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# Benefit-Entitlement Effects and the Duration of Unemployment -
## An Ex-ante Evaluation of Recent Labour Market Reforms in Germany

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# Benefit-Entitlement Effects and the Duration of Unemployment

## An Ex-ante Evaluation of Recent Labour Market Reforms in Germany

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**Abstract:** We analyse benefit-entitlement effects and the likely impact of the recent reform of the unemployment compensation system on the duration of unemployment in Germany on the basis of a flexible discrete-time hazard rate model estimated on pre-reform data from the German Socioeconomic Panel. We find (i) relatively strong benefit-entitlement effects for the unemployed who are eligible to means-tested unemployment assistance after the exhaustion of unemployment benefit, but not for those without such entitlement; (ii) that benefit-entitlement effects on hazard rates are not monotonic in time to benefit-exhaustion but rather occur around the month of benefit-exhaustion, and (iii) relatively small marginal effects of the amount of unemployment compensation on the duration of unemployment. Simulation results show that the recent labour market reform is unlikely to have a major impact on the average duration of unemployment in the population as a whole, but will significantly reduce the level of long-term unemployment among older workers.

**JEL Classification**: J64, J65, H31

**Keywords:** unemployment duration, unemployment insurance, benefit-entitlement effects, German labour market reforms, ex-ante evaluation, hazard rate model.

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# 1 Introduction

Benefit-entitlement effects of unemployment insurance on the duration of unemployment have been the subject of much theoretical and empirical analysis in labour and public economics (for surveys see, e.g., Atkinson and Micklewright 1991, Krueger and Meyer 2002: 2334-2354). Both microeconomic models of individual labor supply and the theory of optimal job search imply that a more generous unemployment compensation system will increase the duration of unemployment (see, e.g., Moffitt and Nicholson 1982, Mortensen 1977). The economic rationale for this prediction is simple: Unemployment benefits act as a search subsidy, thus reducing the costs of leisure or increasing the reservation wage thus inducing the unemployed to search longer for a job. More specifically, as shown by Mortensen (1977), under some simplifying assumptions the simple job-search model implies that the hazard rate from unemployment is continuously increasing as the remaining benefit-entitlement decreases until the benefit-exhaustion point is reached, and remains constant thereafter.

Although these models are somewhat restrictive regarding their focus on the supply-side of the labor market, they have widely been used as a theoretical basis for the empirical analysis of benefit-entitlement effects on the duration of unemployment behavior (see, e.g., Meyer 1990, Katz and Meyer 1990). For Germany, benefit-entitlement effects also have been analysed in several previous empirical studies (e.g., Hunt 1995, Hujer and Schneider 1996, Steiner 1997, Wolff 2003, Fitzenberger and Wilke 2004). These studies used the successive extension of unemployment benefit entitlement periods that took place in the 1980s to estimate the effect of these changes on the duration of unemployment. Estimating simple hazard rate models, these studies established some evidence that this extension of benefit-entitlement periods increased the duration of unemployment, especially among the older unemployed for whom the extension of maximum entitlement was most pronounced (see section 2). Some of these studies also found that, compared to these entitlement effects, the effects of marginal changes in the income replacement ratio, i.e. the share of (previous) net earnings replaced by the amount of unemployment compensation, on the duration of unemployment are quite small.

All the studies mentioned above refer to the period before the recent major reform of the German unemployment compensation system, which partly was a reaction to the perceived disincentive problems related to two features of the previous fairly generous system: First, the rather long maximum unemployment benefit entitlement periods especially for older workers and, secondly, the generally unlimited eligibility for means-tested Unemployment Assistance after the expiration of the entitlement to Unemployment Benefit. Both of these regulations were changed by the recent reform, and the new rules became effective in 2005 and 2006, respectively. In particular, potential Unemployment Benefit

entitlement periods were cut, especially for the older unemployed, and Unemployment Assistance was changed into Unemployment Benefit II with, depending on previous earnings, a reduced benefit level and a tighter means test.

Since this reform has only recently become effective, its likely effects on the duration of unemployment in Germany can only be assessed based on an ex-ante evaluation. Christensen (2005) examines potential effects of the reform on the duration of unemployment by simulating the reservation wages on the basis of a non-stationary job search model for a couple of stylised households differently affected by the reform under various simplifying assumptions. Calibrating the model to an empirically estimated reservation wage elasticity of the hazard rate to employment of 2 % assumed the same for all groups, his simulations indicate that the reform will reduce unemployment by 200,000 to 250,000 persons. One limitation of this approach is that it does not adequately account for the fact that the effects of the analysed reform vary substantially across individuals, even for claimants with the same age and the same previous earnings. Another limitation is the rather restrictive model specification regarding benefit-entitlement effects on the hazard rate from unemployment.

The aim of this paper is to empirically assess the importance of benefit-entitlement effects and the likely impact of the mentioned recent reform on the duration of unemployment. For this purpose, we specify a flexible hazard rate model and estimate it on pre-reform data to simulate the likely effects of the recent policy reform on the duration of unemployment. In the next section, we provide some information on the German unemployment compensation system and the recent reform mentioned above. The empirical model is described in section 3, and estimation results are presented and discussed in section 4. These are then used in section 5 to simulate the effects of the recent reform on the completed duration of unemployment, and on long-term unemployment in particular. Our main results are summarised in section 6, which also concludes.

## 2 The German Unemployment Compensation System – Structure and Recent Reforms

Until the recent reforms of the German unemployment compensation system there were two types of unemployment benefits. Unemployment Benefit (UB, "*Arbeitslosengeld*"), which is funded by contributions of employers and jobholders, and Unemployment Assistance (UA, "*Arbeitslosenhilfe*"), which is funded from government revenues. While the former was granted for a certain number of months depending on the age and the duration of which contributions were made prior to the unemployment benefit claim, the latter was generally granted infinitely if a means-test was passed.

To be eligible for UB one had to meet a number of conditions. First, one had to be registered unemployed and to be available on short notice. The unemployed had to be at most 65 years and to accept any suitable job offer. Employees who quit their job or did not accept suitable job offers were sanctioned up to a length of 12 weeks. In 1995 the unemployed had to have worked for at least 12 months in the last three years. The possible length of UB then depended on the number of months worked in the last seven years and the age of the claimant. The ratio of months worked to the maximum number of months of UB receipt was 2:1. However, people younger than 42 years were only entitled to a maximum duration of 12 months, people younger than 44 to a length of 18 months and so on. The longest possible duration was 32 months for people older than 54 years, who had worked at least 64 months in the last seven years.

**Table 1. Changes in unemployment benefit entitlement periods over time by age and previous work experience**

| until April 1997 | | | from April 1997 until Jan 2006 | | | since Feb 2006 | | |
|---|---|---|---|---|---|---|---|---|
| length of entitlement to UB (months) | age | months worked in last seven years | length of entitlement to UB (months) | age | months worked in last seven years | length of entitlement to UB (months) | age | months worked in last seven years |
| 6 | - | 12 | 6 | - | 12 | 6 | - | 12 |
| 8 | - | 16 | 8 | - | 16 | 8 | - | 16 |
| 10 | - | 20 | 10 | - | 20 | 10 | - | 20 |
| 12 | - | 24 | 12 | - | 24 | 12 | - | 24 |
| 14 | 42 | 28 | 14 | 45 | 28 | | | |
| 16 | 42 | 32 | 16 | 45 | 32 | 15 | 55 | 30 |
| 18 | 42 | 36 | 18 | 45 | 36 | 18 | 55 | 36 |
| 20 | 44 | 40 | 20 | 47 | 40 | | | |
| 22 | 44 | 44 | 22 | 47 | 44 | | | |
| 24 | 49 | 48 | 24 | 52 | 48 | | | |
| 26 | 49 | 52 | 26 | 52 | 52 | | | |
| 28 | 54 | 56 | 28 | 57 | 56 | | | |
| 30 | 54 | 60 | 30 | 57 | 60 | | | |
| 32 | 54 | 64 | 32 | 57 | 64 | | | |

Source: Adapted from Wolff (2003), own extensions

In April 1997 the Employment Promotion Act increased the age limits by three years and reduced the maximum entitlement length for the most people older than 42. Those who became unemployed after April 1997 but had worked at least 12 months out of the last three years prior to the spell before April 1997 were entitled to UB according to the old regulation. Table 1 presents the exact regulations until March 1997 and from April 1997 to January 2006. It also shows the regulations that became effective

in February 2006. This reform tightened the criteria to eligibility for ALG. Now, to become eligible for UB one has to have worked for at least 12 months in the last two years (instead of three years). The maximum entitlement length depends on the number of months worked in the last three years (instead of seven). Also the age limit was increased again; from now on only individuals older than 55 years are possibly entitled to UB for more than 12 months. But even for this group the maximum length of entitlement decreased and is now 18 months.

For unemployed who already received UB in the last seven years (the last three years since February 2006) the period between the last and the new unemployment spell determines the entitlement length. The number of months worked in this shorter period divided by two yields the potential duration of UB receipt. Potential remaining months of UB entitlement from the last spell are added. Again the sum is limited by the maximum duration which is determined by the age of the individual (see Table 1). The amount of UB depends on the earnings in the former job and did not change since 1995. Individuals with children receive 67% of their former net income, individuals without children get 60%.

Until January 2005, people who were not eligible for UB could receive UA if they passed a means test that also included the income of all members of the household. It could either be received from the beginning of the unemployment spell (if people were not entitled to UB because of their work-history) or after the claimant had exhausted his UB benefits (Wolff, 2003). It was in principle unlimited, but only granted for a year and then prolonged every year if another means-test was passed and the claimant was younger than 65 years. The replacement ratio was 57% (53% without children) of the former net earnings.

In January 2005, UA was integrated with Social Assistance to a new form of assistance called UB 2. It is still means-tested and principally granted infinitely. However, the amount does not depend on the former net income of the unemployed individual anymore, but on the requirements of the household ("Bedarf"), as the social assistance already did before. The basic allowance for the household is calculated depending on the number and age of the household members. Adequate rents and heating costs are added, where the definition of "adequate" differs between regions. The UB 2 is this sum deducted by received child allowance ("Kindergeld") and net income of any household member less an amount of exemption.

The data used for the empirical analysis refer to the period 1995 to 2003 and hence do not cover the recent reform's impact on the behaviour of the unemployed. However, for an ex-ante evaluation of these reforms, the hypothetical benefits and maximum entitlement durations are computed according to the new regulations.

# 3 Empirical Model

## 3.1 Hazard Rate Model

We model the transition from unemployment to, respectively, employment and out-of-the-labour-force using a discrete-time hazard rate approach.[1] We use a discrete-time hazard rate model because the duration of unemployment and benefit receipt are coded on a monthly basis in our data (see section 3.2). The specification of the hazard rate model closely follows Steiner (2001), although the focus here is on the effects of regulations concerning unemployment compensation on the hazard rate from unemployment.

Let $T_{ik}$ denote the length of the $k^{th}$ unemployment spell of individual i and be assumed to be a discrete non-negative random variable. It takes on the value t if the unemployment spell ends in interval $[I_{t-1},I_t)$ with one of the two exit states. The hazard rate, $\lambda_{ij}^{k}(t)$, is the conditional probability of transition from unemployment to the exit state j in interval t, given the individual has been unemployed until the beginning of this interval.

$$(1) \qquad \lambda_{ij}^{k}\left(t\left|x_i(t),\varepsilon_i^m\right.\right)=P\left(T_{ik}=t,\Omega=j\left|T_{ik}\geq t,x_i(t),\varepsilon_i^m\right.\right),$$

where $j$ = 1 is transition to employment, $j$ = 2 transition to out-of-the-labour-force, and $x_i$(t) denote the vector of covariates of individual $i$ in interval $t$. In addition to a set of control variables, such as individual characteristics, indicators of an individual's previous labour market history, and the regional unemployment rate, $x_i$(t) also includes unemployment benefit variables, as described in the next section.

The time–invariant individual effect, $\varepsilon_i^m$, accounts for unobserved population heterogeneity in the hazard rates and is assumed to come from an arbitrary discrete probability distribution with a small number of mass points, $m$=1, 2, ... M:

$$(2) \qquad E(\varepsilon_i)=\sum_{m=1}^{M}P(\varepsilon_i^{\mathrm{m}})\varepsilon_i^{\mathrm{m}}=0;\ \sum_{m=1}^{M}P(\varepsilon_i^{\mathrm{m}})=1;\quad E(\varepsilon_i^m x_i(t))=0,\ \forall\ m\ (m=1,2,...\mathrm{M}).$$

These mass points and their probabilities, $P(\varepsilon_i^m)$, which can be interpreted as the respective proportion of the unemployed in the sample belonging to a particular heterogeneity group, are simultaneously

[1] Full-time work, part-time work, temporary work, and vocational training are grouped to the state "employment", while all other states except for unemployment are grouped to "Out-of-the-labour-force". The latter are for example retirement, education or working at home.

estimated with the parameters of the model. The time-invariant individual effect $\varepsilon_i^m$ is assumed to be uncorrelated with the set of explanatory variables in the model, $x_i(t)$.

The overall hazard rate from unemployment is the sum of the two state-specific hazard rates, assumed they are independent, conditional on the vector of covariates and the individual effect, $\varepsilon_i^m$:[2]

$$(3) \qquad \lambda^k\left(t\middle|x_i(t),\varepsilon_i^m\right)=\sum_{j=1}^{2}\lambda_j^k\left(t\middle|x_i(t),\varepsilon_i^m\right)$$

Hence, the conditional probability of remaining unemployed in interval t, given the spell has already lasted until t-1 is

$$(4) \qquad P\left(T_{ik}>t\middle|T_{ik}\geq t,x_i(t),\varepsilon_i^m\right)=1-\lambda^k\left(t\middle|x_i(t),\varepsilon_i^m\right)$$

The survivor function is the unconditional probability of still being unemployed after the end of interval *t*. It is the product of the probabilities of remaining unemployed in all previous periods until t:

$$(5) \qquad S^k\left(t\middle|x_i(t),\varepsilon_i^m\right)=P\left(T_{ik}>t\middle|x_i(t),\varepsilon_i^m\right)=\prod_{\tau=1}^{t}\left(1-\lambda^k\left(\tau\middle|x_i(\tau),\varepsilon_i^m\right)\right)$$

Finally, the unconditional probability that individual *i* leaves unemployment in interval *t* into state *j* can be expressed in terms of the hazard rate as:

$$(6) \qquad P\left(T_{ik}=t\middle|x_i(t),\varepsilon_i^m\right)=\lambda_j^k\left(t\middle|x_i(t),\varepsilon_i^m\right)\prod_{\tau=1}^{t-1}\left(1-\lambda^k\left(\tau\middle|x_i(\tau),\varepsilon_i^m\right)\right)$$

The specification of the hazard rate is a multinomial logit with the three alternatives unemployment, employment and out-of-the-labour-force.

$$(7) \qquad \lambda_{ij}^k\left(t\middle|x_i(t),\varepsilon_i^m\right)=\frac{\exp(\alpha_j(t)+\beta_j'x_i(t)+\varepsilon_i^m)}{1+\sum_{l=1}^{2}\exp(\alpha_l(t)+\beta_l'x_i(t)+\varepsilon_i^m)},$$

where $\alpha_j(t)$ denotes the baseline hazard which is common to all individuals and depends only on elapsed spell time. In the empirical model we specify the baseline hazard by a set of dummy variables, with the first month as the base category, and beginning with the fifth and sixth months variables are grouped to get sufficient exits from unemployment within each category. The coefficients can be

[2] Of course, without conditioning on the individual effect transitions into the two states will be correlated.

interpreted as means of the respective category but refer to a single month within the group (see Steiner, 2001). Due to the inclusion of the error component $\varepsilon_i^m$, the multinomial logit specification does not imply the IIA assumption, i.e., the effect of some component in $x_i(t)$ on the relative odds-ratio between two alternatives, e.g.. unemployment and employment, does depend on the presence of other alternatives, the out-of-the-labour-force state in this case.

With the multinomial logit specification, the survivor function can be rewritten to

$$S_k^u\left(t_i \mid x_i(t), \varepsilon_i^m\right) = \prod_{\tau=1}^{t-1} \frac{1}{1+\sum_{l=1}^{2} \exp\left(\alpha_l(\tau) + \beta_l' x_{il}(\tau) + \varepsilon_i^m\right)} \tag{8}$$

For completed spells the likelihood contribution is given by (6), and by the survivor function in (8) for a right-censored spell. Introducing the indicator variable $\delta_{ijk}$ with is 1 if the *k*-th unemployment spell of individual j ends in state j (0 otherwise), and $c_{ik}$ which takes on the value 1 if the *k*-th spell of individuals i is right-censored (0 otherwise), the maximum likelihood function is given by (Steiner, 1997):

$$\begin{aligned} L = \prod_{i=1}^{n} \sum_{m=1}^{M} P(\varepsilon_i^m) \prod_{k=1}^{K_i} \prod_{j=1}^{2} \left[ \frac{\exp\left(\alpha_j(t) + \beta_j' x_{ij}(t) + \varepsilon_i^m\right)}{1+\sum_{l=1}^{2} \exp\left(\alpha_l(t) + \beta_l' x_{il}(t) + \varepsilon_i^m\right)} \right]^{\delta_{ikj}} \\ \times \prod_{\tau=1}^{t-1} \frac{1}{1+\sum_{l=1}^{2} \exp\left(\alpha_l(\tau) + \beta_l' x_{ij}(\tau) + \varepsilon_i^m\right)} \end{aligned} \tag{9}$$

where *n* is the number of individuals in the sample, and $K_i$ the number of spells of individual i. This function is maximized with respect to the coefficients on the baseline hazard, $\alpha_j$, the coefficients on the explanatory variables, $\beta_j$, and the mass–points together with the corresponding probabilities, $P\left(\varepsilon_i^m\right)$, taking into account the restrictions on the individual effects given in equation (2) above by standard numerical optimization procedures.[3]

### 3.2 Data and Variables

The data base for the empirical analysis is the German Socioeconomic Panel (SOEP), which started in 1984 in West Germany with 12,245 persons and 5,912 households. Since then, the sample has been

[3] The Stata programme gllamm version 2.3.10. was used for the estimations (see Rabe-Hesketh and Skrondal 2004).

continuously followed up every year. In June 1990 it was extended to include East Germany with 2,179 households and 4,453 persons. There were refreshments in 1998 and 2000, resulting in a sample size of 24,586 adult individuals living in 13,258 households that participated in the SOEP survey in 2000 (Schupp and Wagner 2002).

**Constructing Unemployment Spells from Calendar Data in the SOEP**

The SOEP contains retrospective monthly calendar information on the labour force status of the previous year (there are 14 different states). We restrict the sample to unemployment spells that started between January 1995 and December 2003 using retrospective information of the waves from 1996 to 2004. Spells that have not been finished in December 2003 are treated as right-censored in the empirical analysis. We use information of the GSOEP given in the waves from 1988 to 2004 because the work history up to seven years prior to the spell is needed to compute the eligibility for ALG, as described in section 2. In addition to getting a sufficient number of spells, the period 1995 to 2003 spans various macroeconomic conditions and also includes some regulatory changes in 1997 concerning the length of entitlement to UB (see section 2). Spells that are left censored are left out because there is no information available on the length the respective person is already unemployed, which might lead to biased parameter estimates. Unemployment duration is coded on a monthly basis. We distinguish between two transitions from unemployment, employment and out-of-the-labour-force. Spells of unemployed aged 58 years and more are excluded due to a different search behaviour (for example because of early retirement regulations). Spells are also dropped if information on one or more covariates required for the subsequent analysis was missing, or if there was no full information on the work history for at least three years prior to the spell to compute eligibility for unemployment insurance benefits. Information on the number of excluded spells and exit states of the spells that enter the analysis is given in Table 2. There is a total of 10,193 spells between 1995 and 2003.

The variables representing the unemployment insurance system are the remaining months of entitlement to UB and the income-replacement ratio. Both of them are time-varying covariates, that is, they may take on different values for the same spell but at different points of time. They are not directly available in the SOEP and have to be computed, as described below.

**Table 2. Construction of unemployment spells**

| | Men | | Women | | Total |
|---|---|---|---|---|---|
| | West | East | West | East | |
| Spells between 1995 and 2003 | 3194 | 2361 | 2510 | 2071 | 10193 |
| Spells dropped: | | | | | |
| Left censored | 349 | 162 | 242 | 211 | 992 |
| Work history Information missing | 169 | 103 | 135 | 59 | 483 |
| 58 years and older | 179 | 130 | 98 | 62 | 469 |
| Covariates missing | 250 | 184 | 244 | 211 | 900 |
| Spells used | 2247 | 1782 | 1791 | 1528 | 7348 |
| Individuals | 1451 | 972 | 1307 | 882 | 4612 |
| Person-month-Data | 21349 | 14882 | 17586 | 18445 | 72262 |
| Exit to | | | | | |
| Employment | 1534 | 1302 | 1043 | 982 | 4861 |
| Out-of-the-labour-force | 273 | 206 | 358 | 257 | 1094 |
| Right-censored | 440 | 274 | 390 | 289 | 1393 |
| Average duration of spell (months) | 9.50 | 8.35 | 9.82 | 12.07 | 9.83 |

Source: German Socioeconomic Panel (SOEP), waves 1995-2003, own calculations.

### Computation of Remaining Benefit-Entitlement

To identify possible spikes in the hazard at the end of entitlement to UB, we construct a set of dummy variables indicating the remaining months of entitlement to UB at each month of unemployment by deducting the elapsed spell duration from the potential entitlement duration. There are two possible ways to determine an individual's potential benefit-entitlement period from the information provided in the SOEP: First, for persons whose unemployment duration is longer than the duration of UB receipt it can be assumed that their entitlement to UB ended during the spell, and that the duration of UB receipt equals their entitlement duration. This procedure is not possible for persons who left unemployment although they still received UB in the last month. To be sure that UB entitlement really expired before the end of unemployment, the duration of unemployment has to be at least one month longer than the duration of benefit receipt. It should even be at least two months longer, because there might be claimants that did not receive UB in the first month of unemployment due to sanctions or a short waiting period.

**Table 3. Information on previous labour market state for the computation of entitlement to UB**

| Information on previous labour market state | Number of spells | % |
|---|---|---|
| (1) Full Information for seven years prior to the spell begin | 3030 | 41.24 |
| (2) Full Information for seven years when using tenure | 1302 | 17.72 |
| Only full information for the last three years: | | |
| (3) Enough information to detect maximum entitlement duration | 752 | 10.23 |
| (4) Not eligible | 516 | 7.02 |
| (5) Eligible, assigned to the maximum duration | 284 | 3.86 |
| (6) Not enough Information but original value observed | 288 | 3.92 |
| (7) Multiple Spell | 307 | 4.18 |
| (8) corrected to observed value | 459 | 6.25 |
| (9) corrected to 0 | 410 | 5.58 |
| Total | 7348 | 100.00 |

Source: German Socioeconomic Panel, waves 1995-2003, own calculations.

Since the unemployment duration exceeds the duration of benefit receipt by two months for only about half of all spells in our data, and in order to be able to perform the ex-ante simulations of the recent policy reform described below, we compute the potential benefit-entitlement duration using the information on the work history seven years prior to the spell and the age of the unemployed according to Table 1 in section 2. Thereby, we also take into account the regulatory change in April 1997 including the transition period described in section 2. For about 37% of all spells the entitlement durations were computed according to the regulations before the change. Most of these spells began after April 1997 but were treated according the rules before the change due to the transition period.

Table 3 summarizes the information available in the SOEP used to construct the entitlement variable. For 483 spells information on labour market status for the last three years previous was insufficient to construct the entitlement variable; these spells had therefore to be dropped from the subsequent analysis. In order not to lose too many observations, another 284 spells without sufficient information but observable duration of UB receipt were assigned to the observed duration. If the duration of UB receipt coded in the SOEP exceeded an individual's computed potential duration, the observed value was used. On the other hand, computed UB entitlement was set to zero if no UB receipt for the person was coded in the data and the length of the unemployment spell exceeded two months. The main reason for this discrepancy seems to be measurement error, suspension of UI up to 3 months because of resignation of the job or not accepting a suitable job offer.

**Computation of the Income-Replacement Ratio**

The income-replacement ratio (IRR) is defined as the amount of UB received divided by an individual's potential net earnings if she took up a job. This counterfactual is computed in three steps. First, we estimate for each unemployed expected hourly wages on the pooled sample of the SOEP for the years 1995 to 2004 accounting for potential selectivity-bias using the two-step Heckman (1979) procedure. The wage equations and the selection equations are estimated separately for men/women and east/west, regression results are reported in Table A1 in the appendix. Instruments in the participation equation are education, experience, reduction in earning capacity, nationality, marital status, children, region, and other household income. As in the wage equations, experience is divided into years of full-time and part-time employment for women. From these selectivity-corrected wage equations we derive expected gross hourly wages, conditional of being non-employed. Since the variance of estimated wages is much lower than the variance of observed wages we adjust the former by adding a stochastic term to expected wages of the unemployed, where this error term is drawn form the residuals between observed and predicted wages. Potential gross earnings are computed by multiplying the estimated conditional gross hourly wage by four times the number of weekly working hours. It is assumed that individuals who worked full-time before are willing to work full-time in the new job, while individuals who used to work part-time, also want to work part-time in their future job. Further assuming that individuals do not change industry, we have calculated the average working hours of full-time and part-time employed people in each industry by gender and regions (east and west Germany) and assigned each individual the number of expected working hours to calculate gross earnings per calendar year. The last step is to estimate the net wage on the basis of the derived gross wage and a few control variables. This is done by means of a simple tax function, where the log of the gross-net wage differential is regressed on a polynomial in the gross wage, some characteristics known to affect the tax rate due to special legislation in the tax code and year dummies (see Table A2 in the Appendix).

Dividing the amount of UB or UA per month by monthly net earnings yields IRR exceeding one for some individuals implying that they receive higher benefits than they would be able to earn if took up a job. One reason for this might be that our procedure to compute expected wages does still not well predict very high wages. That is, an unemployed who could get a very high wage if he would take up a job could be assigned a predicted wage that is only one third of the real potential wage. Even if one takes into account the social insurance contribution ceiling that results in benefits lower than 60-67% of the former net wage (in case of UB), the replacement rate could be rather high. To avoid bias due to

measurement errors of the numerator (the benefits), we excluded 187 spells with replacement rates of more than 1.5.

Since the SOEP only contains information on the average amount of UB or UA received during a year, we have to allocate this amount to particular months within that year. Following Wolff (2003) we assume that if a person received UB for *n* months, she received it during the first *n* months of the unemployment spell. If she also received UA in the same year, it is assumed that it is received after UB entitlement is exhausted. For people who are not entitled to UB but receive UA we assume that entitlement to the latter starts at the beginning of the spell. For a number of people, the length of unemployment exceeds the length of UB receipt by one month in a given calendar year – e.g. a person is unemployed from June until December in the year 1999, but the duration of benefit receipt in 1999 is only six months. In this case it is sometimes difficult to distinguish whether they were not eligible for UB anymore in the last month and left unemployment then or if they did not receive benefits in the first month due to sanctions or some type of rounding error[4] but were still entitled when they left unemployment. This is important because we want to identify the effect the last months of UB entitlement has on an individual's probability to leave unemployment. For people who are still unemployed and receive UB in the following year we assumed that they did not receive UB in the first month of their spell but in the last month of the last year. If UB is not received in the following year, we assume that entitlement ended in the last month. For people who are not unemployed in the following year, it is assumed that they did receive UB benefits in the first month of their spell and ran out of entitlement in the last month, because this is supposed to be the regular case.

To analyse if there is a different impact of UB receipt than of UA on the behaviour of the unemployed, we use two different replacement rates. The first one, "replacement UB", takes on the value of the replacement rate if the person receives UB and zero if he either receives UA or no benefits at all. The second one, "replacement UA" takes on the value of the replacement rate if the individual receives UA and zero in case of UB receipt or no entitlement to any of these two. They can also be seen as interaction terms between the replacement rate and a binary variable that indicates the receipt of UB or UA. To account for non-linear effects of the replacement rate on the hazard rate, the squares of both interaction terms will also be included in the regression.

[4] Because the data are grouped to monthly observations, while they are calculated on a daily basis in reality.

**Structure of Unemployment Compensation**

Table 4 summarizes relevant information on the variables used to describe the structure of unemployment compensation in the subsequent empirical analysis.

**Table 4. Descriptive statistics on variables concerning unemployment and the UI system**

| | Men | | Women | | Total |
|---|---|---|---|---|---|
| | West | East | West | East | |
| Average entitlement to UB (months) | 9.20 | 10.53 | 8.68 | 9.02 | 9.36 |
| Maximum UB entitlement period | | | | | |
| 0 months | 31.73% | 24.19% | 36.01% | 31.41% | 30.88% |
| 1-6 months | 7.12% | 9.88% | 4.91% | 11.39% | 8.14% |
| 7-12 months | 45.62% | 43.88% | 45.00% | 39.33% | 43.74% |
| 13-18 months | 3.56% | 5.39% | 4.08% | 5.10% | 4.45% |
| > 18 months | 11.97% | 16.67% | 9.99% | 12.76% | 12.79% |
| (1) UB received | 64.89% | 74.41% | 58.12% | 67.28% | 66.05% |
| (2) UB exhausted (of 1) | 29.90% | 22.78% | 35.16% | 36.38% | 30.46% |
| (3) UA after exhaustion of UB (of 2) | 46.79% | 59.27% | 36.61% | 66.31% | 51.76% |
| (4) Neither UB nor ALH | 27.33% | 15.77% | 33.61% | 20.16% | 24.56% |
| Mean amount of UB ( > 0) | 831.61 | 721.43 | 544.21 | 595.67 | 684.25 |
| Mean amount of UA ( > 0) | 608.04 | 557.23 | 444.67 | 430.31 | 509.34 |
| Mean Potential Net Income | 1313.27 | 1075.38 | 881.52 | 877.67 | 1048.07 |
| Mean Potential Net Income (at begin) | 1340.94 | 1103.26 | 908.05 | 886.76 | 1083.46 |
| Income Replacement Ratio, IRR | 0.40 | 0.54 | 0.38 | 0.48 | 0.44 |
| IRR (> 0) | 0.57 | 0.64 | 0.59 | 0.62 | 0.60 |
| IRR if received UB | 0.62 | 0.67 | 0.64 | 0.69 | 0.65 |
| IRR if received UA | 0.50 | 0.57 | 0.52 | 0.53 | 0.53 |

Source: German Socioeconomic Panel, waves 1995-2003, own calculations.

In the observation period, men in east Germany have been more likely to be eligible for both UB and ALH, and they have longer maximum entitlement durations. Roughly 30% of all unemployed are not eligible for ALG, whereas about 43% have a maximum entitlement duration of 7-12 months. The latter results from the majority of unemployed being entitled to UB for a maximum of 12 months. As could be expected, men in west Germany have the highest potential net income and amount of both UB and UA. While their amount of UB exceeds that of men in east Germany by about 15%, the potential net income is even 22% higher. This leads to a lower replacement rate for men in the west compared to those in east Germany. Women have much lower amounts of UB and UA due to lower average hourly wages and part-time work, which is seldom chosen by men. The higher amount of UB for women in

East Germany than in West Germany could result from higher average hours in the former job (37.9 hours compared to 34.5), that is, from more part-time work in west Germany. Nevertheless, women in west Germany have higher potential net wages, again resulting in lower replacement rates. The potential net income in the first month of the spell is higher than the average over all months. This reflects lower possible wages due to human capital depreciation as spell time elapses. But also that those with the chance for higher wages leave unemployment earlier.

**Control variables**

In addition to unemployment variables, we include a number of variables that control for differences in individual characteristics and other observed factors affecting individual unemployment behavior through their effects on reservation wages, job offer arrival rates and wage offer distributions. These include personal characteristics, indicators of household composition, human capital variables and indicators for the state of the aggregate labor market. Human capital variables include education and position in the last job, and previous unemployment experience. Some of these variables, e.g. the regional unemployment rate, not only depend on process time, i.e. the month of the unemployment spell, but also on historical time. We also include a “December dummy” to account for "heaping effects", i.e. the disproportionate number of spells ending in December due to "rounding errors" of interviewees' responses in the calendar data (see Hunt 1995, Kraus and Steiner 1997). Means of control variables are contained in Table A1 in the appendix.

# 4 Estimation Results

The regressions are carried out separately for men and women in east and west Germany because there are still marked differences by gender and in the structure of the labour markets between the two regions. Before we discuss estimation results concerning the variables describing the unemployment compensation system we briefly comment on estimation results in general. Detailed estimation results are reported in Table A4 for men and Table A5 for women in the Appendix. Since the focus of the analysis is on the effects of the unemployment compensation system on these hazard rates, we will not discuss estimation results for the control variables here. Although we include a fairly large number of control variables in the hazard rate models, unobserved heterogeneity remains quantitatively important.

Statistical tests based on the Akaike Information Criterion (AIC)[5] have shown that two heterogeneity groups, i.e. mass points, are sufficient to account for remaining unobserved heterogeneity for men and women in west Germany, whereas three mass points are required for both men and women in east Gemany. These mass points and their probabilities are reported at the bottom of Tables A4 and A5, respectively. Except for the coefficients of the baseline dummies, controlling for unobserved heterogeneity had very little effect on the parameter estimates, however. Estimation results for the unemployment compensation variables defined in the previous section are summarised in Table 5.

Estimated coefficients on the remaining benefit-entitlement dummies are to be interpreted relative to the base category, which is remaining entitlement of more than 19 months. Differences in the coefficients of two remaining entitlement categories show the effect of the transition from one category to the other one on the hazard rate to the respective exit state. As described in section 3, entitlement durations do not only differ by age and previous labour market experience, but also by entry cohort due to the regulatory changes of April 1997 and the special regulations for multiple UB receipt within the base periods.

A "real" entitlement effect would imply that coefficients on the entitlement dummies are monotonically increasing as remaining entitlement duration decreases. As shown in Table 5, there seems to be no strictly monotonic relation between the hazard rate from unemployment neither to employment nor out-of-the-labour force. For example, the coefficient of the 3-4 months remaining entitlement dummy is higher than the one indicating a remaining period of two months in some cases.

However, the hazard rate from unemployment to employment increases significantly for most groups close to benefit-exhaustion. For example, for men in west Germany the coefficient on the remaining entitlement dummy increases from about 0.19 to 0.47 when the unemployed moves form one remaining month of UB entitlement to the month when UB is exhausted, i.e. to zero month of remaining benefit entitlement. Similar effects of benefit exhaustion on the hazard rate to employment are also obtained for east German men and for women in both regions. There is also a strong effect of UB exhaustion on the hazard rate to out-of-the-labour force for women, especially in east Germany. This indicates that some of the unemployed wait until exhaustion of UB eligibility until they take up a new job or drop out of the labour force.

[5] Defined as AIC = ln*lik* – k, where *k* is the number of parameters and ln*lik* is the log likelihood of the model at its maximum. The decision rule is to take the model with the highest AIC.

**Table 5. Estimated effects of unemployment compensation on hazard rates to employment and out-of-the-labour force by gender and region**

| | Men - West | | Men - East | | Women - West | | Women - East | |
|---|---|---|---|---|---|---|---|---|
| | Employment | Out-of-the-labour-force | Employment | Out-of-the-labour-force | Employment | Out-of-the-labour-force | Employment | Out-of-the-labour-force |
| Not entitled to UB | 0.129 | 0.534 | 0.115 | 1.863 | 0.367 | -0.035 | 0.233 | 0.648 |
| | (0.75) | (1.97)* | (0.55) | (3.89)*** | (1.87) | (-0.10) | (0.94) | (1.42) |
| Remaining Entitlement: | | | | | | | | |
| < 0 Months | 0.985 | 1.364 | 0.847 | 2.244 | 1.150 | 1.102 | 1.101 | 1.304 |
| | (5.81)*** | (4.49)*** | (4.01)*** | (4.70)*** | (5.60)*** | (3.03)** | (4.54)*** | (2.91)** |
| 0 Months | 0.47 | 0.885 | 0.699 | 1.821 | 0.928 | 0.912 | 0.732 | 1.322 |
| | (1.92) | (1.69) | (2.78)** | (2.78)** | (3.23)** | (2.25)* | (2.59)** | (2.64)** |
| 1 Month | 0.189 | 0.692 | 0.561 | 2.071 | 0.538 | 0.322 | 0.375 | -0.019 |
| | (0.74) | (1.23) | (2.25)* | (3.56)*** | (1.88) | (0.71) | (1.30) | (-0.03) |
| 2 Months | 0.005 | 0.836 | 0.169 | 2.261 | 0.317 | 0.127 | 0.488 | 1.031 |
| | (0.02) | (1.58) | (0.65) | (4.22)*** | (1.07) | (0.28) | (1.74) | (2.11)* |
| 3-4 Months | 0.462 | 0.666 | 0.157 | 1.952 | 0.626 | 0.832 | 0.446 | -0.264 |
| | (2.42)* | (1.49) | (0.78) | (4.59)*** | (2.93)** | (2.21)* | (1.88) | (-0.53) |
| 5-6 Months | 0.603 | 0.419 | 0.300 | 0.666 | 0.495 | 0.523 | 0.163 | 0.148 |
| | (3.5)*** | (1.04) | (1.57) | (1.21) | (2.41)* | (1.39) | (0.69) | (0.34) |
| 7-8 Months | 0.398 | 0.642 | 0.147 | 1.761 | 0.674 | 0.283 | 0.006 | -0.004 |
| | (2.31)* | (1.73) | (0.78) | (3.77)*** | (3.26)** | (0.72) | (0.02) | (-0.01) |
| 9-12 Months | 0.579 | 1.546 | 0.298 | 1.615 | 0.744 | 0.138 | 0.185 | 0.12 |
| | (3.84)*** | (6.26)*** | (1.81) | (4.05)*** | (4.40)*** | (0.40) | (0.84) | (0.29) |
| 13-18 Months | 0.097 | 0.632 | 0.053 | 0.480 | 0.490 | -0.158 | 0.470 | 0.121 |
| | (0.45) | (1.74) | (0.33) | (0.78) | (2.06)* | (-0.36) | (2.01)* | (0.26) |
| Income Replacement Rate (IRR) | | | | | | | | |
| IRR × received UB | -2.131 | -2.457 | -1.467 | -1.416 | -2.078 | -2.283 | -1.166 | -1.365 |
| | (-6.27)*** | (-3.17)** | (-3.75)*** | (-1.42) | (-5.11)*** | (-3.74)*** | (-2.69)** | (-1.51) |
| (IRR × received UB) squared | 1.476 | 1.302 | 0.758 | 0.198 | 1.379 | 0.951 | 0.726 | 0.715 |
| | (4.88)*** | (1.52) | (2.45)* | (0.21) | (4.26)*** | (1.69) | (2.24)* | (1.05) |
| IRR × received UA | -5.114 | -5.182 | -3.453 | -5.86 | -4.315 | -8.298 | -3.669 | -2.975 |
| | (-9.87)*** | (-5.41)*** | (-5.99)*** | (-5.36)*** | (-7.6)*** | (-6.66)*** | (-6.90)*** | (-3.03)** |
| (IRR. × received UA) squared | 3.89 | 3.245 | 2.194 | 4.375 | 2.686 | 5.099 | 2.587 | 0.642 |
| | (6.6)*** | (3.36)*** | (3.51)*** | (3.99)*** | (4.76)*** | (4.24)*** | (4.77)*** | (0.53) |

Notes: For full estimation results see Tables A4and A5 in the Appendix. t-values are given in parantheses; * p<0.05, ** p<0.01, *** p<0.001.

After benefit exhaustion (remaining entitlement < 0 months), the hazard rate from unemployment to employment, and to a lesser degree also to out-of-the-labour-force, seems to increases further. However, to compare these two months one also has to consider the effects induced by changes in the income replacement ratio (IRR) as well. Since the unemployed could be entitled to Unemployment Assistance after exhaustion of the UB, the IRR need not drop to zero but could take on a positive – if lower – value. It is therefore important also to account for this effect when simulating the total effect of changes in unemployment compensation on the hazard rate from unemployment.

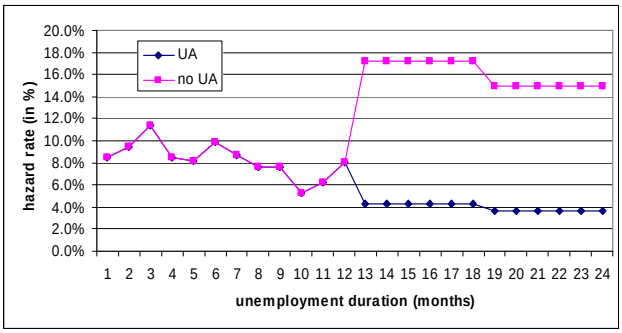
Estimated coefficients of the IRR interaction variables described in the previous section are summarised in the lower part of Table 5. The interaction terms between the IRR and the dummy variables for, respectively, entitlement to UB and UA on the hazard rate to both employment and out-of-the-labour-force are negative for all groups, as expected, and statistically significant in most cases. The positive sign of the coefficients on the squared interaction terms may seem unexpected at first sight, because it indicates that the negative effect of the amount of UB received on the hazard rate from unemployment is diminishing in its level. However, the relative size of estimated coefficients on the respective interaction term and its square implies that the overall effect remains negative as long as the IRR is smaller than about 0.75, which is the case for almost 90% of all observations. The estimates have the plausible implication that an increase in UB at low levels of the IRR has a stronger negative effect on the hazard rate than at high levels, at least up to an IRR of about 75%. For UA estimated coefficients imply marginal effects that are much higher (in absolute values) and decrease faster than for UB receipt, with the sign of the total effect turning positive for only about 5% of all observations.

To compute the effects of unemployment compensation on hazard rates over the duration of the the unemployment, the effect of the remaining UB-entitlement period in each month as well as the impact of changes in the IRR on the hazard rate have to be considered. Furthermore, because of the non-linearity of the hazard rate, the impact of the benefit-entitlement variables and the IRR will also depend on its level, changes in the baseline hazard rate also have to be considered. To account for all these effects, we simulate the evolution of the hazard rates from unemployment for different groups, and conditional on alternative assumptions concerning UB entitlement at the beginning of an individual's unemployment spell. The control variables are assumed constant and take on the following values: Variables with metric measurement (except for the IRR) are set to the respective sample means. The binary variables are set to represent a person who is between 44 and 52 years, married, without children, German, not disabled, with vocational training and A-levels, who lives in North-Rhine Westphalia (Saxony for East Germans) and was not unemployed before. The other dummy variables also take on mean values, except for the baseline hazard and the remaining entitlement variables. The

**Figure 1. Benefit-entitlement effects on hazard rates to … - men**

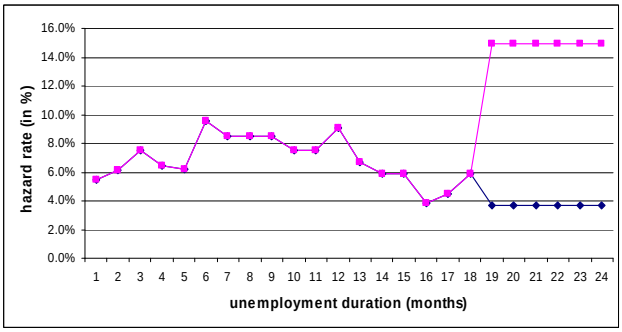
**Employment**

**a)** ***UB entitlement = 12 months, west Germany***

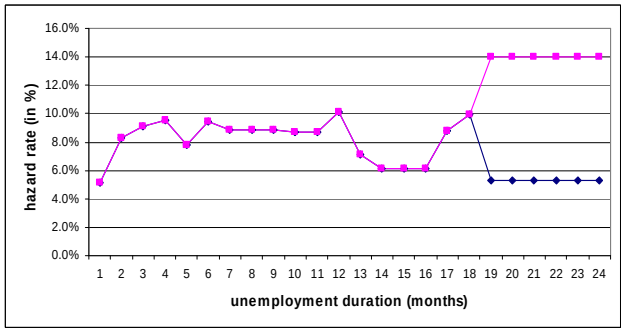



**b)** ***UB entitlement = 12 months, east Germany***


**c)** ***UB entitlement = 18 months, west Germany***




**d)** ***UB entitlement = 18 months, east Germany***



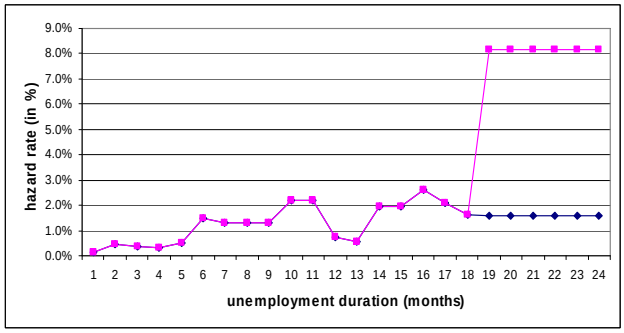

**Out-of-the-labour-force**

**e)** ***UB entitlement = 12 months, west Germany***


**f)** ***UB entitlement = 12 months, east Germany***


**g)** ***UB entitlement = 18 months, west Germany***


**h)** ***UB entitlement = 18 months, east Germany***



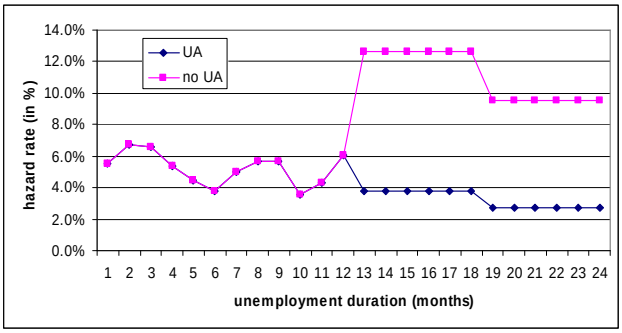

Notes: Explanatory variables are evaluated at base categories for dummy variables and at sample means for metric variables.

Source: Estimation results as reported in Table A4 in the Appendix.

**Figure 2. Benefit-entitlement effects on hazard rates to … - women**

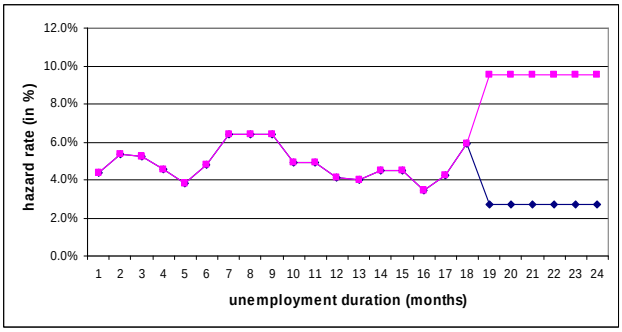
**Employment**

**a)** ***UB entitlement = 12 months, west Germany***

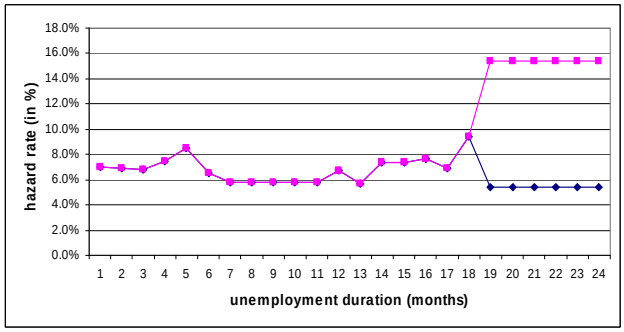



**b)** ***UB entitlement = 12 months, east Germany***


**c)** ***UB entitlement = 18 months, west Germany***



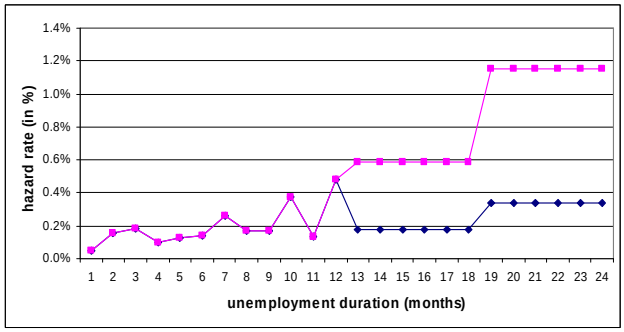

**d)** ***UB entitlement = 18 months, east Germany***




**Out-of-the-labour-force**

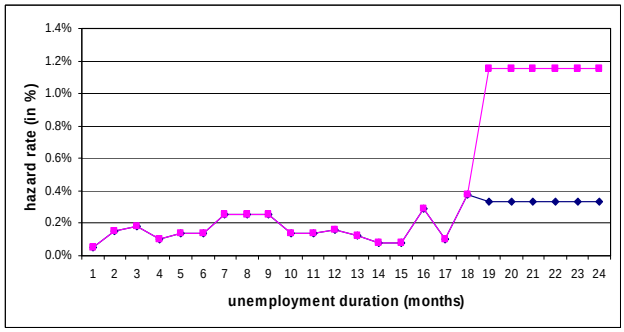
**e)** ***UB entitlement = 12 months, west Germany***


**f)** ***UB entitlement = 12 months, east Germany***




**g)** ***UB entitlement = 18 months, west Germany***


**h)** ***UB entitlement = 18 months, east Germany***




Notes: Explanatory variables are evaluated at base categories for dummy variables and at sample means for metric variables.

Source: Estimation results as reported in Table A5 in the Appendix.

binary variables of the baseline hazard and the remaining entitlement duration change with elapsed spell duration. The replacement rates are set to the respective means for each group - as reported in Table 4 - in case of eligibility, and zero otherwise. The hazard rates are the expected values for unemployed of the reference group as defined above, i.e. we take the expectation over the estimated heterogeneity groups. Empirically, this expectation is calculated as the weighted sum of the hazard rates over the two (three) mass points (heterogeneity groups), with their estimated probabilities as weights.

As Figures 1 and 2 show, simulated hazard rates to employment are fairly constant or slightly decreasing until UB entitlement is exhausted, and increase immediately before UB-entitlement is exhausted. To this point, the pattern of hazard rates more or less corresponds to the estimated entitlement coefficients summarised in Table 5 above. After UB-entitlement exhaustion, simulated hazard rates depend very much on whether or not the unemployed are entitled to UA. In case they do, the hazard rate stays more or less constant or slightly decline with increasing unemployment duration; if they are not entitled to draw UA, the hazard rate jumps to a much higher level in the month following and subsequently stays there or declines only slightly. For example, the average hazard rate from unemployment to employment in the group of west German men with an assumed initial UB-entitlement period of 12 months has reached about 8 percent after 12 month, virtually the same level as at the beginning of the spell. If UA is not available for a typical person in this group, his hazard rate more than doubles in the month following the exhaustion of UB-entitlement to almost 18%, and subsequently remains at this high level. In contrast, in case UA is not available to this person there is no upward-jump in the hazard rate in the month following UB-entitlement exhaustion, and the hazard rate declines slightly in the subsequent months (Figure 1a). A similar patter can also be observed for east German men (Figure 1b) as well as east and west German women (Figures 2a and 2b), although the hazard rates differ somewhat in levels between these groups. Furthermore, a similar pattern regarding the spike in the hazard rate in the month following UB-benefit exhaustion also obtains in case the initial UB-entitlement period is set to, e.g., 18 months, as illustrated in Figures 1c and 1d for men and Figures 2c and 2d for women, or for other assumed maximum initial benefit-entitlement periods defined in section 2 as well.

Simulated hazard rates to out-of-the-labour-force, too, exhibit an upward-jump in the month following UB-entitlement exhaustion in case there is no subsequent eligibility to UA (see lower part of Figures 1 and 2). Again, this effect can be observed for the various initial UB-entitlement defined above, and for all groups considered here. Since the male out-of-the-labour-force hazard rate is rather low, for men this effect is of rather limited quantitative importance. Especially for women in west

Germany, however, this effect is rather large and suggests that only after UB-entitlement has been exhausted is unemployment terminated by way of labour force withdrawal. This effect is much less pronounced for women in east Germany, which is compatible with the higher labour force participation rate of east German women compared to the west.

# 5 Policy Simulations

On the basis of the estimation results described in the previous section, we now simulate the effects of the two main regulatory changes considered in section 2, i.e. the reduction of the potential entitlement period to UB (including tightened eligibility criteria) which came into effect in February 2006, and the replacement of UA by UB II. The calculation of the potential entitlement periods after the reforms assumes that the changes have already been fully phased in, i.e. the existing transition periods are not modelled. That is, the analysis examines the long-term effects of the reform.

Table 6 compares the distribution of UB-entitlement periods in the sample until January 2006 and since then. There is no change for about 80% of all unemployed people in the west and for 70% in the east. Those affected are especially older unemployed men with relatively long previous insured employment histories whose maximum entitlement duration is cut. Whereas between 14% (women/west) and 22% (men/east) of all unemployed were entitled to at least 13 months of UB before 2006, this share now ranges between 2,4% and about 4%. Although this change is mainly related to the marked reduction of maximum UB-entitlement periods for the older unemployed, part of the younger unemployed are also affected. Roughly 5% of all unemployed people who would have been eligible for UB before the reform are not entitled anymore under the new regulations.

In addition to these changes, the integration of UA and Social Assistance into the new Unemployment Benefit II (UB II) transfer also could have substantial effects on unemployed people. Since UB II is means-tested and depends on household income rather than previous individual net income, the effects of the reform differ for claimants in the same age group, with the same work history. As described in section 2, until 2005 a household with an unemployed receiving UA or UB could also receive "Supplementary Social Assistance" if total net household income was below the social minimum determined by the household's "social minimum". For example, a single unemployed person with previous gross income of 1,500 € would, after exhaustion of UB and if eligible, have been entitled to UA in the amount of 552 €. Since this amount was below the Social Assistance of 664€, the person could obtain Supplementary Social Assistance of 112 €. After the reform, UB II including allowances for housing and heating for a single person amounts, on average, to about 670 €. Thus, the

reform has changed very little in this case. However, if the person had earned 3,000 € in his previous job, UA would have been about 900 € before the reform, and he would have lost about 230 € due to the reform. Larger households that were already eligible to Supplementary Social Assistance before the reform, were hardly affected by the introduction of UB II if they still passed the slightly tighter means-test after the reform.[6]

**Table 6. Distribution of benefit-entitlement durations before and after the reforms in the sample**

| | **Men** | | | | **Women** | | | |
|---|---|---|---|---|---|---|---|---|
| | **West** | | **East** | | **West** | | **East** | |
| | ***before*** | ***after*** | ***before*** | ***after*** | ***before*** | ***after*** | ***before*** | ***after*** |
| **UB-entitlement** (shares in %) | | | | | | | | |
| 0 months | 31.7 | 36.5 | 24.2 | 29.3 | 36.0 | 39.7 | 31.4 | 35.8 |
| 1-12 months | 52.7 | 60.2 | 53.8 | 66.5 | 49.9 | 57.9 | 50.7 | 61.1 |
| 13-18 months | 3.6 | 3.4 | 5.4 | 4.1 | 4.1 | 2.4 | 5.1 | 3.1 |
| > 19 months | 12.0 | 0.0 | 16.7 | 0.0 | 10.0 | 0.0 | 12.8 | 0.0 |
| **Average entitlement duration** (months) | 9.2 | 6.9 | 10.5 | 7.4 | 8.7 | 6.8 | 9.0 | 6.5 |
| **UA-entitlement** (shares in %) | | | | | | | | |
| No change | 78.0 | | 70.2 | | 80.3 | | 72.6 | |
| Reduced entitlement | 22.0 | | 29.8 | | 19.7 | | 27.4 | |
| Entitlement completely lost | 5.0 | | 5.7 | | 4.4 | | 5.3 | |

Source: SOEP, waves 1995-2003, own calculations.

To account for the substantial heterogeneity across households in terms of benefit-entitlement and, at the same time, keep the empirical analysis comprehensible, in the following we distinguish between type of household (single, no children; couples with and without children), four age groups (40, 45, 52, and 57 years) and three income groups (low, average and high income). For simplicity, we use the average IRR for to calculate the amount of UB for all income groups. The simulated replacement rates for UA and UB II are then computed assuming the same potential net income as before but with the adjusted amount of benefits. For example, a single unemployed person with gross income of 3,000 € in his previous job receives UB in the amount of 1,024.50 €. The assumed income-replacement ratio of 0.62 for west German men yields potential net income of 1024.5 € / 0.62 = 1652.4 €. The amount of UA of 905 € yields a replacement rate of 905 €/1652.42 € = 0.548, whereas UB II amount of 666 € results in a replacement rate of 0.403.

[6] Since the SOEP does not provide sufficient information on the assets of a households, we have to assume that all unemployed who were eligible for UA before also pass the means-test for UB II.

Simulated survival rates before and after the reforms for the various household and income types are reported in Table A6 for men and in Table A7 for women in the Appendix. The simulations are based on full estimation results for the hazard rate models summarized in Tables A4 and A5 and assume that the reform does not affect employment behaviour of potential claimants prior to the unemployment spell. Furthermore, we have to assume that job offer arrival rates and offered wages are not affected by the reform. The dynamic effects of the reform can be assessed by comparing survival rates after 6, 12, 18, and 24 months of the unemployment spell before and after the reforms for some reference groups. These survival rates are calculated using equation (8) in section 3.1 and estimated coefficients from our preferred specifications of the hazard rate model. The survival rate after 6 months, for example, can be interpreted as the share of individuals who became unemployed in a given month and are still unemployed six months later. Except for age, benefit entitlement and household structure, the definition of the reference groups is the same as the one used in Figures 1 and 2.

As shown in Tables A6 and A7, there is substantial heterogeneity in simulated responses to the reform across the various groups. Block A of each table shows changes in survival rates for unemployed people living in couple households with no children with an average level of gross earnings in the previous job differentiated by three age groups differently affected by the reduction of the maximum UB-entitlement period after the reform. It is further assumed that these groups are not affected by the reform of UA because they are not eligible to means-tested benefits under either regulation. This also means that a reduction in UB-entitlement effectively reduces household income. For most of the groups shown in the tables, simulated survival rates decline substantially after the reform. For example, the 12-months' survival rate of west German unemployed men aged 52 declines by 12 percentage points, from 54% to 42%. For this group, the 18-months' survival rate declines from 37% to 14%, and the survival after 24 months is just 5% after the reform, compared to almost 30% before it. For east German men and women in both regions of the same age group, simulated reduction in survival rates due to the reform would also be substantial, although somewhat smaller in absolute magnitude. Smaller reductions in survival rate are also to be expected for the older (57 years) and especially the younger (45 years) age groups for men and women in both regions, as shown in Tables A6 and A7.

Block B of Tables A6 and A7 shows changes in survival rates for a single unemployed person with alternative levels of previous gross earnings (low/high) by age group. In addition to the three age groups considered above, unemployed singles aged 40 years for whom there was no change in the UB-entitlement period are included in the comparison. For this latter group with low earnings in the previous job the reform did not affect net household incomes because the amount of UB II almost

equals the former UA, as described above. Thus, the reform has no effect on survival rates for this group. Unemployed people of this age but with high previous earnings get less UB II after the reform, but this only becomes effective after exhaustion of regular UB after 12 months. This has very little effect on survival rates after 12 months. For the older age groups, for whom the maximum UB-entitlement period is cut depending on age, reductions of survival rates induced by the reform are somewhat larger but still rather modest. The largest effect occurs for east German men in the oldest age group, for whom the cut of the maximum UB-entitlement period from 32 to 18 months induces, irrespective of the level of previous earnings, a fall in this group's 18-months survival rate by 18 percentage points, from 56% to 37%. A similar pattern can also be observed for unemployed people living in couple households with a child, as shown in (block C). Still, these effects are limited relative to the impact the eligibility to UB II subsequent to the exhaustion of UB has on the survival rate in unemployment (see Figures 1 and 2).

Table 7 summarises simulation results more comprehensively in terms of average survival rates and median unemployment durations before and after the reform for those unemployed actually affected by the reform as derived from the information in the data and summarised in Table 6. The upper part of the table reports results for the whole sample, the lower part for unemployed people older than 45 years.

**Table 7. Simulated effects of reform on survival rates in and the median duration of unemployment**

| | | Before reform | | | | | After reform | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Survival rates* (in %) | | | | *Median* | *Survival rates* (in %) | | | | *Median* |
| | | 6 | 12 | 18 | 24 | (months) | 6 | 12 | 18 | 24 | (months) |
| **Whole Sample** | ***men/west*** | 54 | 42 | 38 | 35 | 8.0 | 53 | 39 | 34 | 31 | 7.0 |
| | ***men/east*** | 47 | 29 | 22 | 17 | 6.8 | 45 | 25 | 18 | 12 | 5.0 |
| | ***women/west*** | 63 | 46 | 37 | 32 | 10.5 | 62 | 42 | 30 | 25 | 9.0 |
| | ***women/east*** | 64 | 46 | 37 | 33 | 10.0 | 63 | 41 | 31 | 25 | 9.0 |
| **45 years and older** | ***men/west*** | 74 | 61 | 55 | 49 | 23.0 | 68 | 53 | 46 | 40 | 14.0 |
| | ***men/east*** | 59 | 39 | 31 | 24 | 8.0 | 54 | 31 | 24 | 18 | 7.0 |
| | ***women/west*** | 80 | 63 | 52 | 45 | 20.0 | 75 | 57 | 42 | 34 | 14.0 |
| | ***women/east*** | 73 | 55 | 46 | 42 | 15.0 | 72 | 51 | 40 | 34 | 12.5 |

Notes: Simulations based on estimation results in Tables A4 and A5 and assumptions about benefit entitlement, see text.

Whereas the reform seems to have only minor effects on survival rates in unemployment, and also on its median duration, in the whole sample, the impact on the unemployed older than 45 years is substantial. For example, for west German men older than 45 years the survival rate after 18 (24)

months would fall from 55% to 46% (49% to 40%), and the median completed duration of unemployment form about 23 to 14 months. The share of long-term unemployed people (> 24 months) among east German men in this age group would fall from 24% to 18%, and the median duration of unemployment from 8 to 7 months. The reform also has a relatively strong impact on older west German women, for whom the simulated median unemployment duration falls from 20 to 14 months, whereas for east German women of the same age this reduction amounts to less than 3 months. Thus, the relatively small effects of the reform on long-term unemployment we obtain for the whole sample are almost completely driven by the impact the reform has on older unemployed men and women in west Germany, whereas the relatively small overall impact on the east-German unemployed is more evenly distributed across all age groups. The stronger impact the reform seems to have on younger people in east Germany can be explained by the fact that the share of unemployed people living in the east whose amount of UA was cut partly or completely is markedly higher than in the west, as shown in see Table 6.

## 6 Summary and Conclusion

Our empirical analysis of the impact of the German unemployment system and its recent reform on the duration of unemployment on the basis of a discrete-time hazard rate model has yielded a number of noteworthy results. First, eligibility to Unemployment Benefit reduces both the transition rate to employment and, especially for women, to the out-of-the-labour-force state, and thus increases the duration of unemployment. Second, benefit-entitlement effects on hazard rates are not monotonically increasing as time to exhaustion of UB gets shorter but rather occur around the month of benefit-exhaustion. These effects differ significantly between the unemployed who are not entitled to means-tested Unemployment Assistance subsequent to the exhaustion of UB-entitlement and those who are not. For the former group, there is a huge spike in the hazard rate to both employment and to the out-of-the-labour-force state in the month following benefit-exhaustion, with both hazard rates thereafter remaining at much higher levels. In contrast, for the latter group the hazard rates more or less remain at the previous level or decline slightly after benefit exhaustion. These patterns indicate that eligible unemployed wait until benefit-exhaustion before they take up a new job or drop out of the labour force. Third, the marginal effects of the amount of both UB and UA are negative and highly non-linear but of modest size. These results are qualitatively similar for men and women in east and west Germany, although the magnitude of estimated effects differs between groups.

In an ex-ante evaluation of the recent reform of the unemployment compensation system in Germany, we used our estimation results to simulate its likely effects on the duration of unemployment, and on long-term unemployment in particular. This reform reduced maximum UB-entitlement periods, especially for the older unemployed, and integrated UA and Social Assistance into a means-tested transfer called Unemployment Benefit II. This implied a lower level of means-tested benefits for unemployed people with high previous earnings in particular, and for a small minority the loss of eligibility to it altogether, whereas not much changed for unemployed people with low previous earnings. Due to there longer previous insured employment periods, the share of unemployed people living in the east whose amount of UA was cut partly or completely is markedly higher than in the west. Our simulation results show that the reform has only small effects on the duration of unemployment for the population as a whole. However, our simulation results also indicate that the share of the long-term unemployed among older people is substantially reduced, as is the median unemployment duration for this age group. These effects are stronger in west Germany than in the east where the relatively small overall impact on the east-German unemployed is more evenly distributed across all age groups. In west Germany, the reduction in long-term unemployment of older men and women is mainly induced by the shortened UB-entitlement periods, whereas the integration of UA and Social Assistance into UB II seems to have relatively little impact. However, we might underestimate this latter effect because the available data do not allow us to model the somewhat stricter means test applied to UB II.

Overall, our simulation results indicate that the recent labour market reform which aroused much heated debates and even some political unrest, especially regarding the repeal of UA and the introduction of UB II, is unlikely to have a major impact on the average duration of unemployment in the population as a whole. However, it will significantly reduce the level of long-term unemployment among older workers, and in particular of those aged above 55 years who effectively used the previously existing UB-entitlement periods of up to 32 months as a way to early retirement. The reduction of long UB-entitlement periods for older people should also reduce incentives to become unemployed in the first place, thereby also contributing to a lower level of unemployment among older workers.

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# Appendix

## Table A1. Selectivity-corrected wage regressions– dependent variable: ln(gross hourly wage)

| | Men | | | | Women | | | |
|---|---|---|---|---|---|---|---|---|
| | West | | East | | West | | East | |
| | *coefficent* | *t-value* | *coefficent* | *t-value* | *coefficent* | *t-value* | *coefficent* | *t-value* |
| Years of education | 0.059 | 49.95 | 0.040 | 20.46 | 0.062 | 39.42 | 0.029 | 13.95 |
| Experience | 0.019 | 12.97 | 0.015 | 10.56 | | | | |
| Experience squared/100 | -0.037 | -10.65 | -0.033 | -9.2 | | | | |
| Full-time | | | | | 0.011 | 5.74 | 0.014 | 9.33 |
| Full-time squared/100 | | | | | -0.023 | -3.82 | -0.037 | -8.87 |
| Part-time | | | | | 0.001 | 0.07 | -0.004 | -2.49 |
| Part-time squared/100 | | | | | -0.001 | -0.09 | 0.01 | 1.1 |
| Tenure | 0.009 | 5.05 | 0.003 | 2.44 | 0.01 | 4.14 | 0.018 | 12.31 |
| Tenure squared/100 | -0.016 | -2.8 | 0.001 | 0.04 | -0.015 | -1.93 | -0.025 | -6.03 |
| Human capital depreciation | -0.051 | -6.5 | -0.131 | -17.04 | -0.025 | -4.3 | -0.058 | -9.81 |
| Years of education x German | 0.006 | 6.05 | | | 0.002 | 1.84 | | |
| Experience x German | 0.001 | -0.28 | | | | | | |
| Experience sq./100 x German | -0.002 | -0.59 | | | | | | |
| Full-time x German | | | | | 0.005 | 2.32 | | |
| Full-time sq./100 x German | | | | | -0.017 | -2.72 | | |
| Part-time x German | | | | | 0.002 | 0.83 | | |
| Part-time sq /100 x German | | | | | -0.017 | -1.31 | | |
| Tenure x German | -0.001 | -0.72 | | | 0.004 | 1.78 | | |
| Tenure sq. /100 x German | 0.013 | 2.17 | | | -0.002 | -0.22 | | |
| Human cap. depreciation x German | -0.071 | -7.86 | | | 0.003 | 0.51 | | |
| Region: | | | | | | | | |
| Schl.-Holstein. Hamburg | 0.017 | 1.27 | | | 0.034 | 2.28 | | |
| Lower Saxony. Bremen | -0.004 | -0.31 | | | -0.015 | -1.14 | | |
| North Rhine-Westphalia | 0.029 | 2.42 | | | 0.005 | 0.37 | | |
| Hesse | 0.049 | 3.86 | | | 0.049 | 3.62 | | |
| Rhineland-Palat.. Saarland | -0.006 | -0.49 | | | -0.017 | -1.23 | | |
| Baden-Wuerttemberg | 0.073 | 6.02 | | | 0.037 | 2.87 | | |
| Bavaria | 0.02 | 1.69 | | | 0.012 | 0.93 | | |
| Mecklenburg-Western Pom. | | | -0.086 | -5.18 | | | -0.130 | -7.71 |
| Brandenburg | | | -0.092 | -6.1 | | | -0.139 | -8.96 |
| Saxony-Anhalt | | | -0.122 | -8.12 | | | -0.16 | -10.51 |
| Thuringia | | | -0.157 | -10.6 | | | -0.156 | -9.98 |
| Saxony | | | -0.148 | -10.5 | | | -0.176 | -12.27 |
| Year: | | | | | | | | |
| 1995 | -0.197 | -27.67 | -0.246 | -18.74 | -0.147 | -17.16 | -0.199 | -14.06 |
| 1996 | -0.163 | -22.5 | -0.196 | -14.53 | -0.132 | -15.2 | -0.172 | -11.95 |
| 1997 | -0.152 | -21.08 | -0.162 | -12.04 | -0.116 | -13.43 | -0.133 | -9.37 |
| 1998 | -0.134 | -18.67 | -0.149 | -11.17 | -0.092 | -10.85 | -0.111 | -7.8 |
| 1999 | -0.129 | -17.86 | -0.144 | -10.71 | -0.09 | -10.53 | -0.099 | -7.03 |
| 2000 | -0.109 | -18.22 | -0.135 | -11.42 | -0.091 | -13.13 | -0.105 | -8.42 |
| 2001 | -0.11 | -17.62 | -0.115 | -9.53 | -0.078 | -10.9 | -0.084 | -6.61 |
| 2002 | -0.031 | -5 | -0.041 | -3.39 | -0.022 | -3.22 | -0.039 | -3.09 |
| Industrial Sector: | | | | | | | | |
| Agriculture. Forestry | 0.058 | 15.08 | 0.008 | 0.8 | 0.009 | 1.22 | -0.091 | -5.27 |
| Mining. Energy | 0.031 | 2.63 | 0.095 | 5.38 | 0.172 | 5.88 | 0.11 | 3.54 |
| Chemical Ind.. Synthetics | 0.051 | 8.73 | 0.041 | 2.81 | 0.03 | 3.7 | -0.063 | -2.85 |
| Construction Industry | -0.01 | -1.87 | -0.005 | -0.71 | -0.018 | -1.25 | 0.026 | 1.45 |
| Heavy Industry | 0.016 | 2.9 | -0.027 | -2.47 | 0.021 | 1.76 | -0.048 | -1.82 |
| Textile Industry | -0.132 | -7.24 | -0.166 | -3.43 | -0.142 | -8.19 | -0.298 | -10.23 |
| Retail | -0.071 | -12.42 | -0.105 | -9.78 | -0.098 | -21.05 | -0.152 | -16.67 |
| Railway. Post. Transport | -0.116 | -17.92 | -0.07 | -5.85 | -0.01 | -0.97 | -0.097 | -5.57 |
| Public Services | -0.023 | -5.91 | 0.06 | 8.67 | 0.033 | 12.78 | 0.084 | 23.03 |
| Private Services | 0.107 | 17.36 | 0.093 | 7.2 | 0.042 | 7.61 | 0.003 | 0.28 |
| Others and Missing | -0.016 | -2.24 | 0.003 | 0.27 | -0.034 | -4.55 | -0.082 | -6.49 |
| Firm Size: | | | | | | | | |
| Small | -0.188 | -20.88 | -0.193 | -14.41 | -0.188 | -27.17 | -0.237 | -20.25 |
| Middle | -0.104 | -21.59 | -0.115 | -16.89 | -0.063 | -13.84 | -0.079 | -10.46 |
| Middle-Big | -0.027 | -8.88 | -0.008 | -1.87 | -0.014 | -3.9 | -0.01 | -1.78 |
| Big | 0.022 | 7.2 | 0.102 | 14.11 | 0.048 | 12.9 | 0.048 | 7.56 |
| Public | -0.016 | -6.92 | 0.023 | 3.97 | 0.027 | 9.13 | 0.015 | 2.05 |
| Constant | 1.734 | 94.83 | 1.985 | 57.1 | 1.516 | 59.99 | 2.017 | 51.96 |
| mills | | | | | | | | |
| lambda | 0.0002 | -0.07 | -0.014 | -1.34 | 0.045 | 6.25 | -0.007 | -0.6 |
| Number of observations | 51329 | | 17534 | | 57731 | | 19896 | |
| Adjusted $R^2$ | | | | | | | | |

**Table A2. Tax function regressions – dependent variable: ln[(gross wage - net wage)/(gross wage)]**

| | Men | | | | Women | | | |
|---|---|---|---|---|---|---|---|---|
| | West | | East | | West | | East | |
| | *Coeff.* | *t-value* | *Coeff.* | *t-value* | *Coeff.* | *t-value* | *Coeff.* | *t-value* |
| year_1996 | 0.0002 | 0.01 | 0.0249 | 1.50 | 0.0211 | 1.45 | 0.0014 | 0.08 |
| year_1997 | 0.0108 | 1.02 | 0.0351 | 2.12 | 0.0440 | 3.01 | 0.0203 | 1.13 |
| year_1998 | 0.0154 | 1.50 | 0.0555 | 3.39 | 0.0338 | 2.38 | 0.0382 | 2.14 |
| year_1999 | 0.0010 | 0.10 | 0.0464 | 2.79 | 0.0344 | 2.37 | 0.0368 | 2.03 |
| year_2000 | -0.0143 | -1.55 | 0.0149 | 0.98 | -0.0054 | -0.43 | 0.0006 | 0.03 |
| year_2001 | -0.0361 | -3.80 | -0.0264 | -1.69 | -0.0252 | -1.94 | -0.0483 | -2.87 |
| year_2002 | -0.0593 | -6.36 | -0.0452 | -2.92 | -0.0459 | -3.65 | -0.0658 | -3.93 |
| year_2003 | -0.0319 | -3.32 | -0.0252 | -1.57 | -0.0397 | -3.08 | -0.0076 | -0.44 |
| year_2004 | -0.0582 | -6.05 | -0.0458 | -2.88 | -0.0564 | -4.39 | -0.0292 | -1.71 |
| gross wage | -3.4e-05 | -13.67 | -3.6e-05 | -6.31 | -1.1e-04 | -21.07 | 3.2e-05 | 1.74 |
| (gross wage)sq./10000 | 2.8e-06 | 6.77 | 3.0e-06 | 4.38 | 9.7e-06 | 13.20 | -6.4e-05 | -4.35 |
| ln(gross wage) | 0.3797 | 53.76 | 0.3866 | 33.54 | 0.4613 | 55.35 | 0.3052 | 15.35 |
| married | -0.1901 | -37.89 | -0.0578 | -7.27 | 0.1234 | 21.31 | 0.0949 | 11.62 |
| children | -0.0452 | -21.54 | -0.0481 | -11.71 | 0.0104 | 3.17 | 0.0009 | 0.20 |
| public sector | -0.2436 | -46.93 | -0.1227 | -14.24 | -0.0891 | -14.95 | -0.0682 | -8.54 |
| constant | -3.815 | -77.80 | -3.9282 | -51.51 | -4.3055 | -79.03 | -3.4469 | -28.59 |
| Observations | 43161 | | 12823 | | 30629 | | 11143 | |
| Adjusted $R^2$ | 0.182 | | 0.186 | | 0.170 | | 0.190 | |

## Table A3. Means of variables in the hazard rate models

| Variable | Men | | Women | |
|---|---|---|---|---|
| | West | East | West | East |
| Personal characteristics | | | | |
| 25 <= Age < 35 | 25.7 | 19.6 | 27.2 | 20.8 |
| 35 <= Age < 44 | 19.7 | 21.9 | 21.1 | 26.0 |
| 44 <= Age < 52 | 15.0 | 21.8 | 18.0 | 19.8 |
| 52 <= Age < 56 | 8.4 | 8.9 | 8.5 | 9.4 |
| Age >= 56 | 14.2 | 13.7 | 9.0 | 13,5 |
| Foreigner | 33.2 | - | 24.0 | - |
| Disabled | 13.0 | 5.9 | 7.7 | 3,3 |
| Education and Vocational Qualification | | | | |
| General elementary | 25.2 | 10.0 | 26.9 | 12.5 |
| Middle vocational | 46.8 | 68.3 | 43.1 | 68.1 |
| Vocational plus college | 3.8 | 1.7 | 5.9 | 2.2 |
| Higher vocational | 3.0 | 5.3 | 5.2 | 3.1 |
| Higher education | 10.5 | 11.5 | 9.6 | 11.8 |
| Trained worker | 15.7 | 29.8 | 2.5 | 10.0 |
| Foreman | 8.8 | 13.3 | 3.8 | 2.9 |
| Self-employed | 2.1 | 2.8 | 2.7 | 2.4 |
| Household variables | | | | |
| Spouse employed | 28.8 | 32.9 | 43.1 | 48.6 |
| Earnings of spouse/1000 | 0.25 | 0.37 | 0.77 | 0.63 |
| Other household income /1000 | 1.01 | 0.70 | 0.84 | 0.60 |
| Married | 56.0 | 52.4 | 55.5 | 65,1 |
| Children <= 6 years | 30.4 | 15.9 | 27.7 | 20.3 |
| Children <= 6 years × single | 1.5 | 0.8 | 6.4 | 3.8 |
| Regional dummies | | | | |
| Northern States | 18.6 | - | 19.4 | - |
| Hesse | 8.3 | - | 7.6 | - |
| Rhineland-Palatinate, Saarland | 8.2 | - | 8.2 | - |
| Baden-Wuerttemberg | 14.4 | - | 18.0 | - |
| Bavaria | 13.9 | - | 14.1 | - |
| West Berlin | 5.0 | - | 6.8 | - |
| East Berlin | - | 6.9 | - | 4.1 |
| Mecklenburg-Western Pomerania | - | 9.5 | - | 10.8 |
| Brandenburg | - | 16.6 | - | 16.3 |
| Saxony-Anhalt | - | 19.3 | - | 20.9 |
| Thuringia | - | 18.2 | - | 20.5 |
| Regional unemployment rate | 10.0 | 19.0 | 10.0 | 18.9 |
| Regional unemployment rate squared | 107.4 | 364.9 | 108.8 | 360.9 |
| Number of previous unemployment spells | 1.0 | 1.5 | 0.7 | 1.5 |
| Not employed before | 21.5 | 11.9 | 33.5 | 22.2 |
| Part-time before | - | - | 19.5 | 9 |
| Vocational Training before | 10.6 | 12.8 | 12.3 | 21.5 |
| 1st Quarter | 37.2 | 33.5 | 39.4 | 36.8 |
| 2nd Quarter | 22.7 | 19.6 | 21.4 | 21.0 |
| 3rd Quarter | 22.1 | 23.4 | 22.2 | 24.0 |
| December | 9.3 | 9.2 | 9.1 | 8.7 |

**Table A3 Continued.**

| | Men | | Women | |
|---|---|---|---|---|
| | **West** | **East** | **West** | **East** |
| Baseline hazard (month 1) | | | | |
| month 2 | 9.0 | 10.4 | 9.0 | 7,5 |
| month 3 | 7.7 | 8.5 | 7.8 | 6,8 |
| month 4 | 6.4 | 7.0 | 6.8 | 6,1 |
| months 5-6 | 10.6 | 11.1 | 11.5 | 10,6 |
| months 19-32 | 14.3 | 12.1 | 12.2 | 15.2 |
| months > 32 | 9.0 | 7.3 | 8.4 | 10,6 |
| UB-entitlement | | | | |
| Not entitled to UB | 30.0 | 20.7 | 35.5 | 30.6 |
| < 0 months | 21.4 | 22.2 | 18.5 | 25,1 |
| 0 months | 2.0 | 2.1 | 1.8 | 2,2 |
| 1 month | 2.1 | 2.4 | 2.0 | 2,3 |
| 2 months | 2.2 | 2.6 | 2.2 | 2,5 |
| 3-4 months | 4.8 | 5.7 | 5.0 | 5,5 |
| 5-6 months | 5.6 | 6.3 | 5.8 | 5,6 |
| 7-8 months | 6.3 | 6.9 | 6.7 | 5,6 |
| 9-12 months | 13.0 | 14.3 | 13.1 | 10,1 |
| 13-18 months | 5.9 | 7.4 | 4.9 | 5.2 |
| Income replacement ratios (IRR) | | | | |
| IRR × received UB | 0.27 | 0.37 | 0.26 | 0.29 |
| (IRR × received UB)squared | 0.19 | 0.28 | 0.20 | 0.23 |
| IRR ×received UA | 0.13 | 0.17 | 0.12 | 0.19 |
| (IRR × received UA) squared | 0.08 | 0.11 | 0.08 | 0.12 |
| Number of observations | 21349 | 14882 | 17586 | 18445 |
| Number of spells | 2247 | 1782 | 1791 | 1528 |
| Number of persons | 1451 | 972 | 1307 | 882 |

Note: Means of dummy variables are given in shares in percent. Means are averages over person months.

Source: German Socioeconomic Panel (SOEP); waves 1995-2003).

**Table A4. Estimation results for other variables in the hazard rate model - men**

| | West | | East | |
|---|---|---|---|---|
| | **Employment** | **Out-of-the-labour-force** | **Employment** | **Out-of-the-labour-force** |
| 25 <= Age < 35 | -0.111 | -1.17 | -0.165 | -1.736 |
| | (-1,06) | (-4,93)*** | (-1,52) | (-5,21) |
| 35 <= Age < 44 | -0.376 | -1.518 | -0.462 | -1.462 |
| | (-2,88)** | (-5,5)*** | (-3,87) | (-4,31) |
| 44 <= Age < 52 | -0.803 | -1.438 | -0.604 | -1.369 |
| | (-5,32)*** | (-4,65)*** | (-4,61) | (-3,46) |
| 52 <= Age < 56 | -1.026 | -1.149 | -0.747 | -1.188 |
| | (-4,99)*** | (-3,13)** | (-4,32) | (-2,44) |
| Age >= 56 | -2.252 | -0.578 | -1.314 | -0.272 |
| | (-8,04)*** | (-1,81) | (-6,89) | (-0,66) |
| Foreigner | -0.424 | -0.614 | - | - |
| | (-4,78)*** | (-3,48)*** | - | - |
| Disabled | -0.474 | 0.371 | -0.456 | 0.392 |
| | (-3,01)** | (1,79) | (-2,53) | (1,30) |
| Married | 0.115 | -0.203 | 0.180 | 0.298 |
| | (1,2) | (-1,06) | (2,02) | (1,13) |
| Children <= 6 years | -0.066 | -0.061 | 0.010 | -0.369 |
| | (-1,16) | (-0,41) | (0,14) | (-1,04) |
| Children <= 6 years * single | -0.192 | -0.213 | -0.391 | 0.645 |
| | (-0,73) | (-0,41) | (-1,08) | (1,03) |
| Spouse employed | 0.369 | 0.381 | 0.224 | -0.272 |
| | (3,47)*** | (1,44) | (2,37) | (-0,82) |
| Earnings of spouse/1000 | -0.177 | 0.165 | 0.117 | 0.017 |
| | (-1,77) | (0,69) | (0,86) | (0,01) |
| Other household income/1000 | 0.056 | 0.073 | 0.098 | 0.177 |
| | (1,77) | (1,44) | (2,40) | (2,55) |
| General elementary | -0.149 | -0.568 | 0.160 | -0.793 |
| | (-1,16) | (-2,28)* | (0,79) | (-2,69) |
| Middle vocational | 0.184 | -0.079 | 0.382 | -0.398 |
| | (1,41) | (-0,34) | (2,07) | (-1,55) |
| Vocational plus college | 0.684 | 0.309 | 0.223 | 0.459 |
| | (4,02)*** | (0,75) | (0,73) | (0,74) |
| Higher vocational | 0.749 | 0.309 | 0.441 | 0.064 |
| | (3,57)*** | (0,76) | (1,94) | (0,13) |
| Higher Education | 0.374 | 0.026 | 0.475 | -0.508 |
| | (2,42)* | (0,08) | (2,14) | (-1,13) |
| Regional Unemployment Rates | 0.241 | 0.341 | 0.180 | -0.406 |
| | (2,37)* | (1,77) | (0,95) | (-1,29) |
| Reg. unempl. rate squared | -0.011 | -0.014 | -0.005 | 0.012 |
| | (-2,41)* | (-1,7) | (-0,96) | (1,39) |
| # unemployment spells in the past | 0.052 | -0.208 | -0.035 | -0.033 |
| | (1,86) | (-2,65)** | (-1,54) | (-0,48) |
| Trained worker | 0.195 | -0.008 | 0.216 | -0.021 |
| | (2,12)* | (-0,04) | (2,94) | (-0,09) |
| Foreman | 0.275 | -0.414 | 0.251 | -0.128 |
| | (2,19)* | (-1,62) | (2,11) | (-0,34) |
| Self-employed | 0.292 | -0.066 | -0.400 | -1.760 |
| | (1,27) | (-0,12) | (-1,63) | (-1,63) |
| Not employed before | -0.438 | 0.27 | -0.339 | 0.759 |
| | (-4,97)*** | (1,62) | (-3,27) | (3,48) |
| Vocational training before | -0.272 | 0.149 | -0.218 | 0.329 |
| | (-2,51)* | (0,68) | (-2,15) | (1,37) |

## Table A4 continued

| | West | | East | |
|---|---|---|---|---|
| | **Employment** | **Out-of-the-labour-force** | **Employment** | **Out-of-the-labour-force** |
| Baseline Hazard | | | | |
| Month 2 | 0.121 | 0.264 | 0.531 | 1.232 |
| | (1,18) | (0.99) | (4.36)*** | (3,93)*** |
| Month 3 | 0.338 | 0.447 | 0.644 | 0.969 |
| | (2,79)** | (1,56) | (4,62)*** | (2,63)** |
| Month 4 | 0.181 | 0.49 | 0.699 | 0.899 |
| | (1,24) | (1,45) | (4,61)*** | (2,27)* |
| Months 5-6 | 0.142 | 0.892 | 0.463 | 1.268 |
| | (1,06) | (3,24)** | (2,97)** | (3,37)*** |
| Months 7-9 | 0.000 | 0.138 | 0.387 | 1.106 |
| | (0.00) | (0,40) | (2,35)* | (2,77)** |
| Months 10-12 | 0.044 | 0.676 | 0.527 | 1.504 |
| | (0,28) | (2,14)* | (2,91)** | (3,84)*** |
| Months 13-18 | -0.294 | 0.859 | 0.120 | 1.139 |
| | (-1,73) | (3,03)** | (0,59) | (2,48)* |
| Months 19-32 | -0.478 | 0.66 | -0.144 | 1.649 |
| | (-2,58)** | (2,12)* | (-0,61) | (4,11)*** |
| Months > 32 | -0.526 | 1.499 | -0.488 | 2.144 |
| | (-2,04)* | (4,32)*** | (-1,60) | (4,46)*** |
| Constant | -3.559 | -6.323 | -4.570 | -3.063 |
| | (-5,72)*** | (-5,07)*** | (-2,51)* | (-0,90) |
| $\varepsilon^1$ | -.404** | | -1.046*** | |
| $\varepsilon^2$ | 0.673 | | 1.875*** | |
| $\varepsilon^3$ | -- | | 0.243 | |
| $P(\varepsilon^1)$ | 0.625 | | 0.261 | |
| $P(\varepsilon^2)$ | 0.375 | | 0.057 | |
| $P(\varepsilon^3)$ | -- | | 0.682 | |
| Number of observations | 21349 | | 14882 | |
| Number of spells | 2247 | | 1782 | |
| Log likelihood | -6145.953 | | -4891.52 | |
| Number of parameters | 122 | | 120 | |
| Akaike criterion | 12535.91 | | 10023.041 | |

Notes: Regional dummy variables and seasonal (quarterly) dummies are included in all regressions; t-values are given in parantheses; * p<0.05, ** p<0.01, *** p<0.001.

**Table A5. Estimation results for other variables in the hazard rate model - women**

| | West | | East | |
|---|---|---|---|---|
| | **Employment** | **Out-of-the-labour-force** | **Employment** | **Out-of-the-labour-force** |
| 25 <= Age < 35 | -0.156 | -0.434 | -0.730 | -0.803 |
| | (-1.39) | (-2.19)* | (-4.71)*** | (-2.78)** |
| 35 <= Age < 44 | -0.364 | -1.030 | -0.991 | -1.68 |
| | (-2.99)** | (-4.61)*** | (-5.97)*** | (-5.36)*** |
| 44 <= Age < 52 | -0.663 | -1.249 | -1.183 | -1.592 |
| | (-4.25)*** | (-4.79)*** | (-6.49)*** | (-4.74)*** |
| 52 <= Age < 56 | -1.024 | -1.327 | -1.58 | -1.991 |
| | (-4.22)*** | (-4.03)*** | (-7.06)*** | (-4.29)*** |
| Age >= 56 | -2.448 | -0.890 | -2.558 | -1.232 |
| | (-6.88)*** | (-2.96)** | (-8.93)*** | (-3.80)*** |
| Foreigner | -0.477 | -0.499 | - | - |
| | (-4.32)*** | (-3.01)** | - | - |
| Disabled | -0.462 | 0.456 | 0.197 | 0.952 |
| | (-2.31)* | (1.85) | (0.68) | (2.34)* |
| Married | -0.225 | 0.437 | 0.064 | 0.466 |
| | (-2.19)* | (2.51)* | (0.56) | (2.27)* |
| Children <= 6 years | -0.279 | 0.207 | -0.304 | -0.117 |
| | (-3.13)** | (1.77) | (-2.85)** | (-0.63) |
| Children <= 6 years * single | -0.533 | -0.378 | 0.287 | -0.042 |
| | (-2.51)* | (-1.23) | (1.25) | (-0.10) |
| Spouse employed | 0.138 | 0.072 | 0.098 | -0.017 |
| | (1.05) | (0.37) | (0.78) | (-0.09) |
| Earnings of spouse/1000 | -0.011 | -0.045 | 0.032 | 0.015 |
| | (-0.17) | (-0.49) | (0.34) | (0.10) |
| Other household income/1000 | 0.049 | 0.011 | 0.160 | 0.223 |
| | (1.35) | (0.19) | (2.90)** | (2.30)* |
| General elementary | 0.086 | -0.218 | 0.607 | 0.023 |
| | (0.49) | (-1.02) | (1.89) | (0.07) |
| Middle vocational | 0.470 | -0.187 | 0.741 | 0.263 |
| | (2.73)** | (-0.85) | (2.59)** | (0.87) |
| Vocational plus college | 0.587 | 0.321 | 0.986 | -0.731 |
| | (2.85)** | (1.00) | (2.73)** | (-0.96) |
| Higher vocational | 0.305 | -0.263 | 1.391 | 0.569 |
| | (1.29) | (-0.73) | (3.88)*** | (1.14) |
| Higher education | 0.682 | -0.316 | 1.306 | 0.733 |
| | (3.37)*** | (-1.05) | (4.15)*** | (1.99)* |
| Regional unemployment rates | 0.013 | -0.028 | -0.142 | -0.386 |
| | (0.10) | (-0.16) | (-0.96) | (-1.23) |
| Reg. Unempl. Rate squared | -0.001 | 0.003 | 0.003 | 0.011 |
| | (-0.23) | (0.39) | (0.75) | (1.32) |
| # unemployment spells in the past | 0.036 | 0.013 | 0.006 | -0.139 |
| | (0.96) | (0.20) | (0.16) | (-1.95) |
| Trained worker | 0.051 | -0.474 | 0.094 | 0.285 |
| | (0.26) | (-1.09) | (0.69) | (1.28) |
| Foreman | 0.128 | 0.338 | 0.575 | 1.112 |
| | (0.70) | (1.20) | (3.02)** | (3.48)*** |
| Self-employed | 0.079 | -0.102 | -0.162 | -0.357 |
| | (0.36) | (-0.17) | (-0.67) | (-0.52) |
| Not employed before | -0.59 | -0.232 | -0.552 | 0.445 |
| | (-5.72)*** | (-1.37) | (-4.43)*** | (2.16)* |
| Vocational training before | -0.178 | -0.399 | -0.159 | 0.164 |
| | (-1.57) | (-1.65) | (-1.46) | (0.80) |

**Table A5 continued**

| | West | | East | |
|---|---|---|---|---|
| | **Employment** | **Out-of-the-labour-force** | **Employment** | **Out-of-the-labour-force** |
| Baseline Hazard | | | | |
| Month 2 | 0.210 | 0.174 | -0.025 | 1.160 |
| | (1.71) | (0.57) | (-0.17) | (3.12)** |
| Month 3 | 0.188 | 0.046 | -0.028 | 1.333 |
| | (1.40) | (0.14) | (-0.19) | (3.42)*** |
| Month 4 | 0.043 | 0.389 | 0.068 | 0.784 |
| | (0.27) | (1.15) | (0.37) | (1.73) |
| Months 5-6 | -0.151 | 0.336 | 0.207 | 1.053 |
| | (-1.05) | (1.10) | (1.42) | (2.60)** |
| Months 7-9 | 0.155 | 0.400 | 0.076 | 1.664 |
| | (1.10) | (1.35) | -0.48) | (4.42)*** |
| Months 10-12 | -0.029 | 1.245 | 0.256 | 1.17 |
| | (-0.18) | (4.37)*** | (1.49) | (2.89)** |
| Months 13-18 | -0.058 | 1.140 | 0.074 | 0.906 |
| | (-0.32) | (3.81)*** | (0.40) | (2.21)* |
| Months 19-32 | -0.412 | 0.929 | -0.159 | 1.541 |
| | (-1.68) | (2.90)** | (-0.76) | (3.94)*** |
| Months > 32 | -0.875 | 0.956 | -0.290 | 2.004 |
| | (-2.34)* | (2.40)* | (-0.92) | (4.69)*** |
| Constant | -2.484 | -3.315 | -1.131 | -2.178 |
| | (-3.14)** | (-2.64)** | (-0.81) | (-0.71) |
| $\varepsilon^1$ | -.7597* | | -2.66*** | |
| $\varepsilon^2$ | 0.287 | | 1.02*** | |
| $\varepsilon^3$ | -- | | -0.148 | |
| $P(\varepsilon^1)$ | 0.274 | | 0.042 | |
| $P(\varepsilon^2)$ | 0.726 | | 0.216 | |
| $P(\varepsilon^3)$ | -- | | 0.742 | |
| Number of observations | 17586 | | 18445 | |
| Number of spells | 1791 | | 1528 | |
| Log likelihood | -5078.174 | | -4735.3154 | |
| Number of parameters | 124 | | 122 | |
| Akaike criterion | 10404.35 | | 9714.6308 | |

**Table A6. Simulated effects of policy reform on survival rates (in %) after 6. 12 … months of unemployment. men**

| | | Age and entitlement to UB | Previous Income | West Germany | | | | | | | | East Germany | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Before reform | | | | After reform | | | | Before reform | | | | After reform | | | |
| | | | | 6 | 12 | 18 | 24 | 6 | 12 | 18 | 24 | 6 | 12 | 18 | 24 | 6 | 12 | 18 | 24 |
| A | No UA and no UB II; Couple. no children | 45 (18 → 12) | *average* | 65 | 38 | 27 | 9 | 55 | 35 | 10 | 3 | 60 | 32 | 19 | 4 | 54 | 26 | 6 | 1 |
| | | 52 (24 → 12) | *average* | 74 | 54 | 37 | 29 | 61 | 42 | 14 | 5 | 68 | 44 | 29 | 17 | 59 | 31 | 8 | 2 |
| | | 57 (32 → 18) | *average* | 89 | 81 | 69 | 58 | 84 | 69 | 59 | 33 | 79 | 61 | 48 | 29 | 74 | 45 | 27 | 5 |
| B | UA and UB II; Single. no children | 40 (12 → 12) | *low* | 46 | 25 | 18 | 13 | 46 | 25 | 18 | 13 | 57 | 29 | 20 | 14 | 57 | 29 | 20 | 14 |
| | | | *high* | | | | | 46 | 25 | 16 | 11 | | | | | 57 | 29 | 18 | 12 |
| | | 45 (18 → 12) | *low* | 67 | 41 | 30 | 24 | 58 | 38 | 30 | 24 | 67 | 41 | 26 | 19 | 61 | 35 | 24 | 18 |
| | | | *high* | | | | | 58 | 38 | 28 | 22 | | | | | 61 | 35 | 23 | 16 |
| | | 52 (24 → 12) | *low* | 76 | 56 | 40 | 31 | 63 | 45 | 36 | 30 | 74 | 52 | 37 | 25 | 66 | 39 | 29 | 22 |
| | | | *high* | | | | | 63 | 45 | 34 | 27 | | | | | 66 | 39 | 27 | 20 |
| | | 57 (32 → 18) | *low* | 90 | 81 | 68 | 56 | 84 | 69 | 58 | 52 | 83 | 68 | 56 | 39 | 79 | 54 | 37 | 28 |
| | | | *high* | | | | | 84 | 69 | 58 | 50 | | | | | 79 | 54 | 37 | 26 |
| C | UA and UB II; Couple. 1 child | 40 (12 → 12) | *low* | 45 | 24 | 16 | 12 | 45 | 24 | 17 | 12 | 50 | 23 | 14 | 9 | 50 | 23 | 14 | 9 |
| | | | *high* | | | | | 45 | 24 | 16 | 12 | | | | | 50 | 23 | 14 | 9 |
| | | 45 (18 → 12) | *low* | 66 | 41 | 29 | 23 | 57 | 37 | 29 | 24 | 60 | 33 | 20 | 13 | 55 | 27 | 18 | 13 |
| | | | *high* | | | | | 57 | 37 | 29 | 23 | | | | | 55 | 27 | 18 | 12 |
| | | 52 (24 → 12) | *low* | 76 | 56 | 40 | 31 | 63 | 44 | 35 | 30 | 68 | 44 | 30 | 19 | 60 | 32 | 23 | 16 |
| | | | *high* | | | | | 63 | 44 | 35 | 29 | | | | | 60 | 32 | 22 | 16 |
| | | 57 (32 → 18) | *low* | 90 | 82 | 70 | 60 | 85 | 71 | 61 | 55 | 80 | 63 | 50 | 34 | 75 | 49 | 33 | 24 |
| | | | *high* | | | | | 85 | 71 | 61 | 55 | | | | | 75 | 49 | 33 | 24 |

Source: Simulations based on estimation results in Table A4.

**Table A7. Simulated effects of policy reform on survival rates (in %) after 6. 12 … months of unemployment. women**

| | | Age and entitlement to UB | Previous Income | West Germany | | | | | | | | East Germany | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Before reform | | | | After reform | | | | Before reform | | | | After reform | | | |
| | | | | 6 | 12 | 18 | 24 | 6 | 12 | 18 | 24 | 6 | 12 | 18 | 24 | 6 | 12 | 18 | 24 |
| A | No UA and no UB II; Couple. no children | 45 (18 → 12) | *average* | 72 | 44 | 26 | 6 | 67 | 40 | 6 | 1 | 65 | 46 | 29 | 10 | 72 | 44 | 13 | 5 |
| | | 52 (24 → 12) | *average* | 84 | 62 | 42 | 30 | 74 | 49 | 10 | 3 | 80 | 58 | 47 | 36 | 80 | 57 | 24 | 12 |
| | | 57 (32 → 18) | *average* | 89 | 73 | 58 | 45 | 88 | 66 | 43 | 10 | 92 | 83 | 73 | 67 | 88 | 79 | 69 | 47 |
| B | UA and UB II; Single. no children | 40 (12 → 12) | *low* | 55 | 28 | 19 | 14 | 55 | 28 | 19 | 14 | 70 | 40 | 26 | 19 | 70 | 40 | 26 | 19 |
| | | | *high* | | | | | 55 | 28 | 17 | 12 | | | | | 70 | 40 | 25 | 17 |
| | | 45 (18 → 12) | *low* | 69 | 41 | 25 | 20 | 64 | 38 | 28 | 23 | 67 | 48 | 32 | 24 | 74 | 47 | 33 | 25 |
| | | | *high* | | | | | 64 | 38 | 26 | 19 | | | | | 74 | 47 | 31 | 22 |
| | | 52 (24 → 12) | *low* | 83 | 60 | 42 | 31 | 72 | 49 | 39 | 33 | 82 | 60 | 49 | 39 | 81 | 59 | 47 | 38 |
| | | | *high* | | | | | 72 | 49 | 36 | 29 | | | | | 81 | 59 | 45 | 36 |
| | | 57 (32 → 18) | *low* | 91 | 79 | 66 | 55 | 90 | 72 | 53 | 49 | 93 | 84 | 75 | 70 | 89 | 81 | 72 | 66 |
| | | | *high* | | | | | 90 | 72 | 53 | 47 | | | | | 89 | 81 | 72 | 65 |
| C | UA and UB II; Couple. 1 child | 40 (12 → 12) | *low* | 64 | 35 | 25 | 20 | 64 | 35 | 26 | 21 | 75 | 48 | 34 | 26 | 75 | 48 | 34 | 26 |
| | | | *high* | | | | | 64 | 35 | 25 | 20 | | | | | 75 | 48 | 34 | 26 |
| | | 45 (18 → 12) | *low* | 76 | 49 | 29 | 24 | 71 | 44 | 35 | 29 | 72 | 55 | 40 | 31 | 78 | 54 | 41 | 32 |
| | | | *high* | | | | | 71 | 44 | 34 | 29 | | | | | 78 | 54 | 40 | 32 |
| | | 52 (24 → 12) | *low* | 85 | 65 | 45 | 31 | 77 | 52 | 43 | 38 | 85 | 67 | 56 | 47 | 85 | 66 | 54 | 46 |
| | | | *high* | | | | | 77 | 52 | 43 | 37 | | | | | 85 | 66 | 54 | 46 |
| | | 57 (32 → 18) | *low* | 88 | 70 | 54 | 40 | 88 | 64 | 38 | 34 | 94 | 86 | 79 | 74 | 91 | 84 | 76 | 70 |
| | | | *high* | | | | | 88 | 64 | 38 | 34 | | | | | 91 | 84 | 76 | 70 |

Source: Simulations based on estimation results in Table A5.