replacement rate by -0.05 prior to calculating the antilog. The transition rate is
about 1.02 times the transition rate prior to the cut. So a moderate reduction in the
replacement rate would hardly alter the speed of return to work.

The coefficient for running out of the UI benefit, "≤ 0", is negative and statistically
significant at a ten percent significance level. But we should not interpret this result

in the sense that running out of UI benefit lowers the hazards. The reason is that simultaneously there is the loss of the benefit and the replacement rate of an individual becomes zero. Only for individuals with a replacement rate below 0.698 this conclusion would hold. But this is the case for a bulk of benefit recipients in the sample. The result could reflect that unemployed people who run out of UI compared with others are more likely to be characterised by some unobservable attributes that adversely affect their probability of finding a job. There is no statistically significant effect of the covariate never received UI benefit, which is plausible since the replacement rate should control for differences between individuals who receive or do not receive UI benefits.

Specification two adds a set of dummy covariates for different intervals of time until exhausting UI. The reference interval is 32 to 19 months prior to the loss of the UI receipt. The likelihood ratio test in the last row of Table 5 suggests that the coefficients of this set of covariates are jointly significant. Provided that there is an entitlement effect the coefficient of an interval should be the higher, the closer it is to the point of loosing the entitlement. However, this is not the case. The interval with the highest coefficient is the one of 8 to 7 months prior to exhausting UI benefits and the coefficients of four intervals are not statistically significant. There is some evidence for a very high hazard in the last two months before the end of the UI entitlement. The coefficient for the interval 2 to 1 is 0.468 and well determined. It implies that in this interval people exit about 1.6 times as rapidly into employment than in the reference interval. However, it does not imply that they exit more rapidly into employment than in the interval of 8 to 7 months prior to the exhaustion date. Note, that the coefficient for having running out of UI is no longer negative and significant. Finally, the coefficient of the replacement rate remained quite stable compared to specification one.

Specification three adds two covariates for the replacement rate interacting with the elapsed duration of unemployment. It is assumed to interact with 4 to 6 months of unemployment as well as more than 6 months of unemployment. These intervals were chosen, because the definition of suitable job offer becomes broader in each of these intervals. The likelihood-ratio test in the last row of Table 5 indicates that these interaction terms are not jointly significant. Yet, I also estimated a model where the replacement rate is interacted with more than three months of unemployment only, where the interaction term turns out to be significant and of the same size as those in Table 5.

The coefficients of the interaction terms in specification three are positive and for the first one is also significant in statistical terms. Together with the coefficient of the replacement rate which is now -0.514 the results for the interaction terms imply that the disincentive effect becomes lower the longer the unemployment spells last. These findings are similar to the ones of Arulampalam and Stuart (1995) for Britain. The reason may be that unemployed people become more desperate over time to find a job,

so that the replacement rate becomes less important for determining their reservations wages and search intensities. Though the fact that labour offices define suitable job offers less restrictively the longer people received their benefit, is another potential reason for this result.

TABLE 6
ESTIMATION RESULTS FOR THE COEFFICIENTS OF TIME UNTIL EXHAUSTION AND THE REPLACEMENT RATE - WOMEN[a],[b]

| | Specification (1) | | Specification (2) | | Specification (3) | |
Covariates	Coef.	$|t|$	Coef.	$|t|$	Coef.	$|t|$
Constant	-2.950	7.8 ***	-3.115	7.5 ***	-3.000	7.1 ***
Baseline hazard (months)						
≤ 2 (Ref. group)						
3 to 4	0.080	0.7	0.075	0.7	0.023	0.2
5 to 6	0.057	0.5	0.172	1.2	0.060	0.4
7 to 8	-0.220	1.5	-0.209	1.3	-0.445	2.3 **
9 to 12	0.231	1.8 *	0.149	1.1	-0.087	0.5
13 to 18	-0.031	0.2	-0.062	0.4	-0.296	1.4
≥ 19	-0.376	2.0 *	-0.422	2.1 **	-0.638	2.8 ***
Replacement rate	-0.506	3.8 ***	-0.488	3.6 ***	-0.791	4.0 ***
Interaction Terms						
Repl. rate * 4th to 6th month unemployed					0.256	1.2
Repl. rate * > 6 months unemployed					0.509	2.3 **
Replacement rate missing	0.096	0.7	0.104	0.8	0.062	0.5
Time until exhausting UI receipt (months)						
32 to 19 (Ref. group)						
18 to 13			0.026	0.1	0.003	0.0
12 to 9			0.182	1.0	0.176	0.9
8 to 7			-0.246	1.1	-0.265	1.1
6 to 5			0.056	0.2	0.031	0.1
4 to 3			0.189	0.8	0.164	0.7
2 to 1			0.485	2.0 **	0.458	1.9 *
≤ 0	-0.109	0.8	0.059	0.2	0.055	0.2
never entitled to UI	0.146	1.0	0.296	1.3	0.243	1.0
Number of observations			13,965			
Pseudo-R^2 (McFadden)	0.0649		0.0674		0.0683	
Log. of the likelihood	-2687.3		-2680.1		-2,677.5	
LR-test statistic			Spec. 1 against 2		Spec. 2 against 3	
			14.3** ($\chi^2(6)$)		5.3* ($\chi^2(2)$)	

[a] The additional control variables are the ones described in section 6. Their coefficients and t-values are displayed in Appendix Tables C2 I and C2 II.
[b] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

Table 6 presents results for the same set of specifications for women. Let me again provide an impression of the size of a monthly transition rate into jobs of the reference women. For specification one it is 5.1 % during the first two months of unemployment. The only coefficients of the base-line hazard that are statistically significant are

those of the intervals 9 to 12 months and "≥ 19" months. In the first of these two intervals the exit rates would be about 1.25 times as high as in the first two months of unemployment, while in the second the corresponding number is only 0.69 times. Hence there is a spike in the hazard in the interval of 9 to 12 months of duration. Note that for many UI benefit recipients this interval represents the last three months of UI receipt.

The results of specification one imply that the exit rates of women are negatively affected by the replacement rate, yet the coefficient at -0.506 is even somewhat higher than for men. A cut in the replacement rate by five percentage points, would imply a rise in the hazard of about 2.5 %. Similar to men, the coefficient of never being entitled to UI is negative, however, it is badly determined. Finally, the coefficient for people who never received UI is positive, but not statistically significant. Hence the results suggest that the main reason for a quicker return to work of women who receive no unemployment benefits is the loss of the benefit receipt.

As for men the likelihood-ratio tests suggests that the intervals for time until exhausting UI benefits in specification two are jointly significant. The coefficients of the intervals of time until exhausting UI benefits do not imply that the hazards tend to rise the closer the point of UI exhaustion. They are badly determined except for the coefficient of 2 to 1 month prior to the end of the UI receipt at 0.485. This coefficient implies that the exit rates in this last interval are roughly 1.6 times as high as for the reference group of 32 to 19 months prior to exhausting UI. Compared to specification one the coefficient of the replacement rate is relatively stable and again statistically significant.

Note, that compared with specification one the coefficient of the base-line hazard for the interval 9 to 12 months in specification two is lower and no longer statistically significant. So, the spike found for this interval in the first specification was due to people who are close to the end of their UI receipt. Finally, the last coefficient of never being entitled to UI benefits still implies a higher exit rate to employment than for benefit recipients, but remains badly determined.

As for men specification three adds two covariates for the interaction of the replacement rate with 4 to 6 and more than 6 months of unemployment. The results are displayed in the last column of Table 6. The coefficients of the interaction terms are jointly significant and positive. They imply that the replacement rate becomes a less important determinant of the hazards for each of the two intervals of unemployment duration. The coefficient of the replacement rate is now roughly -0.8, while the coefficients of the interaction with 4 to 6 months of unemployment is 0.256 and of the interaction wit more than 6 months unemployment it is 0.509.

These results imply the following: A cut of the replacement rate by five percentage points raises the hazard by about four percent in the first three months of unemploy-

ment. Yet in the fourth to sixth month and after the sixth month of unemployment, it raises the hazard only by 2.7 % and 1.4 % respectively. Hence, the disincentive effect becomes less important, the longer the spells last. One reason for this result may be an increased threat of benefit sanctions as suitable jobs are defined more broadly over these intervals. Another reason could be that job searchers become more desperate to find a job the longer their spell lasts.

TABLE 7

ESTIMATION RESULTS FOR THE COEFFICIENTS OF TIME UNTIL EXHAUSTION AND ENTITLEMENT TO UA BENEFIT - MEN[a]

Covariates	Specification (4)		Specification (5)		Specification (6)	
	Coef.	$\|t\|$	Coef.	$\|t\|$	Coef.	$\|t\|$
Constant	-2.159	6.8 ***	-2.3	6.6 ***	-2.3	6.5 ***
Baseline hazard (months)						
≤ 2 (Ref. group)						
3 to 4	0.088	1.0	0.080	0.9	0.036	0.4
5 to 6	-0.168	1.5	-0.249	2.0 **	-0.338	2.0 **
7 to 8	-0.115	0.9	-0.049	0.4	-0.333	1.5
9 to 12	0.008	0.1	-0.008	0.1	-0.283	1.3
13 to 18	-0.402	2.2 **	-0.453	2.4 **	-0.697	2.9 ***
≥ 19	-0.469	2.1 **	-0.539	2.3 **	-0.760	2.8 ***
Receives UA benefit	-1.153	6.6 ***	-1.133	6.4 ***	-1.071	5.9 ***
Interaction Terms						
UI receipt * 4th to 6th month unemployed					0.111	0.8
UI receipt * > 6 months unemployed					0.356	1.6
Time until exhausting UI receipt (months)						
32 to 19 (Ref. group)						
18 to 13			0.094	0.6	0.055	0.3
12 to 9			0.149	1.0	0.136	0.9
8 to 7			0.375	2.0 **	0.347	1.9 *
6 to 5			-0.072	0.4	-0.124	0.6
4 to 3			0.022	0.1	-0.033	0.2
2 to 1			0.268	1.2	0.219	1.0
≤ 0	0.396	2.5 **	0.540	2.6 **	0.697	3.0 ***
never entitled to UI	0.470	3.9 ***	0.594	3.5 ***	0.655	3.7 ***
Number of observations			8,557			
Pseudo-R^2 (McFadden)	0.0786		0.0801		0.0806	
Log. of the likelihood	-2657.5		-2653.1		-2651.7	
LR-test statistic			Spec. 4 against 5		Spec. 5 against 6	
			8.73 ($\chi^2(6)$)		2.78 ($\chi^2(2)$)	

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

As past wages are a bad measure of the wage available in the market as pointed out by Nickell (1979) and Atkinson, Gomulka, and Micklewright (1984), the previous results relied on a replacement relative to a predicted wage of the unemployed individuals. Still, the replacement rates may be measured with error and the wage predictions cannot be achieved in a precise way with the GSOEP, since wage information for each

calendar month is not available and the tax function used in this paper is only a very rough guide to estimating a monthly net wage. Therefore, I present a second set of estimation results that ignores the replacement rate. Instead, it distinguishes between people who receive UI benefit and UA benefit.

Table 7 presents estimation results of this analysis for the male sample. It presents three additional specifications for men.[19] Let me start with specification four. The reference individual is an unemployed person who receives UI benefits. Again I distinguish people who run out of their UI benefit from people who were never entitled to UI benefits by two binary covariates. Additionally, I added a dummy for the UA benefit receipt. The coefficient of this latter covariate is highly negative and well determined. Yet it has to be interpreted together with the two other covariates for people who exhausted UI (≤ 0) or who were never entitled to UI. The coefficients of these two covariates are 0.396 and 0.47. Both are well determined. According to this result people who exhausted UI are characterised by a hazard that is about 1.5 times that of a UI recipient. For people who never received UI, the corresponding number is 1.6.

To compare the hazards of UA recipients with those of UI recipients, we have to add to the coefficient of UA receipt, either to the coefficient of running out of UI or that of entitled to UI, before taking the antilog. The result of this exercise is that UA recipients who exhausted their UI benefit or were never entitled to UI exit into employment only at about half the rate of UI recipients.

The large relative difference of the hazards of UA and UI recipients could be explained by disincentive effects of the benefit system. One may argue that UA benefits are paid indefinitely. Thus once people passed the means-test, they have less incentives to leave the unemployment pool, than before they could be sure to receive the UA benefit. However, another interpretation is likely to contribute to the result. Compared with the average UI recipient, UA recipients may be characterised by less favourable attributes, that make it harder to find a potential employer.

Specification five adds the intervals for time until exhausting UI benefit. Similar to the previous results, the coefficients are not generally higher the closer an interval is to the exhaustion date. They are also not jointly significant as indicated by the likelihood-ratio test in the last row of Table 7. The sixth and last specification adds interaction terms of UI receipt with either 4 to 6 months of unemployment duration or more than 6 months of unemployment duration. Also these two coefficients are not jointly significant according to the likelihood-ratio test statistic displayed in the last row of the table. So, my preferred specification among these three is specification four.

Finally, let me turn to specification four to six for women. They are displayed in Table 8. They represent the only set of estimation results, for which a likelihood-ratio test

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[19]The controls are the same as for the first three specifications. In Appendix C, I do not display the coefficients of the control variables for specification four to six. The reason is that these coefficients do not differ considerably from those of the first three specifications. They are available on request.

TABLE 8

ESTIMATION RESULTS FOR THE COEFFICIENTS OF TIME UNTIL EXHAUSTION AND ENTITLEMENT TO
UA BENEFIT - WOMEN[a]

Covariates	Specification (4)		Specification (5)		Specification (6)	
	Coef.	$|t|$	Coef.	$|t|$	Coef.	$|t|$
Constant	-3.078	7.8 ***	-3.2	7.3 ***	-3.1	7.3 ***
Baseline hazard (months)						
≤ 2 (Ref. group)						
3 to 4	0.128	1.1	0.134	1.1	0.109	0.8
5 to 6	0.160	1.1	0.311	1.9 *	0.252	1.3
7 to 8	-0.066	0.4	-0.018	0.1	-0.463	1.7 *
9 to 12	0.440	2.3 **	0.407	1.9 *	-0.022	0.1
13 to 18	0.243	0.9	0.278	1.0	-0.103	0.3
≥ 19	0.042	0.1	0.087	0.2	-0.270	0.7
Receives UA benefit	-0.587	3.3 ***	-0.586	3.2 ***	-0.551	3.1 ***
Interaction Terms						
UI receipt * 4th to 6th month unemployed					0.042	0.3
UI receipt * > 6 months unemployed					0.550	2.3 **
Time until exhausting UI receipt (months)						
32 to 19 (Ref. group)						
18 to 13			-0.029	0.1	-0.096	0.4
12 to 9			0.118	0.6	0.057	0.3
8 to 7			-0.338	1.4	-0.398	1.6
6 to 5			-0.018	0.1	-0.145	0.6
4 to 3			0.114	0.5	-0.035	0.1
2 to 1			0.434	1.7 *	0.277	1.1
≤ 0	0.431	2.3 **	0.548	2.0 **	0.765	2.6 ***
never entitled to UI	0.617	3.7 ***	0.708	2.9 ***	0.746	3.0 ***
$ln(\sigma_v^2)$	-1.268	-1.7 *	-1.052	1.6	-1.239	1.7 *
Number of observations			13,965			
LR-test (H_0: no unobs. het.)	2.03*		2.86**		2.14*	
Log. of the likelihood	-2,694.6		-2,687.1		-2,684.3	
LR-test statistic			Spec. 4 against 5		Spec. 5 against 6	
			15** ($\chi^2(6)$)		5.56* ($\chi^2(2)$)	

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

rejects the hypothesis that the variance of gamma-distributed unobserved heterogeneity is zero. Hence, I presents the estimation results of a discrete-time proportional hazards model with unobserved heterogeneity. The table shows now additionally the logarithm of the variance of the unobserved heterogeneity ($ln(\sigma_v^2)$) and a likelihood ratio test statistic for the hypothesis that there is no unobserved heterogeneity. I interpret the coefficients as before, as the logarithm of the expectation of the unobservable term v is zero.

In the most simple specification, specification four, I find a significant and negative coefficient of UA benefit receipt of -0.587. The coefficients for non-UI recipients are

both well determined and are 0.431 for those who ran out of UI and about 0.617 for those who during their current spell were never entitled to UI. So their transition rates into jobs would be 1.53 and 1.85 times that of a UI recipient, provided that the are not entitled to UA benefits. Entitlement to UA benefits would change these numbers to 0.86 and 1.03.

For specification five, the likelihood ratio test statistic in the final row of Table 8 implies that the coefficients of the intervals for time until exhausting UI are jointly significant for women. Again though the coefficients are not in line with a general entitlement effect. Only the coefficient of interval 2 to 1 months prior to UI exhaustion is significant at a 5 % level. It is about 0.55 and implies a job hazard that is more than 70 % higher than for people who still could receive UI for 32 to 19 months. So again, we find the female hazard to become particularly high just prior to the loss of UI receipt. The coefficient for UA receipt is nearly the same as in specification four. The coefficients for loosing the UI receipt and of never receiving UI became somewhat higher than in specification four. But this is not surprising, since the reference group are not people who receive UI in general, but people who are still entitled to UI for 32 to 19 months, who have a lower exit rate than the average UI recipient.

Specification six adds the interaction terms of UI receipt with duration of unemployment. Its results are shown in the last column of Table 8. The second interaction term of UI receipt with duration of unemployment of more than six months is positive and well-determined. At 0.55 it implies a transition rate into employment that is about 73 % higher than for UI recipients with a lower elapsed duration of unemployment. So the disincentive effects of UI receipt become lower with the spell length. However, the spike that the previous specification indicated for the last two months prior to exhausting UI benefits disappears. Hence, there is no strong effect of time until exhaustion. Only a total benefit loss raises the hazards considerably.

8   Summary and preliminary conclusions

The preliminary results on the effects of the unemployment compensation system on the speed of exit into employment for East Germany suggested a number of things. First of all the replacement rate does not have a generally strong negative effect on the hazards. Moderate cuts of the replacement rate hardly alter the hazards. Only the total loss of benefits would raise them substantially. For both men and women the coefficients of the third specification implied that the replacement rate becomes a less important determinant of variation in the transition rates into employment, the longer people are unemployed. In the second set of specifications (4 to 6), I find that the hazards of UI recipients after more than 6 months of UI receipt are considerably higher, than in the months before. But this effect is only significant for women.

These results are in line with two different interpretations. One is that the longer people are unemployed, the more desperate they are to find a job, and hence the less

the level of benefits matters to them. A second interpretation is that the threat of a period of benefit sanction becomes higher the longer benefits are received. The reason is that the longer the duration of UI receipt, the less restrictively the labour offices can define an acceptable job offer. Yet the replacement rate used in the estimation procedure is certainly characterised by some degree of measurement error. Hence, it is likely that the effects found in this paper are biased.

There is no convincing evidence for an entitlement effect. The hazards are not generally declining in time until exhausting UI benefits. The coefficients of most of the intervals of time until exhausting UI are badly determined. This may be due to the fact that many individuals can expect to be eligible to UA, once they run out of their UI benefit. For the them hazards should vary less with the remaining duration of UI receipt than for people who cannot expect to pass the means-test for UA. An additional reason for the results could be measurement error in the variable time until exhausting UI benefits as the potential entitlement lengths had to be computed. Too little variation of the potential duration of UI receipt may be another reason for the results. The cut of the length of UI entitlement for some age-groups in April 1997 should lead to more variation of this variable. But this reform only gradually affected benefit claimants between April 1997 and April 1999. Thus, in the sample, there are only a few spells for which it was already relevant. The new wave of the GSOEP-East, which was just released will provide more spells that are affected by the reform. Estimating the effects of the reform by difference-in-difference approach may then become feasible.

Still the results of specifications two and three, for men and women alike, provide evidence that their hazards become particularly high just prior to the end of UI receipt. But only for women, after running out of UI, the transition rates into employment remain at a high level of more than 1.5 times the hazard of a UI recipient who is not about to exhaust the UI receipt. Finally, I should emphasise that specifications four to six showed that people who do not receive UI benefits only exit much more rapidly than UI recipients into employment, provided that they are not eligible for UA benefit.

The evidence, in qualitative terms, is in line with the observations on the gross outflow rates from registered unemployment. At the beginning of the 1990s they were relatively low, but in the second half of the 1990s they were about 40 to 50 % higher. One reason for this is certainly that in the first half of the 1990s a greater percentage of people who entered the unemployment pool was entitled to benefits than in the second half of the 1990s.

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Appendix A: Computing the potential length of UI entitlement

The potential duration of UI benefits has been computed in a similar way as in Steiner (1997). For those unemployment spells where we observe in the data the end of UI benefit receipt, it can be directly determined. By this information the potential duration of UI receipt (including no UI entitlement at all) can be inferred for about 25.4 % of the male and 35.2 % of the female spells in the sample. A second piece of information for determining the potential entitlement is the monthly labour force status provided by the GSOEP. It is collected retrospectively for all months from January to December in the calendar year prior to the interview.[20] It offers information on whether people are employed, registered unemployed, in vocational training, do their military service or are on parental leave. Except for unemployment, all these are states that contribute to the work-history of individuals which together with their age determines the potential duration of the UI receipt.

The labour force history of all individuals was constructed over the seven years prior to their unemployment spell. For people who were during this seven year period still

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[20]This was somewhat different in the first two waves of the GSOEP-East

younger than 16, I assumed that they were not in contributory employment. The general procedure was the following. I first computed the number of months employed in the three years prior to the unemployment spell begin, in order to determine whether people are eligible to UI benefits. Next, I determined the number of months of employment in the seven year period prior to unemployment and used this information to calculate the potential duration of UI benefit receipt. The procedure was applied if 20 % or less of the labour force status history was missing. In this way the entitlement length was determined for little more than 15 % of male and about 8 % female spells.

In contrast to Steiner (1997) I also used the information on past unemployment spells and past UI benefit receipt to compute more exactly the entitlement length for people who already received UI in the seven years prior to their current spell. For them the base period is reduced to the time span between the end of the last and the start of the current spell. Their UI entitlement length is computed by the work-history within this period. It is then added to the remaining length of UI entitlement at the end of the last spell to determine the new potential duration of benefit receipt. Yet it is set to the maximum possible length of UI receipt if this number is exceeded. This procedure determined the potential length of UI receipt of roughly 31 % of the male and 26 % of the female spells.

For those people whose UI entitlement length could still not be determined another piece of information was used. I constructed the work-history in the seven years prior to the unemployment spell by tenure information that people provide at each interview. Again this work-history was only used to determine the entitlement length if 20 % or less of the labour force status history was missing. As a result I could infer the potential length of UI receipt for a further 16 % of the male and female spells.

Among those spells where the potential duration of UI receipt was computed by their work-history, the results suggest that 35 % of the male sample and men and 37 % of the female sample were entitled to UI for a period that is shorter than the maximum. In these cases the potential entitlement length is on average about two months lower than the maximum.

For UI recipients whose work-history was characterised by too many missing values the potential duration of UI receipt was set to the corresponding maximum (about 12 % of the male spells and 15 % of the female spells).

Appendix B: Descriptive statistics of control variables

Table B1. Descriptive statistics of the covariates, Part I

		Men		Women	
		Mean	Std. Dev.	Mean	Std. Dev.
Number of monthly observations		8,557		13,965	
Remaining length of UI benefit (months)					
	32 to 19	0.204		0.118	
	18 to 13	0.101		0.082	
	12 to 9	0.217		0.180	
	8 to 7	0.074		0.077	
	6 to 5	0.062		0.077	
	4 to 3	0.051		0.066	
	2 to 1	0.043		0.054	
	≤ 0	0.123		0.206	
Other benefit related covariates					
	never received UI	0.126		0.139	
	receives UI benefit	0.751		0.655	
	UI receipt * 4 to 6 months unemployed	0.176		0.165	
	UI receipt * > 6 months unemployed	0.244		0.254	
	receives UA benefit	0.158		0.207	
	Replacement rate	0.570	0.492	0.519	0.587
	Repl. rate * 4 to 6 months unemployed	0.127	0.345	0.115	0.357
	Repl. rate * > 6 months unemployed	0.225	0.401	0.246	0.458
	Replacement rate is missing	0.158		0.239	
Elapsed unemployment duration					
	≤ 2	0.283		0.194	
	3 to 4	0.188		0.156	
	5 to 6	0.129		0.126	
	7 to 8	0.096		0.101	
	9 to 12	0.125		0.146	
	13 to 18	0.086		0.114	
	≥ 19	0.093		0.162	
Disability, marital status, age, children, owner of dwelling					
	Disability	0.068		0.027	
	Married	0.663		0.738	
Age	≤ 21	0.056		0.037	
	22 to 26	0.087		0.081	
	27 to 31	0.099		0.127	
	32 to 36	0.101		0.150	
	37 to 41	0.108		0.128	
	42 to 43	0.058		0.057	
	44 to 48	0.113		0.123	
	49 to 53	0.134		0.134	
	≥ 54	0.242		0.163	
	Numb. of children	0.612	0.946	0.814	0.973
	Numb. of children younger than 6	0.145	0.418	0.197	0.445
	owner of dwelling	0.322		0.368	

TABLE B2. DESCRIPTIVE STATISTICS OF THE COVARIATES, PART II

		Men		Women	
		Mean	Std. Dev.	Mean	Std. Dev.
Qualification and characteristics of last job					
Qualification	No qualification	0.079		0.078	
	Vocational training	0.737		0.780	
	Technical college	0.103		0.109	
	University	0.081		0.032	
Industry	Missing	0.110		0.224	
	Agriculture, forestry, fishing	0.068		0.040	
	Energy, mining, manufacturing	0.288		0.217	
	Construction	0.214		0.023	
	Trade	0.075		0.140	
	Transport, communication	0.051		0.036	
	Other services	0.194		0.319	
Situation before current unemployment					
Entry state	Employed, training, education	0.905		0.915	
	Other	0.095		0.085	
Number of	Missing	0.113		0.081	
unempl. spells	None	0.427		0.435	
in prev.	1	0.254		0.313	
4 years:	2	0.144		0.137	
	> 2	0.061		0.034	
	Cumul. duration of unempl. spells/10 (in prev. 4 years)	0.562	0.872	0.728	1.018
Position in the	First quintile	0.253		0.258	
income[a]	Sec. quintile	0.195		0.251	
distribution	Third quintile	0.189		0.213	
	Forth quintile	0.174		0.141	
	Fifth quintile	0.190		0.137	
Time, season, region, labour demand					
Time:	$Time/100$	0.646	0.313	0.585	0.310
(months)	$(Time/100)^2$	0.515	0.386	0.438	0.377
	$(Time/100)^3$	0.450	0.423	0.370	0.409
	$(Time/100)^4$	0.414	0.455	0.334	0.436
Season	First quarter	0.274		0.250	
	Sec. quarter	0.235		0.238	
	Third quarter	0.240		0.256	
	Forth quarter	0.251		0.256	
Region	Berlin, Brandenburg	0.193		0.192	
	Mecklenburg-Vorpommern	0.112		0.116	
	Sachsen-Anhalt	0.199		0.213	
	Thueringen	0.201		0.205	
	Sachsen	0.295		0.274	
	Regional vacancy-unemployment ratio at start of the month	0.045	0.016	0.044	0.016

[a] Net equivalent household income, OECD equivalence scale.

Appendix C: Estimated coefficients of control variables

PART I

		Specification (1)		Specification (2)		Specification (3)	
		Coef.	$|t|$	Coef.	$|t|$	Coef.	$|t|$
Personal characteristics							
Disability		-0.63	3.2 ***	-0.64	3.3 ***	-0.64	3.3 ***
Married		0.06	0.7	0.07	0.7	0.07	0.7
Age:	≤ 21	-0.58	3.0 ***	-0.59	3.0 ***	-0.60	3.0 ***
	22 to 26	-0.15	1.0	-0.14	1.0	-0.15	1.0
	27 to 31	-0.13	1.0	-0.12	0.9	-0.13	1.0
	32 to 36			Ref. group			
	37 to 41	-0.19	1.5	-0.19	1.5	-0.19	1.5
	42 to 43	-0.53	2.9 ***	-0.48	2.5 **	-0.48	2.5 **
	44 to 48	-0.53	3.7 ***	-0.38	2.3 **	-0.38	2.3 **
	49 to 53	-0.58	4.0 ***	-0.38	2.2 **	-0.39	2.2 **
	≥ 54	-1.11	7.1 ***	-0.90	4.8 ***	-0.91	4.9 ***
Numb. of children		-0.04	0.8	-0.04	0.8	-0.04	0.8
Numb. of children younger than 6		0.07	0.7	0.07	0.7	0.07	0.7
Owner of dwelling		0.19	2.6 ***	0.20	2.7 ***	0.20	2.6 ***
Qualification, industry							
Qualif.:	No qualification	-0.21	1.4	-0.19	1.3	-0.19	1.2
	Voc. training			Ref. group			
	Technical college	-0.44	3.1 ***	-0.46	3.2 ***	-0.45	3.2 ***
	University	-0.03	0.2	-0.01	0.1	-0.01	0.1
Industry:	Missing	0.06	0.4	0.06	0.4	0.06	0.5
	Agr./forestry/fishing	0.22	1.6 *	0.22	1.6	0.23	1.7 *
	Energy/mining/manuf.			Ref. group			
	Construction	0.23	2.3 **	0.23	2.3 **	0.24	2.4 **
	Trade	0.00	0.0	-0.01	0.1	-0.01	0.1
	Trans./comm.	-0.46	2.3 **	-0.46	2.3 **	-0.46	2.3 **
	Other services	-0.05	0.5	-0.05	0.5	-0.05	0.4

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

		Specification (1)		Specification (2)		Specification (3)	
		Coef.	$\|t\|$	Coef.	$\|t\|$	Coef.	$\|t\|$
Past labour force status:							
Entry state	Employed/training/education			Ref. group			
	Other	-0.62	3.5 ***	-0.62	3.5 ***	-0.61	3.4 ***
Numb. of	Missing	-0.02	0.2	-0.04	0.3	-0.03	0.2
unempl.	None			Ref. group			
spells	1	0.11	1.1	0.09	0.9	0.09	0.9
in previous	2	-0.02	0.2	-0.05	0.3	-0.04	0.3
4 years:	> 2	0.38	1.9 *	0.36	1.8 *	0.37	1.8 *
Cum. duration of unempl. spells/10		-0.22	2.8 ***	-0.23	2.9 ***	-0.24	2.9 ***
Position in the income distribution[b]							
	First quintile			Ref. group			
	Sec. quintile	0.28	2.6 ***	0.28	2.6 ***	0.28	2.6 ***
	Third quintile	0.19	1.8 *	0.20	1.8 *	0.20	1.9 *
	Forth quintile	0.08	0.7	0.08	0.7	0.08	0.7
	Fifth quintile	0.25	2.1 **	0.27	2.2 **	0.27	2.3 **
Time, season, region, labour demand							
Time:	$Time/100$	5.26	1.9 *	5.33	1.9 *	5.38	1.9 *
(months)	$(Time/100)^2$	-16.26	1.7 *	-16.39	1.7 *	-16.49	1.7 *
	$(Time/100)^3$	19.74	1.6	19.85	1.6	19.93	1.6
	$(Time/100)^4$	-8.55	1.6	-8.59	1.6	-8.61	1.6
Season:	First quarter			Ref. group			
	Sec. quarter	-0.01	0.1	-0.02	0.2	-0.03	0.3
	Third quarter	-0.13	1.3	-0.12	1.2	-0.13	1.3
	Forth quarter	-0.45	4.3 ***	-0.47	4.4 ***	-0.48	4.5 ***
Region:	Berlin/Brandenburg	0.09	0.8	0.09	0.9	0.10	0.9
	Mecklenburg-Vorp.	0.32	2.8 ***	0.32	2.7 ***	0.32	2.8 ***
	Sachsen-Anhalt	0.09	0.9	0.10	1.0	0.11	1.0
	Thueringen	0.11	1.1	0.11	1.1	0.12	1.2
	Sachsen			Ref. group			
Vacancy-unemployment ratio		8.55	2.9 ***	8.76	2.9 ***	8.71	2.9 ***

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.
[b] Net equivalent household income, OECD equivalence scale.

Table C2. Coefficients of control variables - Women, Spec. 1 to 3[a]
Part I

		Specification (1)		Specification (2)		Specification (3)	
		Coef.	|t|	Coef.	|t|	Coef.	|t|
Personal characteristics							
Disability		-0.15	0.5	-0.16	0.6	-0.14	0.5
Married		0.08	0.8	0.08	0.8	0.08	0.8
Age:	≤ 21	0.56	2.5 **	0.55	2.5 **	0.55	2.5 **
	22 to 26	0.33	1.8 *	0.32	1.8 *	0.32	1.8 *
	27 to 31	0.26	1.8 *	0.26	1.8 *	0.26	1.8 *
	32 to 36			Ref. group			
	37 to 41	0.24	1.7 *	0.24	1.8 *	0.25	1.8 *
	42 to 43	-0.10	0.5	-0.06	0.3	-0.06	0.3
	44 to 48	0.01	0.1	0.07	0.4	0.06	0.3
	49 to 53	-0.31	1.6	-0.23	1.1	-0.25	1.2
	≥ 54	-1.14	5.0 ***	-1.04	4.1 ***	-1.07	4.2 ***
Numb. of children		0.02	0.3	0.02	0.3	0.01	0.2
Numb. of children younger than 6		-0.27	2.4 **	-0.28	2.5 **	-0.27	2.4 **
Owner of dwelling		0.00	0.0	0.00	0.0	0.00	0.0
Qualification, industry							
Qualif.:	No qualification	-0.27	1.5	-0.28	1.5	-0.28	1.6
	Voc. training			Ref. group			
	Technical college	0.54	4.9 ***	0.55	5.0 ***	0.55	5.0 ***
	University	0.50	2.9 ***	0.50	2.9 ***	0.50	2.9 ***
Industry:	Missing	-0.17	1.3	-0.17	1.3	-0.17	1.3
	Agr./forestry/fishing	0.50	3.0 ***	0.50	3.0 ***	0.51	3.0 ***
	Energy/mining/manuf.			Ref. group			
	Construction	0.02	0.1	0.02	0.1	0.02	0.1
	Trade	0.18	1.4	0.18	1.4	0.18	1.4
	Trans./comm.	-0.40	1.4	-0.40	1.4	-0.39	1.4
	Other services	0.05	0.4	0.05	0.4	0.04	0.4

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

TABLE C2. COEFFICIENTS OF CONTROL VARIABLES - WOMEN, SPEC. 1 TO 3[a]
PART II

		Specification (1)		Specification (2)		Specification (3)	
		Coef.	$\|t\|$	Coef.	$\|t\|$	Coef.	$\|t\|$
Past labour force status:							
Entry state	Employed/training/education			Ref. group			
	Other	-0.73	3.4 ***	-0.73	3.3 ***	-0.71	3.3 ***
Numb. of	Missing	0.16	1.1	0.16	1.1	0.16	1.1
unempl.	None			Ref. group			
spells	1	0.50	4.3 ***	0.50	4.2 ***	0.50	4.3 ***
in previous	2	0.91	5.3 ***	0.90	5.2 ***	0.89	5.1 ***
4 years:	> 2	1.31	6.0 ***	1.31	6.0 ***	1.32	6.0 ***
Cum. duration of unempl. spells/10		-0.32	4.1 ***	-0.33	4.3 ***	-0.32	4.2 ***
Position in the income distribution[b]							
	First quintile			Ref. group			
	Sec. quintile	0.05	0.4	0.06	0.5	0.06	0.5
	Third quintile	0.36	3.1 ***	0.36	3.1 ***	0.36	3.1 ***
	Forth quintile	0.19	1.4	0.19	1.4	0.19	1.4
	Fifth quintile	0.18	1.3	0.19	1.3	0.19	1.3
Time, season, region, labour demand							
Time:	$Time/100$	1.14	0.4	1.49	0.5	1.92	0.7
(months)	$(Time/100)^2$	-5.98	0.6	-7.31	0.7	-8.63	0.8
	$(Time/100)^3$	7.86	0.6	9.51	0.7	11.08	0.8
	$(Time/100)^4$	-3.49	0.6	-4.15	0.7	-4.78	0.8
Season:	First quarter			Ref. group			
	Sec. quarter	-0.26	2.4 **	-0.25	2.3 **	-0.25	2.3 **
	Third quarter	-0.12	1.1	-0.12	1.1	-0.12	1.1
	Forth quarter	-0.26	2.4 **	-0.30	2.7 ***	-0.30	2.7 ***
Region:	Berlin/Brandenburg	0.07	0.6	0.07	0.7	0.07	0.6
	Mecklenburg-Vorp.	0.07	0.5	0.08	0.6	0.08	0.6
	Sachsen-Anhalt	-0.06	0.5	-0.06	0.5	-0.05	0.4
	Thueringen	0.02	0.2	0.02	0.2	0.03	0.3
	Sachsen			Ref. group			
Vacancy-unemployment ratio		5.83	1.7 *	6.11	1.8 *	6.13	1.8 *

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.
[b] Net equivalent household income, OECD equivalence scale.

Appendix D: Gross wage equations and tax function

To compute an expected net wage, I proceeded as follows. I estimated the parameters of a Heckman selection model. The dependent variable was the logarithm of the monthly gross wage, and the estimation was carried out for men and women and each year separately. The samples include only respondents to the GSOEP-East who live in East Germany. They are restricted to males aged 16 to 64 years and females aged 16 to 59 years. In the GSOEP, the monthly gross and net wages are collected for the month prior to the interview. As determinants of the gross wages I regarded broad occupational qualification groups, experience and experience squared as well as some broad industry categories and the federal states. For women only, I added the covariate part-time employed as there are a considerable number of part-time employed women in the samples but nearly no part-time employed men. The covariates of the selection equation are age, disability, marital status, number of children, number of children younger than 6 years and federal state.

The coefficients of the wage equations are displayed in Tables D1 to D4.[21] Note that in many years a likelihood-ratio test as displayed in the last row of the tables rejects the hypothesis of no selectivity. I used the coefficients of the wage equations to predict the gross monthly wage in month prior to the modal interview month of a wave for the observations of the unemployment spell sample for each wave. Next, I computed from this information the gross monthly wage growth between two waves for each individual in the unemployment spell sample. In turn, this wage growth was used to compute an expected gross wage of the individuals for all the months between two subsequent waves of the GSOEP.

Table D5 presents the estimated parameters of a simple tax function. The dependent variable is the logarithm of the difference between monthly gross and net wages relative to the monthly gross wage. It is regressed on a set of year dummies, a non-linear function of the gross wage, marital status, number of children as well as public sector worker as these are relevant determinants of individual differences in taxation and contributions to the social security system. This tax equation is only a rough guide to an individual average tax rate. I did not attempt to simulate the details of the German tax and social insurance system. The regression was carried out for men and women separately for a pooled sample of respondents to the GSOEP-East over the period 1991 to 1999.

The net and gross wages in the first wave of the GSOEP-East were collected for a calendar month prior to the introduction of the German Economic, Monetary and Social Union, hence, when the tax system was still that of the German Democratic Republic. Consequently, I did not include observations of the first wave in the tax regression. The resulting individual tax rates from this regression were used to compute the expected individual monthly net wage for each calendar month in which a person

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[21]The coefficients of the selection equations are available on request.

in the spell sample was unemployed. For observations of the months between August and December 1990, I assumed that the predicted tax rates are those of the year 1991.

TABLE D1. COEFFICIENTS OF THE LOG GROSS MONTHLY WAGE EQUATIONS[a]
(RESULTS: HECKMAN-SELECTION MODEL, MEN 1990 TO 1995)

		Coefficients					
Year		1990	1991	1992	1993	1994	1995
	Constant	7.004 ***	7.306 ***	7.546 ***	7.541 ***	7.668 ***	7.747 ***
Human Capital:	No qualification	-0.198 ***	-0.156 ***	-0.142 *	-0.230 ***	-0.145 *	-0.123 ***
	Voc. training			Ref. group			
	Technical college	0.259 ***	0.254 ***	0.190 ***	0.272 ***	0.255 ***	0.288 ***
	University	0.321 ***	0.322 ***	0.330 ***	0.371 ***	0.390 ***	0.380 ***
	Experience	0.012 ***	0.007 *	0.009 *	0.024 ***	0.023 ***	0.021 ***
	(Experience/10)^2	-0.023 ***	-0.017 *	-0.017	-0.055 ***	-0.051 ***	-0.048 ***
Sector:	Agr./forestry/fishing	-0.199 ***	-0.213 ***	-0.221 ***	-0.192 ***	-0.262 ***	-0.172 ***
	Energy/mining/manuf.			Ref. group			
	Construction	0.007	0.175 ***	0.176 ***	0.078 ***	0.062 **	0.036
	Trade	-0.045	0.062 *	-0.020	-0.116 ***	-0.061	-0.109 ***
	Trans./comm.	0.056 **	0.019	0.007	-0.001	-0.016	0.014
	Other services	-0.006	-0.024	-0.057 **	0.020	0.004	0.020
Region:	Berlin/Brandenburg	0.041 **	0.071 ***	0.065 **	0.070 **	0.104 ***	0.068 **
	Mecklenburg-Vorp.	0.007	0.022	0.022	0.049	0.114 ***	0.036
	Sachsen-Anhalt	-0.008	0.038	0.016	0.053 *	0.027	0.018
	Thueringen	0.029	-0.004	-0.028	-0.024	-0.007	-0.014
	Sachsen			Ref. group			
	ρ	-0.224 *	-0.120	-0.133	0.482 **	0.159	0.249
	λ	-0.054 *	-0.038	-0.045	0.156 **	0.051	0.079
Number of observations		1,620	1,625	1,548	1,442	1,416	1,358
Number of censored observations		144	327	419	451	440	395
Log. of the likelihood		-332.6	-999.8	-1028.3	-868.4	-890.9	-841.4
LR-test statistic (H_0: no selectivity)		2.7	0.6	1.2	2.4	1.2	1.1

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

TABLE D2. COEFFICIENTS OF THE LOG GROSS MONTHLY WAGE EQUATIONS[a]
(RESULTS: HECKMAN-SELECTION MODEL, MEN 1996 TO 2000)

Year		1996	1997	1998	1999	2000
Constant		7.941 ***	7.851 ***	7.861 ***	8.062 ***	7.999 ***
Human Capital:	No qualification	0.048	0.057	0.072	0.096	0.180
	Voc. training			Ref. group		
	Technical college	0.288 ***	0.249 ***	0.232 ***	0.243 ***	0.233 ***
	University	0.361 ***	0.388 ***	0.349 ***	0.351 ***	0.408 ***
	Experience	0.010 *	0.019 ***	0.020 ***	0.004	0.007
	(Experience/10)^2	-0.019	-0.034 **	-0.031 **	-0.003	-0.010
Sector:	Agr./forestry/fishing	-0.226 ***	-0.345 ***	-0.308 ***	-0.258 ***	-0.367 ***
	Energy/mining/manuf.			Ref. group		
	Construction	-0.010	-0.048	-0.053 *	-0.039	0.000
	Trade	-0.105 ***	-0.083 *	-0.116 ***	-0.054	-0.092 **
	Trans./comm.	0.047	-0.007	0.012	0.036	0.048
	Other services	-0.008	-0.036	-0.009	0.019	0.042
Region:	Berlin/Brandenburg	0.103 ***	0.091 ***	0.130 ***	0.069 **	0.112 ***
	Mecklenburg-Vorp.	0.112 ***	0.134 ***	0.075 *	0.066	0.132 ***
	Sachsen-Anhalt	0.017	0.067 *	0.089 **	0.039	0.119 ***
	Thueringen	-0.026	0.031	0.046	0.001	0.078 **
	Sachsen			Ref. group		
ρ		-0.412 **	-0.321	-0.491 ***	-0.530 ***	-0.527 ***
λ		-0.130 **	-0.108	-0.165 **	-0.179 ***	-0.183 ***
Number of observations		1,333	1,332	1,283	1,194	1231
Number of censored observations		428	455	450	395	419
Log. of the likelihood		-834.5	-910.5	-861.1	-777.6	-810.4
LR-test statistic (H_0: no selectivity)		3.3 *	1.5	5.8 **	7.6 ***	10.4 ***

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

TABLE D3. COEFFICIENTS OF THE LOG GROSS MONTHLY WAGE EQUATIONS[a]
(RESULTS: HECKMAN-SELECTION MODEL, WOMEN 1990 TO 1995)

			Coefficients										
Year		1990		1991		1992		1993		1994		1995	
	Constant	6.807	***	6.984	***	7.159	***	7.320	***	7.463	***	7.441	***
	Part-time empl.	-0.490	***	-0.466	***	-0.390	***	-0.421	***	-0.438	***	-0.468	***
Human Capital:	No qualification	-0.178	***	-0.165	***	-0.308	***	-0.016		-0.142	*	-0.294	***
	Voc. training					Ref. group							
	Technical college	0.269	***	0.246	***	0.221	***	0.241	***	0.235	***	0.273	***
	University	0.410	***	0.373	***	0.474	***	0.501	***	0.497	***	0.513	***
	Experience	0.009	***	0.013	***	0.021	***	0.014	**	0.018	***	0.019	***
	(Experience/10)^2	-0.017	**	-0.024	**	-0.041	***	-0.020		-0.030	**	-0.031	**
Sector:	Agr./forestry/fishing	-0.111	***	-0.248	***	-0.117	*	-0.093		-0.126		-0.020	
	Energy/mining/manuf.					Ref. group							
	Construction	0.021		0.129	**	0.069		0.146	*	0.151	*	0.188	**
	Trade	0.014		0.079	***	0.003		0.020		-0.032		-0.072	
	Trans./comm.	0.065	**	0.097	**	0.126	**	0.228	***	0.232	***	0.126	*
	Other services	-0.019		-0.007		0.058	**	0.162	***	0.142	***	0.126	***
Region:	Berlin/Brandenburg	0.031		0.027		0.068	**	0.094	***	0.097	***	0.086	**
	Mecklenburg-Vorp.	0.041		0.026		0.110	***	0.060		-0.013		0.026	
	Sachsen-Anhalt	-0.010		0.002		0.034		0.002		-0.010		0.017	
	Thueringen	0.000		-0.013		0.017		0.004		0.001		-0.034	
	Sachsen					Ref. group							
	ρ	-0.658	***	-0.164		-0.115		-0.119		-0.127		0.192	
	λ	-0.189	***	-0.050	1.2	-0.037		-0.042		-0.043		0.071	
	Number of observations	1,620		1,625		1,548		1,442		1,416		1,358	
	Number of censored observations	144		327		419		451		440		395	
	Log. of the likelihood	-694.4		-1021.4		-1149.5		-1118.6		-1024.8		-1035.8	
	LR-test statistic (H_0: no selectivity)	14.3		1.5		0.8		0.3		0.6		2.1	

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

TABLE D4. COEFFICIENTS OF THE LOG GROSS MONTHLY WAGE EQUATIONS[a]
(RESULTS: HECKMAN-SELECTION MODEL, WOMEN, 1996 TO 2000)

Year		Coefficients				
		1996	1997	1998	1999	2000
Constant		7.503 ***	7.626 ***	7.590 ***	7.608 ***	7.568 ***
Human Capital:	Part-time empl.	-0.434 ***	-0.423 ***	-0.421 ***	-0.431 ***	-0.474 ***
	No qualification	-0.341 ***	-0.112	-0.157 *	-0.502 **	-0.214 ***
	Voc. training	Ref. group				
	Technical college	0.309 ***	0.294 ***	0.281 ***	0.240 ***	0.262 ***
	University	0.509 ***	0.515 ***	0.522 ***	0.449 ***	0.455 ***
	Experience	0.019 ***	0.014 **	0.019 ***	0.024 ***	0.025 ***
	$(\text{Experience}/10)^2$	-0.033 **	-0.020	-0.032 **	-0.046 ***	-0.047 *
Sector:	Agr./forestry/fishing	-0.153 *	-0.154	-0.127	-0.199 *	-0.180 *
	Energy/mining/manuf.	Ref. group				
	Construction	0.182 **	0.024	0.027	0.107	0.060
	Trade	-0.077 *	-0.104 **	-0.110 **	-0.080	-0.005
	Trans./comm.	0.126 **	0.093	0.052	0.086	0.107
	Other services	0.110 ***	0.051	0.047	0.068 ***	0.104
Region:	Berlin/Brandenburg	0.098 ***	0.088 **	0.108 ***	0.109 ***	0.104
	Mecklenburg-Vorp.	0.038	0.077	0.109 **	0.146 ***	0.100
	Sachsen-Anhalt	0.026	0.022	0.016	0.107 **	0.026
	Thueringen	-0.035	0.002	0.049	0.039	0.055
	Sachsen	Ref. group				
ρ		0.219 *	0.105	0.091 ***	-0.057	-0.003
λ		0.077 *	0.039	0.033 ***	-0.022	-0.001
Number of observations		1,333	1,332	1,283	1,194	1231
Number of censored observations		428	455	450	395	419
Log. of the likelihood		-976.9	-994.6	-915.0	-951.3	-905.3
LR-test statistic (H_0: no selectivity)		2.5	0.5	0.4	0.0	0.1

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.

44

TABLE D5. COEFFICIENTS OF THE TAX REGRESSION[a] [b]

		Men		Women	
		Coef.	$\|t\|$	Coef.	$\|t\|$
Tax equation					
	Constant	-4.308	35.7 ***	-2.809	18.2 ***
Year	1991		Ref. group		
	1992	0.0344327	2.8 ***	0.0655440	4.5 ***
	1993	-0.0101959	0.8	0.0286578	1.9 *
	1994	0.0195220	1.5	0.0634394	4.1 ***
	1995	0.0311201	2.3 **	0.0875371	5.6 ***
	1996	0.0679859	4.9 ***	0.0924656	5.7 ***
	1997	0.0735839	5.3 ***	0.1153183	7.0 ***
	1998	0.1019192	7.2 ***	0.1238964	7.5 ***
	1999	0.0839295	5.8 ***	0.1364751	8.0 ***
	Gross wage	-0.0000282	3.7 ***	0.0000684	4.9 ***
	$(\text{Gross wage})^2/10000$	0.0000010	0.5	-0.0000418	6.4 ***
	ln(gross wage)	0.3998615	22.2 ***	0.1668990	7.0 ***
	Married	-0.0521690	6.7 ***	0.1373352	16.0 ***
	Numb. of children	-0.0625601	17.0 ***	-0.0261334	5.9 ***
	Public sector worker	-0.0627515	8.3 ***	-0.0486954	6.3 ***
Number of observations		9,456		8,131	
Adjusted R^2		0.267		0.230	

[a] * 10 % significance level, ** 5 % significance level, *** 1 % significance level.
[b] Dependent variable: ln[(gross wage - net wage)/(gross wage)]