Observed and unobserved determinants of unemployment insurance benefit sanctions in Germany: evidence from matched individual and regional administrative data

Müller, Kai-Uwe

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Kai-Uwe Müller

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Evidence from matched individual and regional administrative data*

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Social Science Research Center Berlin

Research Area:
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Labor Market Policy and Employment
http://www.wzb.eu/ars/ab/
kmueller@wzb.eu

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Wissenschaftszentrum Berlin für Sozialforschung (WZB) •
Reichpietschufer 50 • D-10785 Berlin • www.wzb.eu

Abstract

The paper analyzes the individual and regional determinants of unemployment benefit sanctions in Germany. On the basis of an administrative data set a multilevel hazard rate model in discrete time for the transitions into a sanction is estimated, controlling for unobserved heterogeneity on the individual and regional level. It is shown that certain benefit recipients, e.g. younger people, are more likely to receive sanctions than e.g. older, disabled, or skilled individuals. Moreover, the risk of being sanctioned not only depends on individual characteristics but is also influenced by the sanction policies of the employment agencies.

Zusammenfassung

Der Beitrag untersucht individuelle und regionale Determinanten von Sanktionen, die Unterstützungsleistungen arbeitsloser Leistungsempfänger in Deutschland mindern. Auf Basis von neu verfügbaren Geschäftsdaten der Bundesagentur für Arbeit werden sanktionierte und unsanktionierte Leistungsempfänger verglichen. Zudem wird ein multivariates Abgangsratenmodell in diskreter Zeit spezifiziert, das unbeobachtete Heterogenität auf individueller und regionaler Ebene kontrolliert. Dabei zeigt sich, dass Arbeitslose in ganz unterschiedlichem Maße von Sanktionen betroffen sind: Beispielsweise erhalten jüngere Menschen unter 25 Jahren Sanktionen mit höherer Wahrscheinlichkeit als Ältere über 50 Jahre, Schwerbehinderte oder hoch qualifizierte Leistungsempfänger. Das individuelle Sanktionsrisiko ist nicht ausschließlich vom Verhalten des Arbeitslosen, sondern ebenso von der Sanktionierungspolitik der regionalen Arbeitsagenturen abhängig.

Content

1 Introduction

The 'JobAqtiv Act' of late 2001 and the so-called 'Hartz laws I-IV' implemented between 2003 and 2005 mark important milestones in the reform of active and passive labor market policies in Germany. As part of the reorganization of the unemployment insurance (UI) system the legal rules for benefit sanctions were amended in order to make the imposition of sanctions more effective in Germany. These changes in the sanction regime are part of a broader international trend to increase the pressure on UI benefit recipients and to 'activate' them (cf. Eichhorst et al., 2006 or Klammer and Leiber, 2004).

Primarily due to data limitations so far little is known for the German case about the imposition of benefit sanctions and individual sanction probabilities. A descriptive study by Wilke (2004) based on individual data from the 'Employment Sub-sample' of the Institute for Labor Market and Employment Research exemplifies the data restrictions as it cannot discriminate between benefit sanctions in a narrower sense ('Sperrzeiten') and minor penalties that are in most cases revoked ('Säumniszeiten'). Wilke's findings do thus not completely correspond to actual benefit sanctions that lead to a suspension of benefits. For instance, the result that most of the sanctions are withdrawn within a short period of time does not hold for benefit sanctions in the narrow sense as aggregate data on the share of revoked sanctions show (cf. Müller and Oschmiansky, 2005).

With the *Integrated Employment Biographies (IEB)* a new comprehensive administrative data set is available (cf. Hummel et al., 2005). On this basis the paper aims to broaden the understanding of the imposition of sanctions. Focusing on UI benefit sanctions after the rejection of a job offer or a placement into a program of active labor market policy (ALMP) that lead to a suspension of benefits the following empirical questions will be addressed: What proportion of the newly unemployed individuals is actually receiving a benefit sanction? At which point in time during the unemployment spell are sanctions predominantly imposed? How does the composition of the faction of sanctioned unemployed differ from the group that has not received a sanction? What are the individual and regional determinants of the transition rate into a sanction? Which role does the sanction policy of the local public employment agency play for the individual sanction probability? The wider ranging and complex question concerning the labor market effects of sanctions will not be tackled in this short contribution, though.

In order to answer these research questions I first analyze the transition rate from unemployment into a benefit sanction descriptively. Then a *multivariate, multilevel hazard rate model* in discrete time that also controls for nested unobserved heterogeneity is specified to investigate the individual and regional determinants of receiving a benefit sanction. It will be shown that the overall share of sanctioned unemployed is rather small. Only about one percent of newly unemployed benefit recipients receives a sanction that effectively reduces their benefits for at least 3 weeks. More sanctions are imposed in the first six months of the unemployment spell. The composition of the pool of sanctioned unemployed is markedly different from non-sanctioned benefit recipients: younger and low-qualified individuals are over-, women, older, highly-qualified and disabled persons are underrepresented among the sanctioned. Unobserved individual characteristics of the unemployed also affect the probability of being sanctioned. Moreover, it will be shown that there is systematic regional variation in the individual risk of re-

ceiving a benefit sanction that cannot only be attributed to regional context conditions but also to the sanction policy of the respective employment agency. This means that benefit recipients in Germany are not being treated equally with regard to the sanction rules.

The remainder of the paper consists of five parts. Section 2 briefly reviews the literature, discusses the theoretical background for the imposition of sanctions and formulates hypotheses. In section 3 the data base is described, the sample design is discussed and the variables of the empirical analysis are defined. Section 4 outlines the econometric model. The results are presented in section 5. Section 6 summarizes my conclusions.

2 State of the Literature and Hypotheses

The monitoring of the unemployed and the imposition of benefit sanctions can be understood as institutional features of UI systems to reduce disincentive effects. The *theoretical literature* on optimal UI design dealing with the effects of sanctions (cf. Fredriksson and Holmlund, 2003) tries to derive the optimal level of monitoring and sanctions given their costs and benefits. It is shown that sanctions can improve the incentive structure of UI benefit systems and increase the transition rate to employment (Boone and Van Ours, 2000; Boone et al., 2001; Fredriksson and Holmlund, 2005). Incorporating sanctions into an UI system can be more efficient than an across the board reduction of benefits and is thus potentially welfare improving (Boone and Van Ours, 2000).

Empirical analyses on benefit sanctions are mainly concerned with their causal labor market effects on the transition rate from unemployment to employment. The direct incentive effect for those individuals who have received a benefit sanction is to be distinguished from the threat effect of a potential sanction that affects the reservation wage and search intensity of all unemployed benefit recipients. There is a series of papers based on experimental data for the U.S. (cf. Meyer, 1995; Johnson and Klepinger, 1994; Klepinger et al., 2002; Benus et al., 1997 and Ashenfelter et al., 2005) and for Europe (cf. Dolton and O'Neill, 1996; Micklewright and Nagy, 2005; Gorter and Kalb, 1996; Jensen et al., 1999 and Van den Berg and Van der Klaauw, 2006). In addition, non-experimental studies that draw on administrative data sets were carried out by Keeley and Robins, 1985, Lalive et al., 2005 and Abbring et al., 2005. Most of the studies conclude that sanctions exert a positive impact on the transition rate into employment. In several cases the imposition of a sanction is combined with more intensive counseling for the unemployed.

Whereas in many theoretical models agents are assumed to be homogeneous (i.e. everyone has the same sanction probability given his or her behavior), empirical analyses of the sanction effects have to account for individual heterogeneity to avoid selection bias in the estimated effects. I am not aware of any publications analyzing explicitly the determinants of benefit sanctions. Therefore this paper is focused on observed and unobserved factors on the individual and regional level that influence the transition process from unemployment into the state of an imposed benefit sanction.

On the *individual level* a number of explanations can be thought of that are related to *observable characteristics*. First, a certain behavior of the unemployed may be related to their socio-economic characteristics. Older people, for instance, tend to be more risk averse than younger persons. Since their employment options are generally limited, the elderly will be more inclined to accept a job offer or to participate in a labor market policy program and therefore will not risk a benefit sanction. Younger people could be more careless regarding the sanction rules and thus face sanctions with a higher probability. Second, institutional factors restricting the behavior and hence the sanction probability could also be relevant. Job search requirements and sanction rules are not implemented uniformly, but applied selectively, e.g. by age or family status. Older unemployed, single parents as well as disabled persons should thus ceteris paribus have lower inflow rates into a penalty. People with larger benefit entitlements ought to be sanctioned less often since they have a greater financial incentive to avoid a penalty. Third, the capacity of circumventing benefit sanctions may not be distributed equally. For instance, highly qualified persons could be more skilled and successful in avoiding sanctions which would lead to lower sanction rates. Fourth, to some degree societal norms may influence the decision of an employment officer (not) to impose a benefit sanction. One could imagine that individuals who are perceived to be not as flexible, e.g. older people or parents, will not be treated as strictly by the Public Employment Service (PES) as e.g. young singles.

In addition to the described effects that are related to observable variables *unobserved individual heterogeneity* should also play an important role for transitions into a benefit sanction. Some individual characteristics (e.g. risk aversion or work motivation) cannot be observed but vary between individuals regardless of age, sex, etc. Some people could therefore engage in more risky behavior than others and thereby accept the higher probability of benefit sanctions. This may lead to different sanction rates between on the surface identical people.

Institutional details of UI design (see e.g. Grubb, 2000) and the implementation of sanctions, which both also affect the probability of receiving a benefit sanction, are neglected in most of the above mentioned literature. Müller and Oschmiansky (2005; 2006) have shown that there is considerable cross-regional variation in the implementation of benefit sanctions in Germany. As sanction rules have to be executed by the PES, problems of policy implementation arise. Eventually a placement counselor decides if a job offer is suitable, or search requirements were violated and, therefore, a benefit sanction is warranted. In addition such decisions are constrained by the conditions on the regional labor market. This leads to regional differences in the monitoring and sanction intensity which have an effect on the individual probability of getting sanctioned.

The following hypotheses can be derived for *factors on the regional level*. First, the situation on the regional labor market influences the sanction probability. The individual risk of getting sanctioned is higher when the level and duration of unemployment is low and the vacancy rate is high; otherwise there would not be many possibilities for rejecting job offers made by the PES that could ultimately lead to a sanction. Second, implementation variables will have an impact on the transition rate into a sanction. An employment agency that has relatively more personnel (a favorable staff/client-ratio) and/or maintains a larger secondary labor market has more resources and/or opportunities to impose benefit sanctions.

Not least, the sanction policy of an employment agency is crucial: Benefit recipients living in an employment district where the local agency pursues a stricter activation strategy should have a markedly higher probability of benefit sanctions.

3 Data Set, Sample Design and Definition of Variables

This study uses a new individual data set, the *Integrated Employment Biographies (IEB)* from the German PES (see Hummel et al., 2005). Originating from four different sources this administrative data contains register data on unemployment insurance and assistance benefits, the participation in programs of ALMP, and employment registrations covered by the social security system. It comprises all individuals who are either registered as 'unemployed' or officially 'searching for employment'. The data are merged by means of the social security or the PES customer number.

This spell data set consists of information about different employment states and the transitions between those states on a daily basis. The IEB does not record data about certain labor market states like self- and civil employment or being out of the labor force. As notifications from the employers about new employment contracts can arrive delayed there are data gaps for the latest year included in the IEB. *Quarterly inflow samples* are used for the years 2001 and 2002 which are randomly drawn from the population of unemployed individuals receiving unemployment insurance or assistance benefits and therefore being at risk of getting sanctioned (for more details see WZB and infas, 2006). Samples were drawn and estimations carried out separately for both sexes as well as for East and West Germany.

For the empirical analysis benefit sanctions in the sense used here have to be distinguished from several short term penalties (maximum of seven days), including penalties for a missed appointment with an employment officer ('Säumniszeiten'), and from the so-called 'Minderungsbeträge', when benefits are reduced due to a late registration as unemployed. The focus here is thus solely on temporary suspensions of benefits ('*Sperrzeiten*') which entail the following types of penalties: the rejection of a reasonable job offer from the PES (§ 144 I, No. 2 SGB III) and the refusal to participate in programs of ALMP (§ 144 I, No. 3 SGB III). These cases correspond to the theoretically interesting types of sanctions for already unemployed benefit recipients which are intended to reduce adverse incentive effects of the UI.

The *dependent variable* is the individual transition rate from unemployment to a *benefit sanction* in the form of a temporary suspension of benefits. Only those cases are recorded as 'effective sanctions' that are followed by a period of 20 days without benefit payments. This condition guarantees that a benefit sanction of at least 3 weeks was not only imposed but also implemented insofar as payments were actually suspended. If this is not the case either an objection was entered and the sanction was lifted or any type of shorter sanction was imposed. In constructing the sample only those cases are considered that are actually at risk of getting sanctioned. Leaving the state of unemployment, e.g. transitions to employment or into a labor market program as well as outflows from benefit reception for other reasons lead to right-censored cases.

Independent variables on the *individual level* are socio-economic characteristics like sex, age, level of qualification, disabilities, nationality, benefit level, children younger than 3 years in the household, and more than 2 children in the household. In order to model the labor market and unemployment history of individuals the cumulated duration of previous unemployment spells is calculated before the individual enters unemployment at the beginning of the observation period. Moreover, dummies for the incidence of benefit sanctions and other types of shorter penalties before the inflow into unemployment in the observation period are specified. The latter two might capture to some extent unobserved individual heterogeneity and shall give an indication, whether the individual is prone to receiving different kinds of penalties. One has to be aware that – if they are correlated with the stochastic process of getting sanctioned – these dummies are not completely exogenous. The independent variables are partially time-variant and denoted by x_{tij} in the methodological section 4 (for details see WZB and infas, 2006). The descriptive statistics are discussed in more detail in sub-section 5.1 (see Tab. 2 below).

In addition *aggregate data on the regional level* of employment agencies are utilized. These data are available on a monthly basis for the years 2000-2004 and can be matched with the individual IEB variables. The *covariates* (denoted by x_{tj}) that are used to model the regional labor supply and demand are the regional unemployment rate, the average unemployment duration and the vacancy rate. Moreover, implementation indicators like the personnel resources of the agency and the size of the secondary labor market are included in the model (for definitions see Tab. 5 and for descriptive statistics Tab. 6 in the Appendix). I did not include the regional sanction rate as a proxy variable for the sanction policy of the employment agency. Its coefficient could not be interpreted as this variable would be endogenous: the dependent variable would also appear in the regional sanction rate on the right-hand side. Therefore unobserved heterogeneity at the regional level is analyzed explicitly.

4 Econometric Model

An empirical reduced-form model (cf. Neumann, 1997) is specified to analyze the determinants of the hazard rate from unemployment into a sanction which is assumed to have the following continuous time representation:

(1) $$\theta(t \mid x) = \lambda(t)\exp(x'\beta) \ .$$

θ(.) is the transition rate from unemployment into an 'effective' sanction. It is a function of the time variable *t* denoting the elapsed duration since entering the state of unemployment and conditioned on observed covariates *x*. *θ(.)* is assumed to have a *Proportional Hazards (PH) specification* given the vector *x* (see Lancaster, 1990; Jenkins, 2005). The term *λ(t)* symbolizes the baseline hazard function depending on *t* but not on *x* and is assumed to be common to all persons. The individual-specific (and non-negative) function *exp(x'β)* scales the baseline hazard. Therefore this specification is also known as multiplicative hazard model. Proportionality means that absolute changes in *x* imply proportionate changes in *θ(.)* at each *t*, moreover the effects of *x* are assumed to be constant over time.

Although it is often impossible to justify the PH assumption on theoretical grounds (cf. Neumann, 1997), these types of models have been popular in applied research (Devine and Kiefer, 1993). Van den Berg, 2000 shows that under certain assumptions a PH specification can be derived from economic search theory. In the subsequent analysis *θ(.)* is modeled in discrete time (cf. Allison, 1982) for the following reasons: First, the baseline hazard rate can be specified very flexibly (see below). This means that the assumption of proportionality needs only to hold in smaller time intervals. Second, as time is observed in discrete units there would be a number of 'ties' in a continuous time model. Third, it is easy to incorporate time-varying covariates. The continuous time IEB data set is thus expanded into the person-period format generating monthly time intervals (see e.g. Jenkins, 1995). The *discrete time representation* of the proportional hazards function *θ(.)* is referred to as the *'complementary log-log model'* (see e.g. Singer and Willet, 2003 or Kalbfleisch and Prentice, 2002) and looks like follows:

$$(2) \qquad h_t(t, x_{tij}, x_{tj}) = 1 - \exp[-\exp(\kappa_t + \beta_0 + \beta_1' x_{tij} + \beta_2' x_{tj})] \ .$$

Thereby $h_t(.)$ represents the discrete time hazard rates at the end of the respective time interval and κ_t is the difference between the integrated *baseline hazard rates* at the beginning and the end of the interval (see e.g. Jenkins, 2005). The threefold indexing represents the *3-level structure of the discrete time data* (see e.g. Goldstein, 1995 for similar models) distinguishing: *t=1,2,…, T* time periods (measured in months) for each individual, *i=1,2,…,N* individuals and *j=1,2,…,141* West German as well as *j=1,2,…,40* East German employment districts.

Two types of *explanatory variables* are incorporated into the model. The matrix x_{tij} contains observable individual characteristics whereas x_{tj} includes observable regional covariates like the level and the structure of unemployment, the number of vacancies or the personnel resources of the employment agency which should also influence the individual probability of a sanction. The variables, both in x_{tij} and x_{tj}, may also vary over time (see section 3).

The functional form that characterizes the *duration dependence* is modeled flexibly using a piecewise constant specification. This means that the baseline hazard is assumed to be constant within groups of months whereas the hazard can differ between these groups. This is technically realized by the inclusion of a set of dummy variables into the model that are equal to one in the respective time period and equal to zero otherwise (Kalbfleisch and Prentice, 2002; Lancaster, 1990). The *baseline hazard* is given as follows:

$$(3) \qquad h_t(t) = 1 - \exp[-\exp(\gamma_1 D_{1t} + \gamma_2 D_{2t} + ... + \gamma_J D_{Jt})] \ .$$

In most applications *unobserved heterogeneity* is only considered for the individual level. In section 2 it was mentioned that important individual characteristics are unobserved and not included in x_{tij}. The same is true for unobserved variables at the regional PES agency level – especially a PES agency's sanction policy – which are not captured by x_{tj}. As argued in the theoretical considerations above unobserved factors on the regional PES agency level (e.g. due to differences in policy implementation and PES performance) may also influence the sanction intensity and therefore the individual sanction probability. If those factors are ignored the baseline hazard and parameters for x_{tij} and x_{tj} are biased and

inconsistently estimated in (2) (cf. Heckman and Singer, 1984a or Lancaster, 1990). Moreover standard errors in such models are underestimated.

For this reason the terms v_{ij}, v_j, are incorporated into the empirical model representing *unobserved heterogeneity at the individual and the regional level*. These heterogeneity terms are assumed to be constant over time. Following Heckman and Singer (1984b) a non-parametric approach is chosen to model time-invariant unobserved heterogeneity at the individual (v_{ij}) and the regional (v_j) level. It is specified as an arbitrary *discrete distribution with a set of 'mass points'*. These locations are estimated freely whereas individual probabilities of being located at each point are attached to them. For the example of two heterogeneity classes at the individual level (denoted by *a* and *b*) v_{ij} has the values $v_{ij}=(v_{ija},v_{ijb})$ with probabilities $\Pr(v_{ija})=p_a$ and $\Pr(v_{ijb})=p_b=1-p_a$. If there are also two classes at the regional level (denoted by *c* and *d*), then v_j has the values $v_j=(v_{jc},v_{jd})$ with probabilities $\Pr(v_{jc})=p_c$ and $\Pr(v_{jd})=p_d=1-p_c$. It is assumed that v_{ij} and v_j fulfill the following conditions:

(4)
$$\sum_{l=1}^{L}\Pr(v_{ijm})=1\ ,\ \sum_{m=1}^{M}\Pr(v_{jm})=1\ ,$$
$$\sum_{l=1}^{L}v_{ijl}\ \Pr(v_{ijl})=1\ ,\ \sum_{m=1}^{M}v_{jm}\ \Pr(v_{jm})=1\ ,$$
$$E[v_{ijl}x_{ijt}]=E[v_{ijl}x_{jt}]=E[v_{jl}x_{ijt}]=E[v_{jl}x_{jt}]=0 \ \textit{and}$$
$$E[v_{ijl}v_{jm}]=0\ .$$

Unobserved heterogeneity is then introduced into the duration model by allowing the intercept β_0 to vary between different types of individuals and regions. It is replaced by v_{ij}, v_j (see Sastry, 1997 for a similar model). The hazard function including individual and regional heterogeneity terms looks like follows:

(5)
$$h_{tij}(t,x_{tij},x_{tj})=1-\exp[-\exp(\kappa_t+v_{ij}+v_j+\beta_1'x_{tij}+\beta_2'x_{tj})]\ .$$

Since an inflow sample is used, the individual likelihood contribution for a right-censored spell equals the discrete time survivor function:

(6)
$$L_i=\Pr(T_i>t)=S_i(t)=\prod_{k=1}^{t}(1-h_{ki})\ .$$

For the completed spell it is given by the discrete time density function (see Lancaster, 1990 or Jenkins, 2005):

(7)
$$L_i=\Pr(T_i=t)=\ f_i(t)=h_{ti}S_i(t-1)=\frac{h_{ti}}{1-h_{ti}}\prod_{k=1}^{t}(1-h_{ki})$$

The overall likelihood results from the product of individual likelihoods. After incorporating the above outlined heterogeneity terms and re-arranging the following overall sample likelihood can be derived:

(8)
$$L=\prod_{i=1}^{n}\left[\sum_{l=a}^{b}\sum_{m=c}^{d}p_{ml}\left\{\left(\frac{h_{lmti}}{1-h_{lmti}}\right)^{\delta_i}\prod_{k=1}^{t}(1-h_{lmki})\right\}\right].$$

Thereby δ_i symbolizes a censoring indicator with the value $\delta_i=1$ for complete, and $\delta_i=0$ for right-censored spells. The hazard function from (5) is then plugged into (8), logs are taken for computational simplicity and the model is estimated with the help of the program package Gllamm (see Rabe-Hesketh et al., 2004) which is implemented in Stata.

5 Empirical Results

5.1 Descriptive Statistics

Basic statistics for the IEB data samples are provided in Tab. 1 for the inflows in 2001 and 2002. The inflow samples contain a total of about 80,000 spells per year. An 'effective' sanction which suspends benefit payments for at least 20 days is imposed in 1.2% (West) and 0.5% (East) of all inflow spells. This small share is consistent with aggregate administrative data for Germany where the rate of imposed sanctions in relation to all inflows of unemployed is also around 1%. Abbring et al., 2005 who utilize a comparable data set report similarly small numbers whereas the higher share of sanctions in comparable Suisse data reflects a much stricter sanction regime in this country (cf. Lalive et al., 2005). In addition Tab. 1 shows that in West Germany a slightly higher share of sanctions is imposed during the first six months of the unemployment spell. After that the transition rate into an effective sanction steadily declines with the elapsed unemployment duration.

Tab. 1 Sample statistics, inflow samples 2001 and 2002

	West Germany		East Germany	
Variable	**Inflows 2001**	**Inflows 2002**	**Inflows 2001**	**Inflows 2002**
No. spells	81,392	82,089	80,060	79,870
No. individuals	79,602	80,311	78,698	78,278
No. 'effective' sanctions	1,078	972	431	404
% of which within (of unemployment spell)				
1-3 months	20.71	21.19	12.33	14.36
4-6 months	15.88	23.66	14.88	20.54
7-9 months	10.68	13.48	13.26	16.34
10-12 months	9.94	11.73	10.70	11.14
13-15 months	7.52	8.02	6.51	10.40
16-20 months	12.35	9.05	12.09	11.39
21-25 months	7.71	6.38	9.53	8.66
>25 months	15.23	6.48	20.70	7.18

Sources: IEB and the authors' own calculations.

The descriptive comparison between spells of sanctioned and non-sanctioned unemployed shows considerable differences with respect to several individual characteristics from which a profile of the sanctioned unemployed can be derived (see Tab. 2). *Women* receive a benefit sanction less frequently than men. *Highly qualified* unemployed are also clearly under-represented in the group of unemployed having received a benefit sanction. Moreover, *older* and *disabled* unemployed get a benefit sanction less frequently than their respective comparison

groups. In East Germany older unemployed are sanctioned a little more often compared to the West.

The most over-represented group among newly unemployed persons receiving a benefit sanction are *younger individuals* below the age of 25 years whose portion in West Germany is more than 40% and nearly 50% in the East. The share of younger persons in the comparison groups is only 20% respectively. Between 2001 and 2004 the share of younger individuals among sanctioned unemployed increased by 10 and 15 percentage points in the West and East respectively (results not shown; cf. WZB and infas, 2006). Unemployed with *no formal qualification* receive a sanction much more frequently than qualified people. *Immigrants* are sanctioned with an above-average frequency only in West Germany.

Tab. 2 Comparison of unemployment spells without and with benefit sanction, inflow samples 2001-2002

Variable	West Germany		East Germany	
	No sanction	Sanction	No sanction	Sanction
Women (%)	39.41	27.01	38.76	22.57
University qualification (%)	3.32	0.65	3.44	0.70
No formal qualification (%)	32.83	41.45	15.36	23.86
Younger than 25 years (%)	19.91	40.84	20.19	48.65
Older than 50 years (%)	15.76	2.94	20.17	4.80
Disabled (%)	3.03	1.12	2.30	0.94
Immigrants (%)	11.61	17.34	2.77	3.63
Child < 3 years (%)	7.28	5.84	5.33	4.44
> 2 children (%)	3.90	3.22	2.72	1.52
Daily benefit payment (€)	23.81	19.74	20.33	16.81
Unemployment experience (%)	13.92	16.31	21.19	21.00
Sanction experience (%)	0.67	2.43	0.41	1.05
Other penalties experience (%)	0.47	1.54	0.39	1.29
No. spells	162,907	2,140	160,143	855

Sources: IEB and the authors' own calculations.

Moreover, the sanction probability seems to decrease with a higher *level of benefit* payments. The average benefit level per day of a non-sanctioned unemployed amounts to 24€ (West) and 20.5€ (East), whereas the sanctioned unemployed received 19.5€ (West) and 16.5€ (East) per day. This discrepancy can partly be explained by the different socio-economic composition of both groups. Only in West Germany sanctioned unemployed have experienced slightly higher unemployment durations over the last five years before the observation period. Individuals who get a benefit sanction had on average more often been hit with a *benefit sanction prior* to the observed period. This group had also experienced more *short-term penalties* in the past. The latter applies for Germany as a whole.

5.2 Results from Hazard Rate Models

Multivariate hazard rate models are specified to investigate the determinants of the imposition of benefit sanctions. To make the estimations computationally feasible stratified sub-samples had to be drawn from the original samples. This explains the smaller number of observations. The results are based on the inflows into unemployment for the years 2001 and 2002 and given in Tab. 3 and 4 as

well as Tab. 7 to 12 in the Appendix. All models were estimated separately for men and women and for West and East Germany. In all tables the coefficients for the models without and with unobserved heterogeneity are reported to emphasize the relevance of accounting for unobserved factors. Ultimately, the coefficients together with the hazard ratios from the full model with unobserved heterogeneity are shown to discuss the direction and size of the estimated effects.

With respect to *observed individual characteristics* of the sanctioned unemployed the basic patterns that emerged from the descriptive analysis are confirmed in the multivariate models. Not all relationships remain statistically significant for East and West Germany, though, if other observed and unobserved factors are taken into account. The results show that *younger unemployed (< 25 years)* clearly get sanctioned with an above-average probability, if other observed and unobserved factors are taken into account. The positive coefficient is consistent and statistically significant for most of the observed inflow cohorts. This effect is also fairly substantial: for young males in West Germany who entered unemployment in 2001 the hazard ratio is nearly five times higher than for males above the age of 25 (see Tab. 3). For females of the same inflow cohort this effect is considerably larger; the hazard ratio for women below the age of 25 is 16 times higher than for older females (see Tab. 4). For the inflow cohorts 2002 the effect size diminishes and becomes insignificant for men. In East Germany the same relationship is statistically significant only for women with a similar magnitude (see Tab. 7 to 12).

The descriptive findings suggested that *low-qualified individuals* receive more sanctions. This relationship is not confirmed in the multivariate analysis holding all other factors constant. For males the variable remains insignificant throughout the estimations. For females in West Germany the effect is slightly positive whereas it becomes negative in the models for East Germany when unobserved heterogeneity is introduced. It seems that being low-qualified does per se not increase the individual risk of getting sanctioned.

On the other hand *older (> 50 years)* and *disabled benefit recipients* as well as individuals with a *university degree* are confronted with a lower risk of being sanctioned. These relationships are consistent for men and women in East and West Germany and statistically significant in most of the estimations. The negative effect is the largest for older individuals: in West Germany the hazard ratio of older men is for the 2001 cohort only 10 percent and for the 2002 cohort only 1 percent compared to all other men (see Tab. 3 and Tab. 7). For males in East Germany similar effects are found whereas the coefficient for females in West and East Germany have the same sign and a comparable size but are only weakly significant. Disabled males have similarly small hazard ratios compared to the reference group. The results are not as robust as for the elderly because the number of cases is considerably smaller, especially for females and in East Germany. Possessing a university degree reduces the sanction probability significantly only for men in West Germany, if other factors are controlled for.

The hypotheses regarding individual characteristics seem to be confirmed in those cases. The imposition of benefit sanctions is highly selective and depends on the age, qualification and health of the unemployed. It appears, however, that the existence of children in the household does not influence the imposition of benefit sanctions as neither the coefficient for young children nor for a higher

number of children turns out to be significant in any of the models. As expected the *benefit level* is negatively related to the imposition of sanctions in West and East Germany. The relationship is consistent over different inflow cohorts and regions but only statistically significant for the West German men in 2001.

Tab. 3 Determinants of a benefit sanction, Cloglog proportional hazards model in discrete time, West Germany, Men, inflows into unemployment in 2001

	Coefficients (without heterogeneity terms)		Coefficients (with heterogeneity terms)		Hazard ratios (with heterogeneity terms)	
	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]
Baseline hazard						
1-3 months	-0.4245**	0.1295	-3.2335**	0.3384	0.0394**	0.0133
4-6 months	0.1379	0.1290	-2.1617**	0.3036	0.1151**	0.0350
7-9 months	0.1029	0.1420	-1.7693**	0.2893	0.1704**	0.0493
10-12 months	0.2680	0.1500	-1.2449**	0.2626	0.2880**	0.0756
13-15 months	0.2208	0.1697	-0.7941**	0.2274	0.4520**	0.1028
Individual level covariates						
University degree	-1.2070*	0.5109	-2.3215*	1.1676	0.0981*	0.1146
No qualification	-0.0816	0.0856	-0.1824	0.2079	0.8333	0.1733
< 25 years	1.1320**	0.0991	1.5553**	0.2822	4.7365**	1.3365
> 50 years	-1.5916**	0.2171	-2.4621**	0.4503	0.0853**	0.0384
Immigrants	0.1542	0.1010	-0.3119	0.5212	0.7321	0.3815
Disabled	-1.4603**	0.4148	-2.7554**	0.6622	0.0636**	0.0421
> 2 children	-0.0788	0.1987	0.2496	0.4943	1.2835	0.6344
Child < 3 years	-0.2686	0.1748	-0.6119	1.7699	0.5423	0.9599
Benefits	-0.0405**	0.0054	-0.0637**	0.0176	0.9382**	0.0165
Prev. unemployment	-0.4221*	0.1912	0.5453	0.5578	1.7252	0.9623
Prev. sanctions	1.0902**	0.2501	0.9906	0.6758	2.6929	1.8200
Other penalties	0.3724	0.2662	0.1197	1.1184	1.1272	1.2606
Regional level covariates						
Personnel resources	-0.0016	0.0009	-0.0022	0.0020	0.9978	0.0020
Sec. labor market	-0.0113	0.0365	0.0391	0.1055	1.0399	0.1097
Unemployment rate	-0.1352**	0.0266	-0.1368	0.1242	0.8721	0.1083
Avg. unempl. duration	0.1506	0.3246	-0.8560	0.6223	0.4249	0.2644
Vacancy rate	0.0009	0.0013	-0.0039	0.0032	0.9961	0.0032
Constant	-3.9287**	0.8667	0.2598	1.7186		
Unobserved heterogeneity at individual level						
ε_1			-1.2962**	0.0732		
ε_2			5.4130			
Prob(ε_1)			0.8068			
Prob(ε_2)			0.1932			
Unobserved heterogeneity at regional level						
ε_3			-0.4486**	0.1250		
ε_4			1.2477			
Prob(ε_1)			0.7355			
Prob(ε_2)			0.2645			
Log likelihood	-4,974.1403		-3,684.6009			
AIC	9,994.2806		8,540.1914			
No. observations	45,861		45,861			

[1] White/Huber robust standard errors. [2] Variable determined outcome perfectly and was left out of the model. * Significance at 5% level. ** Significance at 1% level.
Sources: IEB and the authors' own calculations.

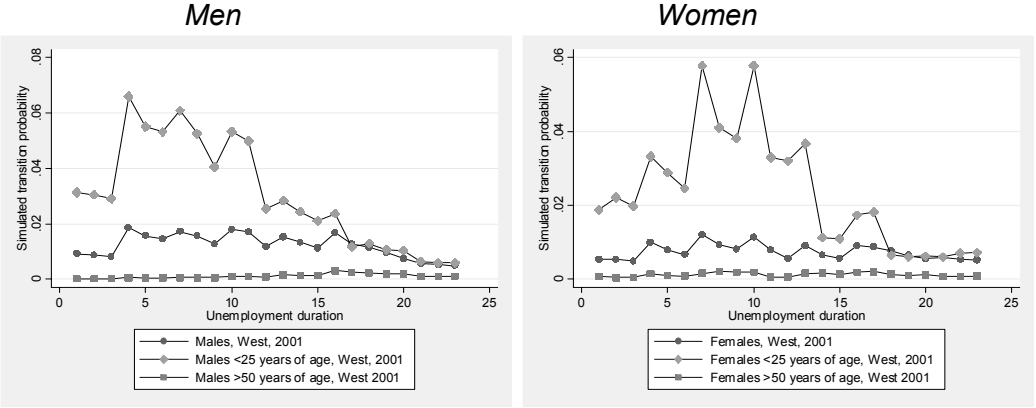
Tab. 4 Determinants of a benefit sanction, Cloglog proportional hazards model in discrete time, West Germany, Women, inflows into unemployment in 2001

	Coefficients (without heterogeneity terms)		Coefficients (with heterogeneity terms)		Hazard ratios (with heterogeneity terms)	
	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]
Baseline hazard						
1-3 months	-0.8915**	0.2272	-4.3761**	0.4463	0.0126**	0.0056
4-6 months	-0.3830	0.2181	-3.0560**	0.3068	0.0471**	0.0144
7-9 months	0.0288	0.2176	-2.0717**	0.3921	0.1260**	0.0494
10-12 months	-0.0384	0.2383	-1.3931**	0.2879	0.2483**	0.0715
13-15 months	0.0660	0.2548	-0.5960*	0.2511	0.5510*	0.1383
Individual level covariates						
University degree	-0.4265	0.5220	0.2009	0.8670	1.2225	1.0600
No qualification	0.2973*	0.1340	0.7257*	0.3416	2.0662*	0.7059
< 25 years	1.8301**	0.1582	2.8005**	0.3670	16.4536**	6.0379
> 50 years	-1.3849**	0.2600	-0.9437	0.5330	0.3892	0.2074
Immigrants	-0.0096	0.1961	-0.5359	0.2987	0.5852	0.1748
Disabled	0.0798	0.3650	-0.9134	1.0852	0.4012	0.4354
> 2 children	-0.1674	0.3906	-0.7569	0.7781	0.4691	0.3650
Child < 3 years	-0.1370	0.2117	0.9680	1.7199	2.6327	4.5279
Benefits	-0.0089	0.0088	0.0171	0.0282	1.0173	0.0287
Prev. unemployment	0.4750	0.2933	0.4738	0.3759	1.6061	0.6038
Prev. sanctions	2.2356**	0.4296	4.8982**	0.7657	134.0454**	102.6442
Other penalties	-0.0438	0.6229	1.8279	1.3263	6.2210	8.2510
Regional level covariates						
Personnel resources	-0.0002	0.0013	0.0015	0.0047	1.0015	0.0047
Sec. labor market	0.0449	0.0493	-0.0922	0.0834	0.9120	0.0761
Unemployment rate	0.0147	0.0402	-0.0054	0.0621	0.9947	0.0618
Avg. unempl. duration	-1.4681**	0.4723	-2.1326**	0.8994	0.1185**	0.1066
Vacancy rate	0.0078**	0.0017	0.0149**	0.0034	1.0150**	0.0034
Constant	-2.5394*	1.2748	-2.7115	3.1090		
Unobserved heterogeneity at individual level						
ε_1			-0.8645**	0.1076		
ε_2			6.8588			
Prob(ε_1)			0.8881			
Prob(ε_2)			0.1119			
Unobserved heterogeneity at regional level						
ε_3			-0.7322**	0.2146		
ε_4			1.6017			
Prob(ε_1)			0.6863			
Prob(ε_2)			0.3137			
Log likelihood	-2,173.6099		-1,859.5773			
AIC	4,393.2198		3,773.1546			
No. observations	31,190		31,190			

[1] White/Huber robust standard errors. [2] Variable determined outcome perfectly and was left out of the model. * Significance at 5% level. ** Significance at 1% level.
Sources: IEB and the authors' own calculations.

The differences in the sanction rate with regard to observable socio-economic characteristics can also be illustrated graphically by plotting *predicted sanction probabilities* for different unemployment durations and diverse sub-groups of the sample. In Fig. 1 this is done for the two age groups below 25 and above 50 years of age for West Germany and the inflow cohorts from the year 2001.

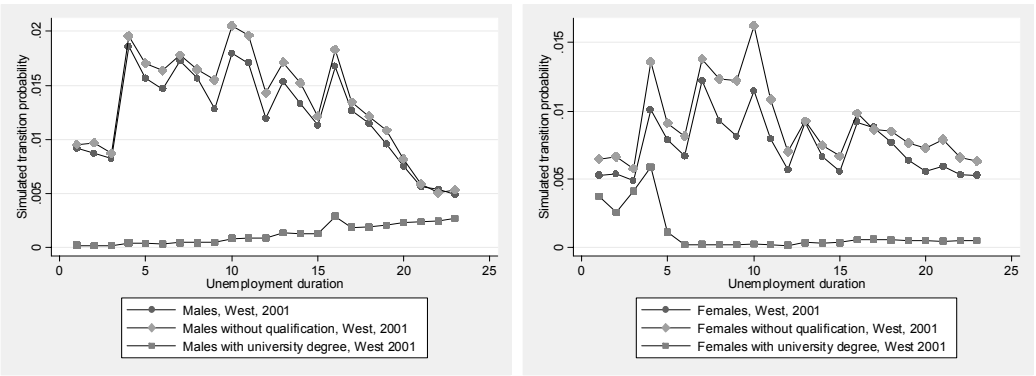
Fig. 1 Predicted transition probabilities by age group, West Germany, inflows into unemployment in 2001



Sources: IEB and the authors' own calculations.

Clearly, for both men and women it holds that individuals who are younger than 25 years of age have above-average sanction probabilities. Older persons above the age of 50 years, however, are practically in no danger of risking a penalty. Their predicted transition probabilities lie way below the average and are nearly zero. One has to keep in mind that these group effects are modeled to be constant over time. The group differences must not be interpreted as time-varying effects. The overall discrepancy in the sanction probability is the difference between the areas under both functions. In Fig. 2 the same graphs are drawn for low and highly qualified people. The predicted probability of getting sanctioned for individuals without a formal qualification is markedly higher than for persons who have a university degree. The difference can mainly be attributed to the small sanction risk for highly qualified individuals whereas the sanction probability for low-qualified persons ranges only slightly above the average for all men or women. Fig. 4 to Fig. 9 in the Appendix demonstrate that these patterns are also valid for the inflow cohorts of the year 2002 and East Germany.

Fig. 2 Predicted transition probabilities by level of qualification, West Germany, inflows into unemployment in 2001



Sources: IEB and the authors' own calculations.

For West Germany an important determinant of the sanction probability is the *previous incidence of benefit sanctions* over the individual's labor market history. Its positive effect on the sanction probability is robust for males and females as well as for different inflow cohorts (cf. WZB and infas, 2006). The size of the effect is considerable: The hazard ratio for males in West Germany who had received a sanction before they entered unemployment during the observation period is two times higher than that of previously not sanctioned men. For women the effect is markedly higher: for the 2002 inflow cohort the hazard ratio of previously sanctioned women is ten times, for the 2001 inflows more than 100 times higher than for the not sanctioned unemployed (see Tab. 3 and 4 as well as Tab. 7 and 8 in the Appendix). Two important caveats have to be made here. First, the large size of the effect for women should be seen in the light of a relatively low number of observations. Second, the substantial interpretation of this variable remains somewhat vague. As discussed in section 2 above certain unobservable characteristics should affect individual sanction probabilities. These factors might be captured in this variable which is why one does not measure the causal effect of previous sanctions on the incidence of current sanctions.

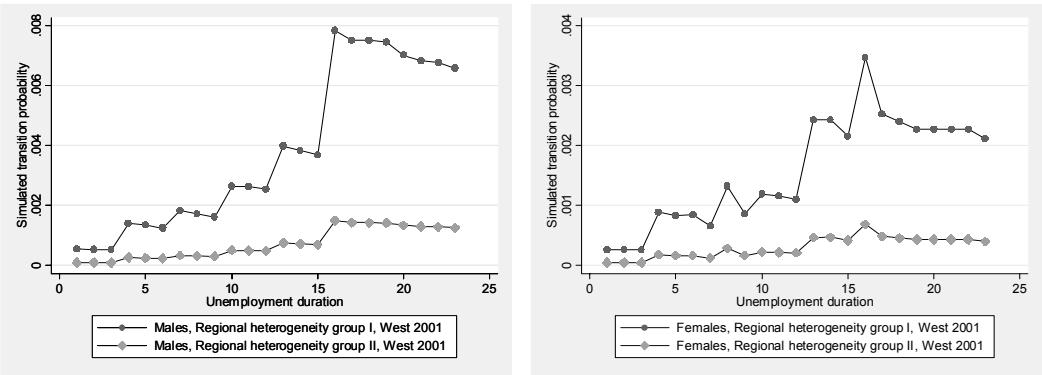
Note that there is no such consistent pattern in East Germany (see Tab. 9 to 12 in the Appendix). With the sanction probability being generally lower and labor market conditions more tight a recurrence of sanctions is relatively seldom. The same positive relationship does in general not hold for other types of *short penalties* whose coefficients are insignificant in most models. Apparently these types of misconduct (like missing an appointment or registering too late) happen rather randomly and are not related to the sort of misbehavior that is followed by a 'real' benefit sanction.

With regard to the *observed covariates on the regional level* some of the expected relationships are reflected in the empirical results. The coefficients of the average unemployment duration show negative signs and are statistically significant in most models. For example, if the average unemployment duration in the region increases by one week the hazard ratio for the female inflow cohort of the year 2001 is only about 10 percent as high as before (see Tab. 4). Moreover, the vacancy rate and size of the secondary labor market are positively related to the imposition of benefit sanctions and significant in some of the estimations as they present opportunities to impose penalties. In general the likelihood of receiving a benefit sanction is greater under more favorable labor market conditions, i.e. a lower level and duration of unemployment and higher demand for labor.

Finally, note that *unobserved heterogeneity* is clearly present in the data with respect to the transition process from unemployment into a benefit sanction. The freely estimated heterogeneity terms (ε_1, ε_3) on the individual and on the regional level are highly significant throughout the various models. The coefficients of the covariates, their standard errors and the overall likelihood change considerably when heterogeneity is introduced compared to a model without heterogeneity. In all estimations the model which includes unobserved heterogeneity is clearly favored according to Akaike's information criterion (see Tab. 3 and 4 as well as Tab. 7 to 12 in the Appendix). On the *individual level* this confirms the hypothesis that in addition to observable individual characteristics some unobserved factors (like motivation or risk aversion) are at play determining the individual sanction probabilities. The results show that given the observed covariates there are two groups of individuals with high and low sanction probabilities.

Moreover, the significant heterogeneity terms on the *regional level* suggest that groups of agencies differ with regard to the sanction probability after observed and unobserved individual as well as observed regional factors are controlled for. This finding supports the hypothesis that – aside from his or her socio-economic and behavioral characteristics – the UI benefit recipient's place of residence influences the probability of being sanctioned. Aside from unobserved context variables a plausible explanation would be an uneven imposition of benefit sanctions in Germany which confirms previous results from implementation research (cf. Müller and Oschmiansky, 2006). The individual probability of receiving a benefit sanction is therefore also influenced by the sanction policy of the local employment agency. Again, it is possible to illustrate this effect by way of plotting predicted transition probabilities which are conditioned on different values for the heterogeneity terms on the regional level (see Fig. 3). Thereby the other (individual) heterogeneity terms are conditioned to be equal to zero.

Fig. 3 Predicted transition probabilities conditioned on regional heterogeneity groups, West Germany, inflows into unemployment in 2001



Sources: IEB and the authors' own calculations.

In Fig. 3 it is shown that falling into a group with a higher sanction probability significantly increases the individual probability of receiving a benefit sanction. For the West German inflow cohorts from 2001 the risk of getting sanctioned ceteris paribus increases by factor three if an individual would move from the group of agencies with a low sanction rate into an agency with a higher sanction rate. This is a substantial difference and indicates that benefit recipients from different agencies may not be treated equally over different employment agencies.

6 Conclusions

This paper investigated the individual and regional determinants of UI benefit sanctions in Germany utilizing a newly available and very rich individual data set from the German PES. On the basis of descriptive statistics and a multivariate hazard rate model that controlled for unobserved heterogeneity on the individual and regional level the individual transition rate from unemployment into a sanction was analyzed for inflows into unemployment between 2001 and 2002. Only sanctions after the refusal of a job offer or the rejection of a placement into a

measure of ALMP which carried an effective reduction of benefit payments were considered here.

It was shown that the overall incidence rate of sanctions is rather small. Most of the benefit sanctions are imposed in the first six months of the unemployment spell. The descriptive statistics illustrated the differences between the groups of sanctioned and non-sanctioned individuals with respect to individual characteristics. Younger unemployed (<25 years) are noticeably, and to a lesser degree also low-qualified people, overrepresented in the pool of sanctioned unemployed. On the contrary, women, older unemployed (>50 years) and disabled persons have a lower share in the group of the sanctioned compared to all other benefit recipients.

Most of the theoretically derived hypotheses are reflected in the empirical results, if observed and unobserved factors on the individual and regional level are taken into account in a discrete time hazard rate model. Among the socio-demographic characteristics the age categories, especially the one for younger unemployed, remain statistically significant determinants of the imposition of benefit sanctions for West and East Germany. Apparently younger benefit recipients face a higher, older unemployed a markedly lower risk of getting a benefit sanction. Another cleavage in the risk of getting sanctioned is constituted by the level of qualification. Individuals who possess a university degree have ceteris paribus a significantly lower sanction probability. If other individual and regional factors are held constant, persons without a formal qualification are sanctioned only slightly more often than the average individual. Moreover, as was expected, disabled persons have a significantly lower risk of being sanctioned by the employment agency.

Another very strong individual determinant of benefit penalties was found to be the *previous incidence of benefit sanctions* over the individual's labor market history. This was interpreted as an indication that unobserved behavioral characteristics (like risk aversion or conformity to the rules) may influence the individual's sanction probability. That would mean that the group of sanctioned individuals differs from other unemployed with respect to its labor market behavior as suggested by previous theoretical and empirical research. Other types of shorter sanctions are not consistently related to the benefit sanctions that were considered here. Those breaches of rules seem to happen rather randomly.

Moreover, it was demonstrated that, having controlled for all observed factors and unobserved heterogeneity on the individual level, there are groups of employment agencies with either high or low sanction probabilities. This could be explained by unobserved context variables. It is plausible, though, to partially attribute these differences to a systematic variation in the implementation of the sanction rules. That means that a person's individual probability of receiving a penalty also depends on the sanction policy of the local PES agency. People who live in employment districts with a stricter sanction policy are indeed sanctioned more often. This means that unemployment benefit recipients are not treated equally with regard to the sanction rules. The question which follows from this result is, if a higher (regional) sanction rate increases the inflow into employment which could justify such inequalities? This more complicated issue concerning the labor market impact of sanctions could not be tackled in this paper and remains thus a question for future research.

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Appendix

Tab. 5 Definition of control variables measured at the level of regional employment agencies

Variable	Definition
Regional labor market conditions	
Unemployment rate	Number of registered unemployed divided by the civilian labor force (in percent)
Average duration of unemployment	Average duration of unemployment in weeks. Approximation: $unemployment\,duration = \frac{average\ stock\,of\ unemployed}{0{,}5*(entries + exits\ from\,unemployment)} * 52$
Share of benefits recipients	Average stock of unemployment insurance recipients divided by average stock of all unemployed (in percent)
Ratio between unemployed and vacancies	Ratio of newly registered unemployed and newly registered vacancies (in percent)
Employment growth	Percentage change in number of employed with mandatory social security coverage in December of current year in relation to number in December of preceding year (in percent)
Service sector share	Number of employed service-sector persons with mandatory social security coverage divided by total number of employed persons with mandatory social security coverage (in percent)
Population density	Population density of the district served by the public employment agency in the year 2000
Seasonality indicator	Spread between minimum and maximum monthly stock of unemployment; moving average for year of reference (2001)
Regional employment offices	
Size of the secondary labor market	Inflow of persons in job creation schemes (ABM) and structural adjustment measures (SAM) divided by newly unemployed persons (in percent)
Personnel resources	Average stock of unemployed divided by the number of job counselors ('Arbeitsvermittler' and 'Arbeitsberater') in employment agencies

Tab. 6 Descriptive statistics, control variables measured at the level of regional employment agencies, West Germany, 2001-2004

Variable	West Germany		East Germany	
	Mean	Std. Dev.	Mean	Std. Dev.
Sanction rate	1.06	0.68	0.51	0.37
Personnel resources	407.15	65.04	433.06	63.64
Secondary labor market	0.83	0.85	6.24	4.20
Unemployment rate	9.05	2.46	19.98	3.62
Average duration of unemployment	3.27	0.18	3.50	0.12
Ratio between unemployed and vacancies	41.31	19.49	28.35	10.40
Service sector share	67.23	8.75	76.00	12.13
Employment growth	-1.58	1.85	-1.57	9.18

Sources: Register data from the Federal Employment Agency and the author's own calculations.

Tab. 7 Determinants of a benefit sanction, Cloglog proportional hazards model in discrete time, West Germany, Men, inflows into unemployment in 2002

	Coefficients (without heterogeneity terms)		Coefficients (with heterogeneity terms)		Hazard ratios (with heterogeneity terms)	
	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]
Baseline hazard						
1-3 months	-0.6361**	0.1607	-2.2064**	0.2199	0.1101**	0.0242
4-6 months	0.0595	0.1533	-0.8715**	0.2169	0.4183**	0.0907
7-9 months	0.2578	0.1586	-0.4445**	0.1603	0.6412**	0.1028
10-12 months	0.4423**	0.1648	-0.1990	0.1775	0.8196	0.1455
13-15 months	0.3486	0.1893	-0.2283	0.1792	0.7959	0.1426
Individual level covariates						
University degree	-0.5818	0.4560	-1.9514*	0.7920	0.1421*	0.1125
No qualification	-0.0706	0.1008	0.2087	0.1388	1.2321	0.1710
< 25 years	1.1159**	0.1166	0.2478	0.1748	1.2812	0.2240
> 50 years	-2.4721**	0.4127	-4.7822**	0.5142	0.0084**	0.0043
Immigrants	0.3352**	0.1252	0.2245	0.1444	1.2517	0.1808
Disabled	-1.8548**	0.7121	-3.6463**	1.1596	0.0261**	0.0302
> 2 children	-0.4432	0.2793	-0.9798**	0.2766	0.3754**	0.1038
Child < 3 years	-0.1003	0.2150	-0.4110	0.3257	0.6630	0.2159
Benefits	-0.0310**	0.0058	-0.0195	0.0117	0.9807	0.0114
Prev. unemployment	0.0208	0.2616	-0.5654	0.3244	0.5681	0.1843
Prev. sanctions	1.0244**	0.2666	0.7384**	0.2497	2.0925**	0.5225
Other penalties	-0.1350	0.4439	0.1624	0.5851	1.1764	0.6883
Regional level covariates						
Personnel resources	0.0003	0.0010	0.0006	0.0013	1.0006	0.0013
Sec. labor market	0.0008	0.0605	0.0885	0.0972	1.0926	0.1062
Unemployment rate	-0.0399	0.0290	-0.0098	0.0317	0.9902	0.0313
Avg. unempl. duration	-1.4332**	0.4127	-1.6453**	0.5617	0.1930**	0.1084
Vacancy rate	-0.0019	0.0023	-0.0049	0.0036	0.9952	0.0036
Constant	-1.0015	0.9768	-14.1212	49.6255		
Unobserved heterogeneity at individual level						
ε_1			-3.6546	9.8461		
ε_2			17.6210			
Prob(ε_1)			0.8282			
Prob(ε_2)			0.1718			
Unobserved heterogeneity at regional level						
ε_3			0.4766**	0.1711		
ε_4			-3.9515			
Prob(ε_1)			0.8924			
Prob(ε_2)			0.1076			
Log likelihood	-3,684.6009		-3,112.5617			
AIC	7,415.2018		6,279.1243			
No. observations	48,633		48,633			

[1] White/Huber robust standard errors. [2] Variable determined outcome perfectly and was left out of the model. * Significance at 5% level. ** Significance at 1% level.
Sources: IEB and the authors' own calculations.

Tab. 8 Determinants of a benefit sanction, Cloglog proportional hazards model in discrete time, West Germany, Women, inflows into unemployment in 2002

	Coefficients (without heterogeneity terms)		Coefficients (with heterogeneity terms)		Hazard ratios (with heterogeneity terms)	
	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]
Baseline hazard						
1-3 months	-0.8250**	0.2577	-3.6137**	0.3822	0.0270**	0.0103
4-6 months	-0.0882	0.2412	-2.3672**	0.3300	0.0937**	0.0309
7-9 months	-0.1375	0.2706	-1.8795**	0.3925	0.1527**	0.0599
10-12 months	0.1177	0.2745	-1.2730**	0.3589	0.2800**	0.1005
13-15 months	0.1615	0.3016	-0.9566**	0.3313	0.3842**	0.1273
Individual level covariates						
University degree						
No qualification	0.1380	0.1603	0.1164	0.3467	1.1234	0.3894
< 25 years	1.7726**	0.1706	1.8102**	0.4154	6.1117**	2.5386
> 50 years	-1.4986**	0.4275	-3.5702*	1.5870	0.0281*	0.0447
Immigrants	0.4222	0.2312	0.7220	0.4545	2.0586	0.9357
Disabled	-0.6215	0.7225	-0.4927	1.6704	0.6109	1.0205
> 2 children	-0.4347	0.5192	1.1721	0.8647	3.2287	2.7919
Child < 3 years	-0.4806	0.3039	-1.1578	0.7051	0.3142	0.2215
Benefits	-0.0351**	0.0107	-0.0502	0.0329	0.9511	0.0313
Prev. unemployment	-0.4264	0.4552	-0.7837	1.1237	0.4567	0.5132
Prev. sanctions	1.9845**	0.7660	2.8240**	0.8299	16.8433**	13.9788
Other penalties	-0.1550	1.0184	-3.8932**	0.7955	0.0204**	0.0162
Regional level covariates						
Personnel resources	-0.0014	0.0017	0.0016	0.0030	1.0016	0.0031
Sec. labor market	-0.0911	0.1262	0.4943**	0.1818	1.6394**	0.2981
Unemployment rate	-0.0155	0.0514	-0.0964	0.0747	0.9081	0.0678
Avg. unempl. duration	-0.9589	0.7458	-1.5723	1.4965	0.2076	0.3106
Vacancy rate	-0.0069	0.0043	-0.0115	0.0063	0.9886	0.0062
Constant	-2.6555	1.9441	-3.8028	5.1043		
Unobserved heterogeneity at individual level						
ε_1			-0.9571**	0.2067		
ε_2			8.3224			
Prob(ε_1)			0.8969			
Prob(ε_2)			0.1031			
Unobserved heterogeneity at regional level						
ε_3			-1.480**	0.4953		
ε_4			0.8342			
Prob(ε_1)			0.3605			
Prob(ε_2)			0.6395			
Log likelihood	-1,420.6023		-1,211.4285			
AIC	2,885.2046		2,474.8570			
No. observations	31,695		31,695			

[1] White/Huber robust standard errors. [2] Variable determined outcome perfectly and was left out of the model. * Significance at 5% level. ** Significance at 1% level.
Sources: IEB and the authors' own calculations.

Tab. 9 Determinants of a benefit sanction, Cloglog proportional hazards model in discrete time, East Germany, Men, inflows into unemployment in 2001

	Coefficients (without heterogeneity terms)		Coefficients (with heterogeneity terms)		Hazard ratios (with heterogeneity terms)	
	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]
Baseline hazard						
1-3 months	-0.3788	0.2103	-2.4911**	0.3752	0.0828**	0.0311
4-6 months	0.0918	0.2079	-1.3419**	0.3422	0.2614**	0.0894
7-9 months	0.0758	0.2169	-0.8896**	0.3253	0.4108**	0.1337
10-12 months	-0.0982	0.2483	-0.9300**	0.3495	0.3945**	0.1379
13-15 months	0.2716	0.2510	-0.4352	0.2873	0.6471	0.1859
Individual level covariates						
University degree	-1.4275	0.9970	-3.2047	3.9026	0.0406	0.1583
No qualification	0.0081	0.1588	-0.1555	0.3805	0.8560	0.3257
< 25 years	1.2225**	0.1486	0.8710	0.5097	2.3893	1.2178
> 50 years	-1.2208**	0.2806	-2.5520**	0.7241	0.0779**	0.0564
Immigrants	0.5937	0.3146	-0.1059	0.5449	0.8995	0.4901
Disabled	-1.0990	0.7113	-2.2758*	0.9550	0.1027*	0.0981
> 2 children	-0.2993	0.4868	-0.4637	0.6492	0.6289	0.4083
Child < 3 years	0.3808	0.2516	0.3050	0.4841	1.3567	0.6567
Benefits	-0.0344**	0.0104	-0.0139	0.0257	0.9862	0.0254
Prev. unemployment	-0.3657	0.3434	-1.0062	0.7169	0.3656	0.2621
Prev. sanctions						
Other penalties						
Regional level covariates						
Personnel resources	-0.0019*	0.0009	-0.0007	0.0019	0.9993	0.0019
Sec. labor market	0.0023	0.0148	-0.0264	0.0247	0.9740	0.0241
Unemployment rate	0.0489	0.0290	0.1577**	0.0604	1.1708**	0.0708
Avg. unempl. duration	-1.9716**	0.6598	-3.5716*	1.4407	0.0281*	0.0405
Vacancy rate	0.0124*	0.0059	0.0288**	0.0094	1.0292**	0.0097
Constant	-0.2899	2.0023	0.1998	3.9901		
Unobserved heterogeneity at individual level						
ε_1			-0.7841**	0.0987		
ε_2			7.4139			
Prob(ε_1)			0.9044			
Prob(ε_2)			0.0956			
Unobserved heterogeneity at regional level						
ε_3			-0.5663*	0.2420		
ε_4			1.3827			
Prob(ε_1)			0.7095			
Prob(ε_2)			0.2905			
Log likelihood	-2,238.3958		-1,920.4109			
AIC	4,518.7916		3,890.8218			
No. observations	43,357		43,357			

[1] White/Huber robust standard errors. [2] Variable determined outcome perfectly and was left out of the model. * Significance at 5% level. ** Significance at 1% level.
Sources: IEB and the authors' own calculations.

Tab. 10 Determinants of a benefit sanction, Cloglog proportional hazards model in discrete time, East Germany, Women, inflows into unemployment in 2001

	Coefficients (without heterogeneity terms)		Coefficients (with heterogeneity terms)		Hazard ratios (with heterogeneity terms)	
	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]
Baseline hazard						
1-3 months	-1.4874**	0.4631	-3.9250**	0.6278	0.0197**	0.0124
4-6 months	-0.2340	0.4166	-2.1323**	0.6250	0.1186**	0.0741
7-9 months	0.1460	0.3937	-1.6063**	0.5513	0.2006**	0.1106
10-12 months	-0.3691	0.4635	-1.8344**	0.4805	0.1597**	0.0768
13-15 months	0.0690	0.4394	-0.9736	0.5269	0.3777	0.1990
Individual level covariates						
University degree	0.4070	1.0464	2.2498	1.9517	9.4857	18.5130
No qualification	0.0995	0.3107	-1.0987*	0.5177	0.3333*	0.1725
< 25 years	2.4522**	0.3711	2.8774**	0.5665	17.7687**	10.0656
> 50 years	-0.9984	0.5444	-2.9713	2.0296	0.0512	0.1040
Immigrants	0.2027	1.0157	-0.5416	0.5633	0.5818	0.3277
Disabled						
> 2 children	-0.0022	0.7324	4.8129**	1.1351	123.0842**	139.7187
Child < 3 years	-0.8079	0.5366	-0.5224	0.7897	0.5931	0.4684
Benefits	-0.0438	0.0264	-0.0451	0.0346	0.9559	0.0331
Prev. unemployment	0.6933	0.6214	1.5448	0.9620	4.6870	4.5090
Prev. sanctions	0.4081	0.8302	0.3822	0.7936	1.4655	1.1630
Other penalties	2.8216*	1.1058	2.0868**	0.7524	8.0588**	6.0632
Regional level covariates						
Personnel resources	0.0024	0.0018	-0.0013	0.0035	0.9987	0.0035
Sec. labor market	-0.0475	0.0361	-0.0220	0.0542	0.9782	0.0530
Unemployment rate	0.0726	0.0557	0.0082	0.0786	1.0082	0.0793
Avg. unempl. duration	-4.5465**	1.6909	-3.4065	2.1425	0.0332	0.0710
Vacancy rate	0.0150	0.0118	-0.0039	0.0227	0.9961	0.0226
Constant	4.8645	4.8074	-10.4805	.		
Unobserved heterogeneity at individual level						
ε_1			-1.2756**	0.3738		
ε_2			20.6890			
Prob(ε_1)			0.9419			
Prob(ε_2)			0.0581			
Unobserved heterogeneity at regional level						
ε_3			0.2543	0.1719		
ε_4			-1.8469			
Prob(ε_1)			0.8790			
Prob(ε_2)			0.1210			
Log likelihood	-1,420.6023		-562.9643			
AIC	2,885.2046		1,177.9287			
No. observations	37,726		37,726			

[1] White/Huber robust standard errors. [2] Variable determined outcome perfectly and was left out of the model. * Significance at 5% level. ** Significance at 1% level.
Sources: IEB and the authors' own calculations.

Tab. 11 Determinants of a benefit sanction, Cloglog proportional hazards model in discrete time, East Germany, Men, inflows into unemployment in 2002

	Coefficients (without heterogeneity terms)		Coefficients (with heterogeneity terms)		Hazard ratios (with heterogeneity terms)	
	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]
Baseline hazard						
1-3 months	0.1300	0.2803	-3.5506**	0.3323	0.0287**	0.0095
4-6 months	0.4781	0.2832	-2.6633**	0.3547	0.0697**	0.0247
7-9 months	0.7163*	0.2941	-2.0159**	0.3430	0.1332**	0.0457
10-12 months	0.8968**	0.3007	-1.3866**	0.2785	0.2499**	0.0696
13-15 months	0.6897*	0.3350	-1.2676**	0.2436	0.2815**	0.0686
Individual level covariates						
University degree	-0.7586	1.0301	-2.0931**	0.7219	0.1233**	0.0890
No qualification	-0.1096	0.2081	0.3437	0.3394	1.4102	0.4787
< 25 years	1.4550**	0.2005	1.4634**	0.5172	4.3207**	2.2345
> 50 years	-1.2339**	0.4011	-2.9246*	1.1458	0.0537*	0.0615
Immigrants	0.5210	0.6022	2.5231**	0.3326	12.4668**	4.1467
Disabled	-0.6676	0.7153	2.3285**	0.8482	10.2630**	8.7052
> 2 children	-0.7564	0.9776	-1.2400	1.1568	0.2894	0.3348
Child < 3 years	-1.4093*	0.7160	-3.0339	2.1854	0.0481	0.1052
Benefits	-0.0229	0.0131	-0.0200	0.0290	0.9802	0.0284
Prev. unemployment	-0.3030	0.4533	3.1311**	0.8621	22.8982**	19.7413
Prev. sanctions	0.2985	0.7320	-2.2958*	0.9825	0.1007*	0.0989
Other penalties	0.7461	0.5536	-0.8014	0.5888	0.4487	0.2642
Regional level covariates						
Personnel resources	-0.0076**	0.0016	-0.0025	0.0033	0.9975	0.0033
Sec. labor market	0.0390*	0.0193	0.0356	0.0220	1.0362	0.0228
Unemployment rate	-0.0201	0.0414	-0.0426	0.0569	0.9583	0.0545
Avg. unempl. duration	-0.9763	1.1014	-2.9457*	1.5030	0.0526*	0.0790
Vacancy rate	-0.0102	0.0088	-0.0122	0.0161	0.9879	0.0159
Constant	-0.7834	2.9013	0.3475	4.1542		
Unobserved heterogeneity at individual level						
ε_1			-0.8065**	0.1271		
ε_2			10.6680			
Prob(ε_1)			0.9298			
Prob(ε_2)			0.0702			
Unobserved heterogeneity at regional level						
ε_3			0.7148**	0.2602		
ε_4			-0.6115			
Prob(ε_1)			0.4610			
Prob(ε_2)			0.5390			
Log likelihood	-1,359.7631		-1,147.0222			
AIC	2,765.5262		2,348.0444			
No. observations	41,451		41,451			

[1] White/Huber robust standard errors. [2] Variable determined outcome perfectly and was left out of the model. * Significance at 5% level. ** Significance at 1% level.
Sources: IEB and the authors' own calculations.

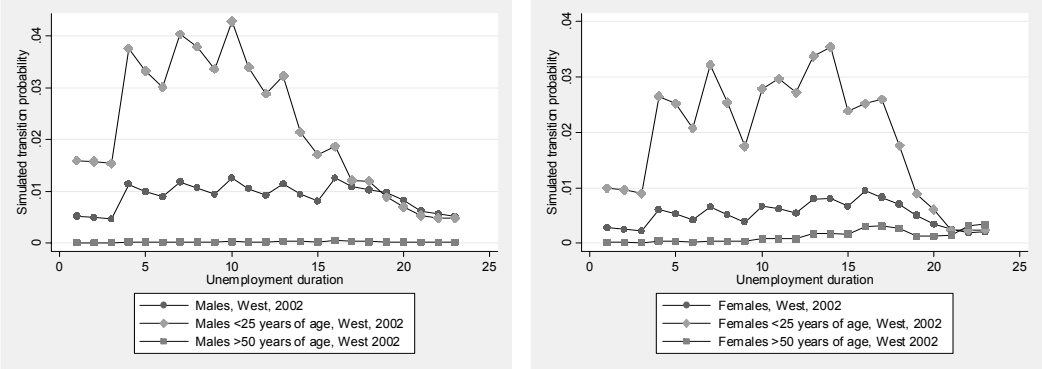
Tab. 12 Determinants of a benefit sanction, Cloglog proportional hazards model in discrete time, East Germany, Women, inflows into unemployment in 2002

	Coefficients (without heterogeneity terms)		Coefficients (with heterogeneity terms)		Hazard ratios (with heterogeneity terms)	
	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]	Coeff.	Std. Er.[1]
Baseline hazard						
1-3 months	-0.7233	0.5184	-3.8796**	0.9953	0.0207**	0.0206
4-6 months	0.3262	0.4187	-2.6888**	0.7669	0.0680**	0.0521
7-9 months	0.8465	0.3813	-1.6218*	0.7483	0.1975*	0.1478
10-12 months	0.6261	0.4626	-0.5728	0.5064	0.5640	0.2856
13-15 months	-0.3281	0.6523	-1.1048	0.6279	0.3313	0.2080
Individual level covariates						
University degree	0.4246	1.0208	1.2789	1.0580	3.5929	3.8011
No qualification	-1.1606*	0.5572	-2.9907**	0.8823	0.0503**	0.0443
< 25 years	1.8738**	0.3011	2.0367**	0.4706	7.6654**	3.6072
> 50 years	-1.2159	0.7484	-3.6527*	1.6982	0.0259*	0.0440
Immigrants	0.9306	1.0632	3.1386*	1.2633	23.0704*	29.1450
Disabled						
> 2 children						
Child < 3 years	-1.1413	0.6103	-0.9542	0.6594	0.3851	0.2539
Benefits	-0.0980**	0.0285	-0.1466*	0.0585	0.8636*	0.0505
Prev. unemployment	-2.3577*	0.9676	-4.1943**	1.1510	0.0151**	0.0174
Prev. sanctions	2.7994*	1.1002	6.9483**	0.9463	1041.4270**	985.4546
Other penalties	3.8672**	1.2505	4.4367**	1.1210	84.4988**	94.7224
Regional level covariates						
Personnel resources	-0.0031	0.0028	-0.0172**	0.0062	0.9829**	0.0061
Sec. labor market	0.0056	0.0483	0.0786	0.0532	1.0818	0.0576
Unemployment rate	0.1007	0.0667	-0.0554	0.1462	0.9461	0.1383
Avg. unempl. duration	-3.8338*	1.8291	1.8008	2.9969	6.0545	18.1447
Vacancy rate	-0.0276	0.0216	-0.0554*	0.0233	0.9461**	0.0221
Constant	6.2503	5.2401	2.2417	1.9860		
Unobserved heterogeneity at individual level						
ε_1			-5.7498	0.5965		
ε_2			2.7200			
Prob(ε_1)			0.9472			
Prob(ε_2)			0.0528			
Unobserved heterogeneity at regional level						
ε_3			-0.5431**	0.7614		
ε_4			0.5431			
Prob(ε_1)			0.1586			
Prob(ε_2)			0.8414			
Log likelihood		-509.8479		-453.5190		
AIC		1,061.6959		957.0381		
No. observations		31,679		31,679		

[1] White/Huber robust standard errors. [2] Variable determined outcome perfectly and was left out of the model. * Significance at 5% level. ** Significance at 1% level.
Sources: IEB and the authors' own calculations.

Fig. 4 Predicted transition probabilities by age group, West Germany, inflows into unemployment in 2002

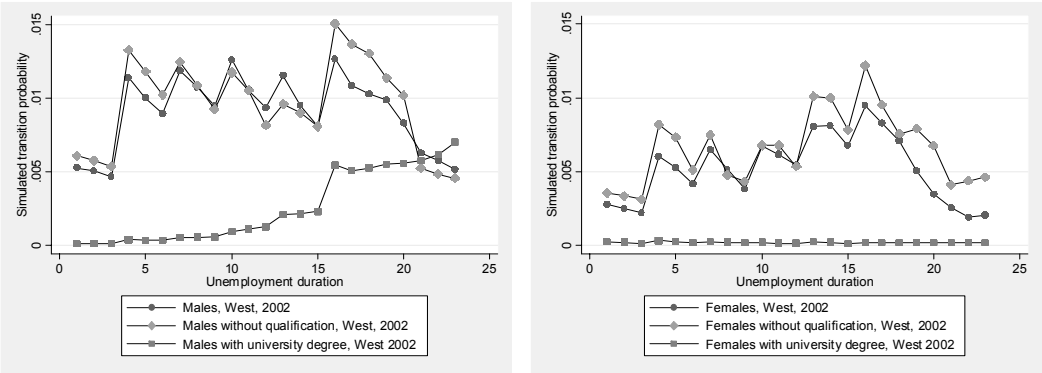
Men *Women*



Sources: IEB and the authors' own calculations.

Fig. 5 Predicted transition probabilities by level of qualification, West Germany, inflows into unemployment in 2002

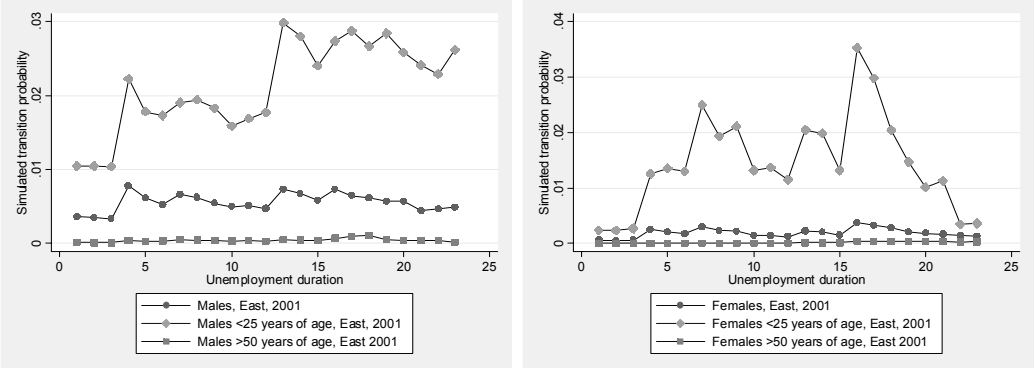
Men *Women*



Sources: IEB and the authors' own calculations.

Fig. 6 Predicted transition probabilities by age group, East Germany, inflows into unemployment in 2001

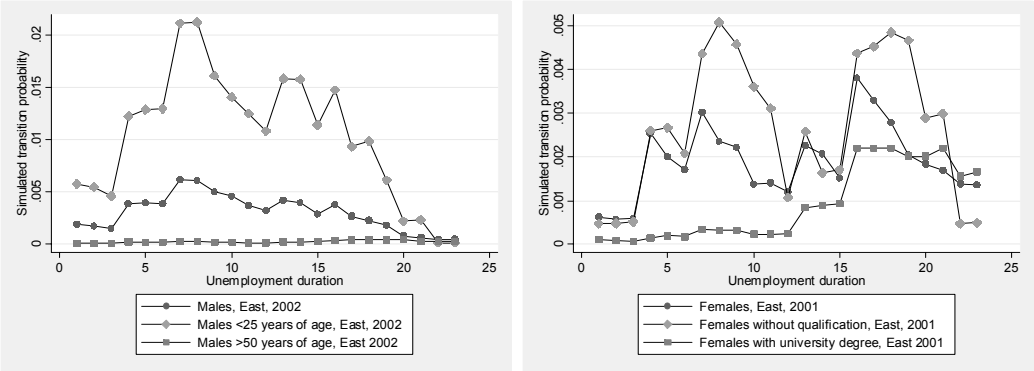
Men *Women*



Sources: IEB and the authors' own calculations.

Fig. 7 Predicted transition probabilities by age group, East Germany, inflows into unemployment in 2002

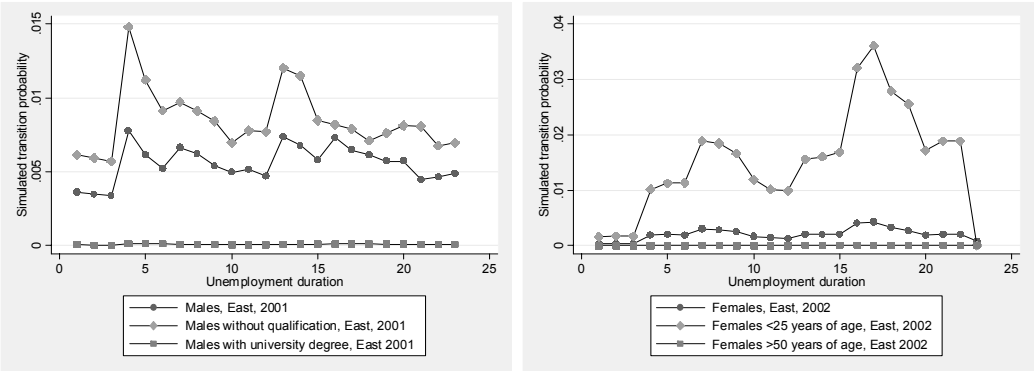
Men *Women*



Sources: IEB and the authors' own calculations.

Fig. 8 Predicted transition probabilities by level of qualification, East Germany, inflows into unemployment in 2001

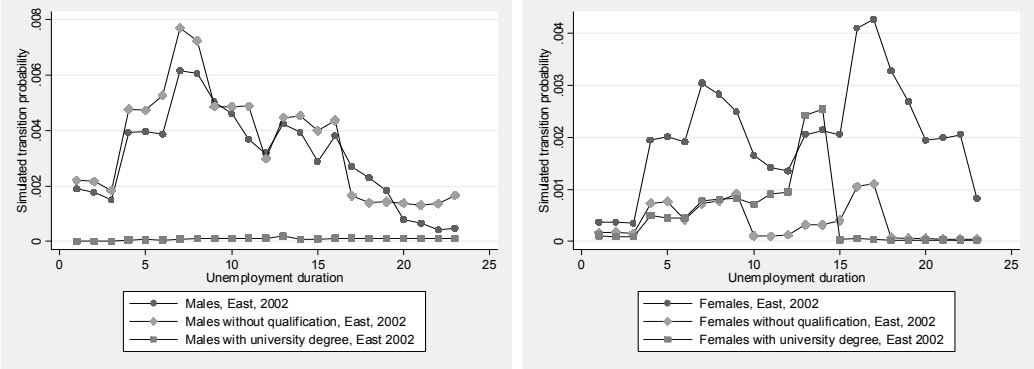
Men *Women*



Sources: IEB and the authors' own calculations.

Fig. 9 Predicted transition probabilities by level of qualification, East Germany, inflows into unemployment in 2002

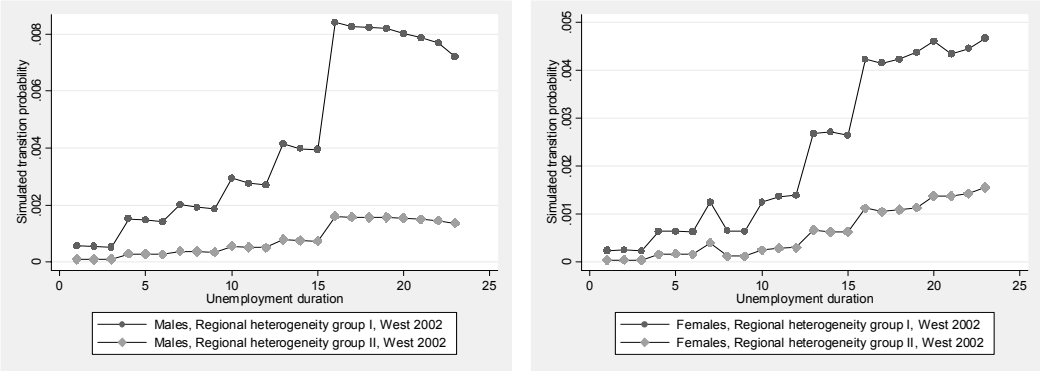
Men *Women*



Sources: IEB and the authors' own calculations.

Fig. 10 Predicted transition probabilities conditioned on regional heterogeneity groups, West Germany, inflows into unemployment in 2002

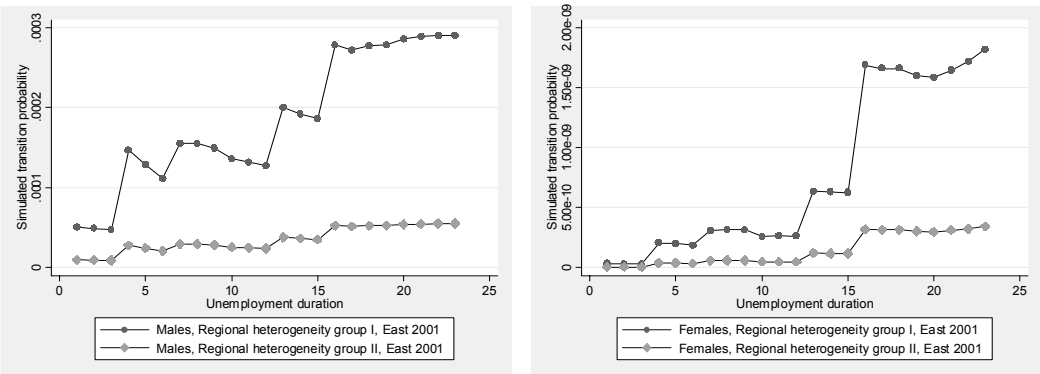
Men *Women*



Sources: IEB and the authors' own calculations.

Fig. 11 Predicted transition probabilities conditioned on regional heterogeneity groups, East Germany, inflows into unemployment in 2001

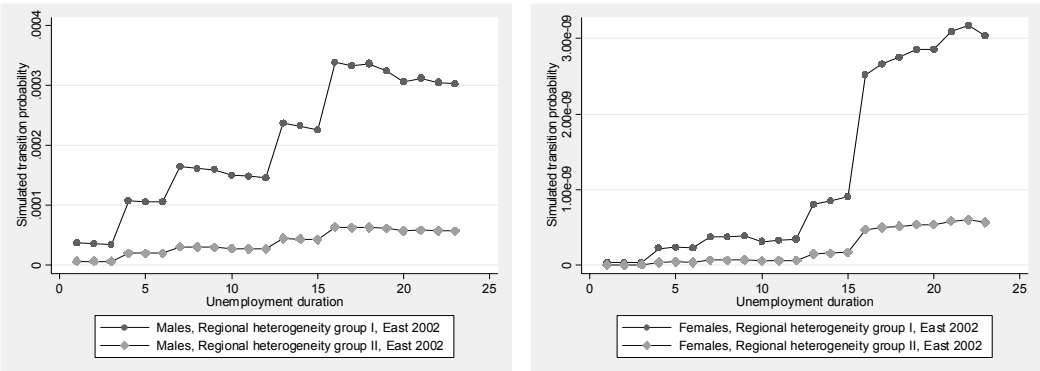
Men *Women*



Sources: IEB and the authors' own calculations.

Fig. 12 Predicted transition probabilities conditioned on regional heterogeneity groups, East Germany, inflows into unemployment in 2002

Men *Women*



Sources: IEB and the authors' own calculations.

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