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ABSTRACT

Unemployment Dynamics among Migrants and Natives*

Unemployment rates are often higher for migrants than for natives. This could result from longer periods of unemployment as well as from shorter periods of employment. This paper jointly examines male native-migrant differences in the duration of unemployment and subsequent employment using German panel data and bivariate discrete time hazard rate models. Compared to natives with the same observable and unobservable characteristics, unemployed migrants do not find less stable positions but they need more time to find these jobs. The probability of leaving unemployment also varies strongly between ethnicities, while first and second generation Turks are identified as the major problem group. Therefore, policy should concentrate on the job finding process of Turkish migrants to fight their disadvantages on the labor market.

JEL Classification: C41, J61, J64

Keywords: unemployment duration, employment stability, bivariate hazard rate models, migration, ethnicity

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1 Introduction

As part of a strategy to foster growth, migrants have been identified as a target group within the European Union strategy to raise employment levels (Zimmermann, 2005). Of concern is that unemployment is typically very high among migrants with a tendency to rise over time. For instance, since the early 1970s, the unemployment rates of natives and migrants in Germany bifurcate. In 2005, the average share of unemployed migrants has been 25.2% in comparison to the much lower 12.1% among natives. This higher rate of unemployment could derive from a higher risk of becoming unemployed, i.e. a higher frequency of unemployment spells or shorter periods of employment, as well as from a lower probability of leaving unemployment, i.e. a longer duration of unemployment spells. It is important to understand why individuals leave and reenter unemployment, and whether these processes differ between natives and migrants.

Germany can be considered to be a interesting case to investigate the duration of unemployment and employment issue in the context of native-migrant differences. For long, Germany receives the largest migratory flows in the European Union. Nowadays, nearly 20% of the people living in Germany (or 15 million people) are from families with a migration background, one third of the children in the Kindergarden age are from migration families. Hence, the assimilation of immigrants into the German economic system has been subject to much research. For a recent overview of those attempts see Bauer et al. (2005). The previous literature largely deals with differences in wages and labor market participation between natives and migrants and their assimilation over time. There exist, however, only very few studies dealing with unemployment experiences of migrants in Germany. One is the early contribution by Mühleisen and Zimmermann (1994), who deal with the frequency of unemployment among natives and migrants. To our knowledge only Kogan (2004) investigates unemployment and employment durations of migrants.

Hence, this study investigates both sources of higher unemployment rates, unemployment duration and employment stability. The two processes are determined by observed and unobserved characteristics and it is reasonable that the unobserved characteristics influencing both durations are not independent from each other. Therefore we are interested to estimate unemployment and subsequent employment duration models simultaneously and allow for correlation between unobserved terms. Departing from Kogan (2004) we concentrate on immigrants from five guest-worker countries (Greece, Italy, Spain, Turkey, Ex-Yugoslavia), take the potential

dependence of the two durations into account and analyze subsequent employment duration, conditional on previous unemployment.

Section 2 explains the panel data used. Section 3 outlines our novel econometric approach. Section 4 presents the empirical results and section 5 summarizes and discusses the implications for economic policy.

2 Data

This study uses data from the German Socio-Economic Panel (SOEP). The annual survey started 1984 in West Germany with a sample of about 5,900 households, 1,400 of them with a household head from one of the main guestworker ethnicities: Turks, Greeks, Italians, ex-Yugoslavians or Spaniards. These migrant groups were over-sampled. 1994/1995 a new migrant sample started consisting of households in which at least one household member migrated to Germany within the last ten years. For a detailed description of the survey see Haisken-DeNew and Frick (2005).

Our sample focuses on migrants from the guestworker countries. This enables us to analyze the labor market assimilation of a group of relatively similar individuals, but also enables us to study potential differences between sufficiently large groups of ethnicities in our sample. We concentrate also on west German natives and migrants only. In east Germany, the share of immigrants is very low and we observe in the SOEP only a few unemployed migrants. Furthermore, east and west German labor markets still exhibit large differences which would attract attention away from our major research topic. However, we include individuals with a migratory background born in Germany if they have have not taken the German citizenship.

Every wave contains retrospective monthly information about the individual employment status of the previous calendar year. We distinguish three categories: employment, unemployment and out of the labor force. The category employment includes full time and half time employment. Out of the labor force includes being in retirement, parental leave, school, university, vocational training and military service. We exclude individuals younger than 20 and older than 55 years, the latter because of special early retirement regulations in Germany during our observation period. Spells of individuals who become 56 years old during the observation period are right-censored at the beginning of the year of the fifty-sixth birthday. Since we only have the information of the year of birth, we right-censor spells at the beginning of the corresponding year and not at the month of the birthday.

Only individuals entering unemployment between 1983 and 2003 are included in the analysis. Our sample consists of unemployment spells and subsequent employment spells. Note that individuals with employment spells enter our sample only if we observe a transition from unemployment to employment. Individuals who are unemployed several times between 1983 and 2003 are in our sample with several spells of unemployment and of subsequent employment. A transition from unemployment to employment is defined as a situation where the employment spell begins at the latest two months after the unemployment spell ends; a transition from employment to unemployment is defined similarly.

The data set used in this paper consists of 4,368 unemployment and 3,080 employment spells of 2,427 individuals. Among the natives, we have 3,111 unemployment spells and 2,204 employment spells. Among the migrants, there are 1,257 unemployment spells and 876 employment spells.

[Figure 1 about here]

In Figure 1 product-limit estimates of the survival functions for both groups, migrants and natives, are presented. They refer to the survivor probability in unemployment and employment, independent of the destination state. At each point in time the share of individuals who are still unemployed is higher for immigrants than for natives. The log-rank test for equality of survivor functions as well as the likelihood-ratio test statistic of homogeneity indicate that the survival functions of both groups differ significantly from each other. For the duration of employment spells the log-rank test indicates no significant difference while the likelihood-ratio test indicates a difference between the two groups at a 10% level. Natives and migrants seem to differ mainly in their unemployment duration and seem to be more similar in their employment duration. Both test-statistics follow a χ^2-distribution with one degree of freedom. The values of the test statistics are 232.55 for the likelihood-ratio test and 125.11 for the log-rank test with respect to the unemployment duration. For the employment duration the corresponding values of the test statistics are 3.12 and 0.03, respectively.

The length of unemployment in our sample ranges from 1 to 160 months, the length of employment spells ranges from 1 to 242 months. Corresponding to the difference in survivor functions in unemployment the average observed length of unemployment spells differs between migrants and natives, see Table 1. The observed mean length to a transition to employment is 5.8 months for natives and 8.8 months for migrants, the corresponding mean length for transitions out of labor force is 9.3 months for

natives and 17.4 months for migrants. Note that these observed mean lengths do not take the censored spells and competing risks into account, which are provided separately in Table 1, but nevertheless provide us with a good description of the data set. Around 70% of the observed unemployment spells end due to a transition into employment. Table 2 reports the average lengths of employment spells. The observed average length of employment spells exceeds the length of unemployment spells and the differences between migrants and natives are not as striking as in the case of unemployment, which corresponds to the similar survivor functions.

[Tables 1 and 2 about here]

Descriptive statistics of covariables are documented in Table 3 separated for natives and migrants and unemployment and employment spells, respectively. Many of those are fixed, but covariables age, marriage status, children in the household, GNP and local unemployment rate are time-variant and they are updated on a yearly level. To control for seasonal effects within the year, dummies for the quarter in which the spell begins are included (first quarter to fourth quarter). For both natives and migrants most unemployment spells begin in the first quarter of the respective year, i.e. between January and March. On average, native and migrant men have the same age (around 33 years). We include educational dummies for the dual-system apprenticeship, additional vocational training and a university degree. Natives have on average a higher education, while more migrants are married and live together with their spouse and they have more often children. Another variable used is disability or handicap. To be disabled means that the individual responds positively to the question whether he is officially registered to have a reduced capacity for work or of being severely disabled. When unemployed, natives and migrants have a 6% share of disabled persons. This share decreases to 5% among natives and to 3% among migrants in subsequent employment spells.

The previous unemployment duration is higher among migrants if they enter a new employment spell. The mean of the local unemployment rate is slightly higher for natives than for migrants when they enter unemployment or employment. In addition to the regional unemployment rate we include the yearly growth rate of the Gross National Product (GNP) in west Germany, which is slightly higher for migrants than for natives, indicating that the migrants in our sample enter unemployment more often in years with relatively high growth rates.

With respect to unemployment spells 42% of those observations are from migrants born in Turkey, 19% are from Ex-Yugoslavians, 15% from Italians, 6% from Greeks,

and 3% from Spainiards. 16% of the observations are from migrants who are born in Germany and are, therefore, members of the so called second generation, and around 40% of this second generation have the Turkish citizenship. The German active recruitment policy for guest workers was terminated in the end of 1973 and the following period was characterized by migration through family reunification. Around 40% of the immigrants in our sample arrived before 1974. With respect to the first month of each spell the observed characteristics are similar distributed among the unemployment and employment spells.

[Table 3 about here]

Natives and migrants differ with respect to several observable characteristics. These differences could explain differences in the duration of unemployment and employment. In addition to that the two groups could differ with respect to unobservable characteristics. This needs to be distinguished from the status effect of being a migrant which could also cause a longer duration of unemployment, e.g. due to discrimination or difficulties with the native language. To analyze these differences in detail we apply econometric methods introduced in the following section.

3 Econometric Approach

In this study, we are interested in the duration of and the interdependence between the states unemployment and employment. The process of leaving unemployment for paid labor and the duration of the subsequent employment spell can appropriately be modelled by a multivariate hazard rate model. However, on the labor market we can distinguish three states: unemployment, employment and out of the labor force. There exist two potential levels of dependence via correlated error-terms: Correlations between competing risks and correlations between the duration in different states. The category "out of the labor force" unifies several different categories like early retirement, military service and education. Due to the heterogeneity within this category and the small number of males being in the main working age and not working or searching for work we take the category "out of the labor force" as an independent competing risk into account, i.e. we treat transitions out of the labor force as right-censored, and we do not estimate its duration. Therefore our model ends up in a bivariate hazard rate model consisting of two potentially correlated states, unemployment and employment. For a discussion of multivariate mixed proportional hazard models see van den Berg (2001). According to the type of data

being used here - monthly interval-censored observation of the status - discrete time hazard rate models have to be applied (see for example Han and Hausman, 1990, Narendranathan and Stewart, 1993, or Jenkins, 2004).

In the context of employment dynamics, the initial conditions problem arises, because the initial (inflow-) sample of unemployed individuals cannot be assumed to be random, see e.g. Heckman (1981). This initial conditions problem can be ignored in this study, because we are interested in the subpopulation consisting of individuals entering unemployment. Therefore, the results have to be interpreted with respect to this subpopulation.

The duration of unemployment and employment is generated by a continuous time process. The overall hazard rate $\lambda_s(t)$ for each state s is defined as the limit of the conditional probability for the ending of a spell in interval $[t, t + \triangle t[$ given that no transition occurred before the start of this interval:

$$\lambda_s(t) = \lim_{\triangle t \to 0} \frac{P(t \leq T_s \leq t + \triangle t \mid T_s \geq t)}{\triangle t} \tag{1}$$

where T_s denotes the length of a spell. T_s is assumed to be a continuous, non-negative random variable. We assume proportional transition rates with covariates causing proportional shifts of a so-called baseline transition rate and interval constant covariates. For unemployment spells ($s = u$), as well as for employment spells ($s = e$), there exist several potential destination states. Two potential destination states d are considered reflecting transitions into employment and into unemployment ($d = 1$), respectively, and transitions out of labor force ($d = 2$).

$$\lambda_s(t \mid x_i(t), \eta_i) = \sum_{d=1}^{2} \lambda_{sd}(t \mid x_i(t), \eta_{isd}); \quad s = \{u, e\} \tag{2}$$

with the hazard rate from state s to destination state d corresponding to

$$\lambda_{sd}(t \mid x_i(t), \eta_{isd}) = \lambda_{0sd}(t) \exp(x_i(t)\beta_{sd} + \eta_{isd}). \tag{3}$$

$\lambda_{0sd}(t)$ denotes the state and destination specific baseline transition rate, $x_i(t)$ an individual time variant row vector of covariates for individual i, β_{sd} a column vector of parameters, η_{isd} a time invariant individual unobserved term that varies with state and destination. The unobserved heterogeneity η_i is assumed to be independent of the observed individual characteristics.

We observe the duration of unemployment and employment in monthly intervals. This implies that instead of continuous levels of $x_i(t)$ their interval specific levels

have to be taken into account. Assumed that the time axis is divided into intervals of unit length, a given spell consists of a number of j intervals, in the following referred to as subspells. The interval specific levels of $x_i(t)$ and the observed interval baseline hazard $\lambda_{0sd}(t)$ for the $k-th$ subspell are denoted as x_{ik} and $h_{0sd}(k)$.

For interval-censored data with underlying continuous time processes the state-specific survivor function is given by:

$$\begin{aligned} S_s(j|x_i,\eta_i) = \quad & \exp\Big(-\sum_{d=1}^{2}\sum_{k=1}^{j}\exp(x_{ik}\beta_{sd}+h_{0sd}(k)+\eta_{isd})\Big) \\ = \quad & S_{s1}(j)S_{s2}(j); \quad S_{sd}(j)=\exp\Big(-\sum_{k=1}^{j}\exp(x_{ik}\beta_{sd}+h_{0sd}(k)+\eta_{isd})\Big); \\ & h_{0sd}(k)=\ln\Big(\int_{t_{k-1}}^{t_k}\lambda_{0sd}(\tau)d\tau\Big). \end{aligned} \tag{4}$$

The survivor function $S_s(j)$ describes the probability that a spell lasts at least j intervals. The h_0 parameters are capturing the duration dependence of the baseline transition function and correspond to the log of the integrated destination-specific baseline hazard rate. The survival function is separable into two destination-specific parts.

In principle, the transitions could occur at any time during the observed intervals. In our approach we assume that transitions can only occur at the boundaries of the intervals (for a similar approach see e.g. Narendranathan and Stewart, 1993). This is a reasonable approximation because new employment is often taken up at the beginning of a month. In the absence of a correlation between the destination specific unobserved heterogeneity terms this leads to two independent risk-specific hazard rates, both following a complementary log-log form and ends up in a separable likelihood with respect to the two independent risks. This implies that transitions from unemployment into employment are independent from transitions out of the labor force and that transitions from employment into unemployment are also independent from transitions out of the labor force, given the observed characteristics. Therefore one can estimate the transition processes, described by transition probabilities $h_{sd}(j)$, separately within each state.

The probabilities $h_{ue}(j)$ and $h_{eu}(j)$ of a transition from unemployment to employment and from employment to unemployment in interval j, respectively, correspond to:

$$\begin{aligned} h_{ue}(j|x_i,\eta_i) &= 1-\exp(-\exp(x_{ij}\beta_{ue}+h_{0ue}(j)+\eta_{iue}) \\ h_{eu}(j|x_i,\eta_i) &= 1-\exp(-\exp(x_{ij}\beta_{eu}+h_{0eu}(j)+\eta_{ieu}) \end{aligned} \tag{5}$$

This study focusses on the transitions from unemployment to employment and the probability of reentering unemployment. The state specific unobserved heterogeneity components of these transition processes are allowed to be correlated across the two states. Therefore both processes, transitions from unemployment to employment and the process of reentering unemployment again have to be estimated jointly. Transitions out of the labor force enter the estimation as right-censored spells. The joint estimation is important because there is no reason to believe that unobserved characteristics determining the duration of unemployment are independent from unobserved characteristics influencing subsequent employment stability. Ignoring this could create a sample selection problem and thereby yield biased estimates. For a similar argument in the context of experimental data on training and the selection into subsequent employment spells see Ham and LaLonde (1996).

η_{ue} is the unobserved heterogeneity influencing the transition process from unemployment to employment, while the unobserved term η_{eu} effects employment stability. Following Heckman and Singer (1984) these unobserved terms or random intercepts are assumed to follow a discrete probability distribution with a finite number of mass points η_{sd}^m, $m = (1, ..., M)$.

The indicators δ_u and δ_e take on the value 1 if a transition to employment or to unemployment, respectively, is observed and zero otherwise. The likelihood contribution of an unemployment spell of j_u intervals and a subsequent employment spell of j_e intervals for a given x_i, η_{iue} and η_{ieu} is:

$$\begin{aligned} l(x_i, \eta_{iue}, \eta_{ieu}) = \quad & S_{u1}(j_u - 1|x_i, \eta_{iue}) h_{ue}(j_u|x_i, \eta_{iue})^{\delta_u} (1 - h_{ue}(j_u|x_i, \eta_{iue}))^{(1-\delta_u)} \\ & S_{e1}(j_e - 1|x_i, \eta_{ieu})^{\delta_u} h_{eu}(j_e|x_i, \eta_{ieu})^{\delta_e \delta_u} (1 - h_{eu}(j_e|x_i, \eta_{ieu}))^{(1-\delta_e)\delta_u}. \end{aligned}$$

The unobserved heterogeneity is assumed to follow a multivariate distribution $G(\eta_{ue}, \eta_{eu})$ with a finite number of points of support. Each term has three points of support. This results in 9 points of support for G: $(\eta_{ue}^1, \eta_{eu}^1)$, $(\eta_{ue}^1, \eta_{eu}^2)$, ... and $(\eta_{ue}^3, \eta_{eu}^3)$. For each of these combinations there exists a probability or a share of individuals having these values of unobserved heterogeneity. For a similar modelling of unobserved heterogeneity with two points of support for each random term see e.g. Stevens (1999) in the context of income poverty duration or Belzil (2001) in the context of unemployment and subsequent employment duration. The likelihood contribution of an unemployment and a subsequent employment spell for a given x_i but unknown η_{iue}

and η_{ieu} can be written as

$$\begin{aligned} l(x_i, \eta_{ue}, \eta_{eu}) = \quad & \pi_1 * l(x_i, \eta_{ue}^1, \eta_{eu}^1) + \pi_2 * l(x_i, \eta_{ue}^1, \eta_{eu}^2) + \pi_3 * l(x_i, \eta_{ue}^1, \eta_{eu}^3) + \\ & \pi_4 * l(x_i, \eta_{ue}^2, \eta_{eu}^1) + \pi_5 * l(x_i, \eta_{ue}^2, \eta_{eu}^2) + \pi_6 * l(x_i, \eta_{ue}^2, \eta_{eu}^3) + \\ & \pi_7 * l(x_i, \eta_{ue}^3, \eta_{eu}^1) + \pi_8 * l(x_i, \eta_{ue}^3, \eta_{eu}^2) + \pi_9 * l(x_i, \eta_{ue}^3, \eta_{eu}^3). \quad (6) \end{aligned}$$

For the estimation procedure the probabilities π_l are specified as logistic probabilities to ensure that the probabilities vary between 0 and 1 and add up to 1.[1]

$$\pi_l = \frac{\exp(p_l)}{\sum_{r=1}^{9} \exp(p_r)}, \quad l = 1, ..., 9, \quad \sum_{r=1}^{9} \pi_r = 1 \tag{7}$$

As the hazard rates contain a constant term, for identification reasons one of the mass points of each unobserved heterogeneity term η_{ue} and η_{eu} and one of the parameters p_r are normalized to 0.

In the data we observe several spells for some individuals. We assume that the unobserved heterogeneity terms are constant for each individual i. Therefore the unobserved heterogeneity has to be integrated out over all Q_i spells of one individual. For a similar treatment of repeated spells per individual see e.g. Steiner (2001) or Roed and Zhang (2005).

The sample likelihood is given by

$$L = \prod_{i=1}^{n} \sum_{r=1}^{9} \pi_r \prod_{q=1}^{Q_i} l_q(x_i, \eta_{ue}, \eta_{eu}) \tag{8}$$

4 Results

We estimate a bivariate discrete time hazard rate model with jointly distributed unobserved heterogeneity. The coefficients can be interpreted with respect to the underlying continuous time proportional hazard rates. Compared to the model without unobserved heterogeneity, the inclusion of unobserved heterogeneity does significantly improve the model fit. The results of the models without and with unobserved heterogeneity are reported in Tables 4 and 5, respectively. All estimated mass-points are significantly different from 0. The coefficients indicate that there exist three groups in both processes which differ significantly from each other with

[1]The model has been programmed in Stata version 8.2

respect to the baseline hazard rate. The point estimates suggest that the hazard rate from unemployment to employment is reduced by 69% for one group and increased by a factor of 2.4 for another group. With respect to the probability of staying employed one group has a 75% reduced risk of leaving employment and this probability is nearly 5 times higher for another group.

[Tables 4 and 5 about here]

Two of the nine probabilities describing the distribution G of the unobserved heterogeneity converge to zero. This indicates that two combinations of unobserved heterogeneity terms do not exist. In the estimation procedure we set these points of support to zero and a distribution with seven points of support remains. The distribution is shown in Table 6.

[Table 6 about here]

The largest group (45%) belongs to the base (middle) category with respect to the unemployment duration and remains employed relatively long while the smallest fraction reenters unemployment with a high probability and belongs to the base group with respect to unemployment duration (1.3%). In addition to this model we estimated the processes separately, both with three points of support. Compared to the joint estimation of the duration processes, the Akaike Information Criterion (AIC) indicates that the processes are not independent from each other.[2] However, the increase in the log-likelihood is relatively small (5.8) and the results do not change qualitatively. Alternatively, we estimated our models with two points of support for each random term and found the difference in the log-likelihood between the joint model and the separated models not significant. However, the estimation with three points of support lead to a significant improvement.

We estimated three different models with respect to the included migration variables: in the first model one variable indicating whether a person is a migrant or not is included, in the second model we additionally control for migrants who are born in Germany, and in the third model detailed information about the ethnicity and the year of migration is included. The inclusion of detailed information significantly increases the log-likelihood, indicating that it is important to distinguish between different ethnic groups when analyzing the unemployment dynamics of migrants.

[2] $AIC = -2lnL+2z$, lnL is the log Likelihood and z the number of parameters, see e.g. Cameron and Trivedi (2005).

The findings discussed in the sequel are based on the full model capturing unobserved heterogeneity (see model 3 in Table 5), since this is the one with the best overall fit. We are particularly interested in the unemployment and employment duration differences between natives and and the migrant groups. We find that Turks and Greeks have a significantly lower hazard rate from unemployment to employment than natives, but the effect for the Greeks is significant only at the 10% level. The point estimate for the Turks suggest that they have a reduction in the hazard rate of around 50% compared to the natives, which is quite substantial. The hazard rates of migrants coming from Italy, Ex-Yugoslavia and Spain do not differ significantly from the hazard rate of native men. Members of the second generation, i.e. children of migrants coming from the guestworker countries, have a 44% lower hazard rate from unemployment to employment if they have a Turkish citizenship; however, there is no difference for second generation migrants with other citizenships. This indicates that job finding difficulties do not disappear for Turkish individuals who were grown up in Germany. Moreover, these results indicate that the economic disadvantages of migrants typically identified in studies on unemployment duration in Germany (see e.g. Steiner, 2001, or Uhlendorff, 2004), are driven by the performance of one ethnic group, the Turks.

Once migrants find a new job, we observe no significant disadvantages of ethnic groups in the employment stability compared to natives. These results suggest that, compared to natives with the same observable and unobservable characteristics, unemployed immigrants do not find less stable jobs but that they need more time to find these jobs. Immigrants who came to Germany before 1974, i.e. before the recruitment policy for guestworkers was terminated, and persons who immigrated afterwards do not differ from each other with respect to both processes.

Our analysis controls for a number of covariables. The results indicate that the probability of finding a job increases in the months 4-6 being unemployed in comparison with the first three months and decreases afterwards. For employed individuals we observe a higher exit rate from jobs to unemployment in the months 7-12, compared to the first half year of employment, and a decreasing exit rate afterwards. Young and old unemployed persons stay longer in unemployment, while young and old employed have less stable jobs than the middle aged. The presence of young children in the household exhibits a higher probability of staying unemployed, while the coefficient of having older children is not significantly different from zero. Small kids do not have a significant impact estimate on the duration of employment, while the presence older children shows a negative impact on job stability. Married men have

a higher probability of leaving unemployment as well as a more stable employment.

Higher education protects individuals from unemployment, since all the categories included (apprenticeship, further vocational training and university with no vocational training at all as the reference category) have parameter estimates that strongly indicate a higher probability of leaving unemployment and a more stable employment spell. Individuals with a handicap have a higher risk of staying unemployed, but once they find a job, these jobs are as stable as the jobs of employees without a handicap. For both, the business cycle and the local unemployment rate, we find an impact on unemployment duration but no impact on employment stability. Growth increases the probability to find a job while higher local unemployment rates decrease such a chance.

5 Summary and Policy Conclusions

There is much concern in many European countries such as Germany about the very high unemployment rates among migrants and the likely causes. Therefore, this paper has investigated the differences in unemployment dynamics between natives and migrants in Germany to provide evidence about the most relevant factors. Using spell information of the 1984-2004 waves from the German Socio-Economic Panel (SOEP) for men aged between 20 and 55 the analysis is based on an inflow sample into unemployment and the estimation of a bivariate hazard rate model with two states, unemployment and employment.

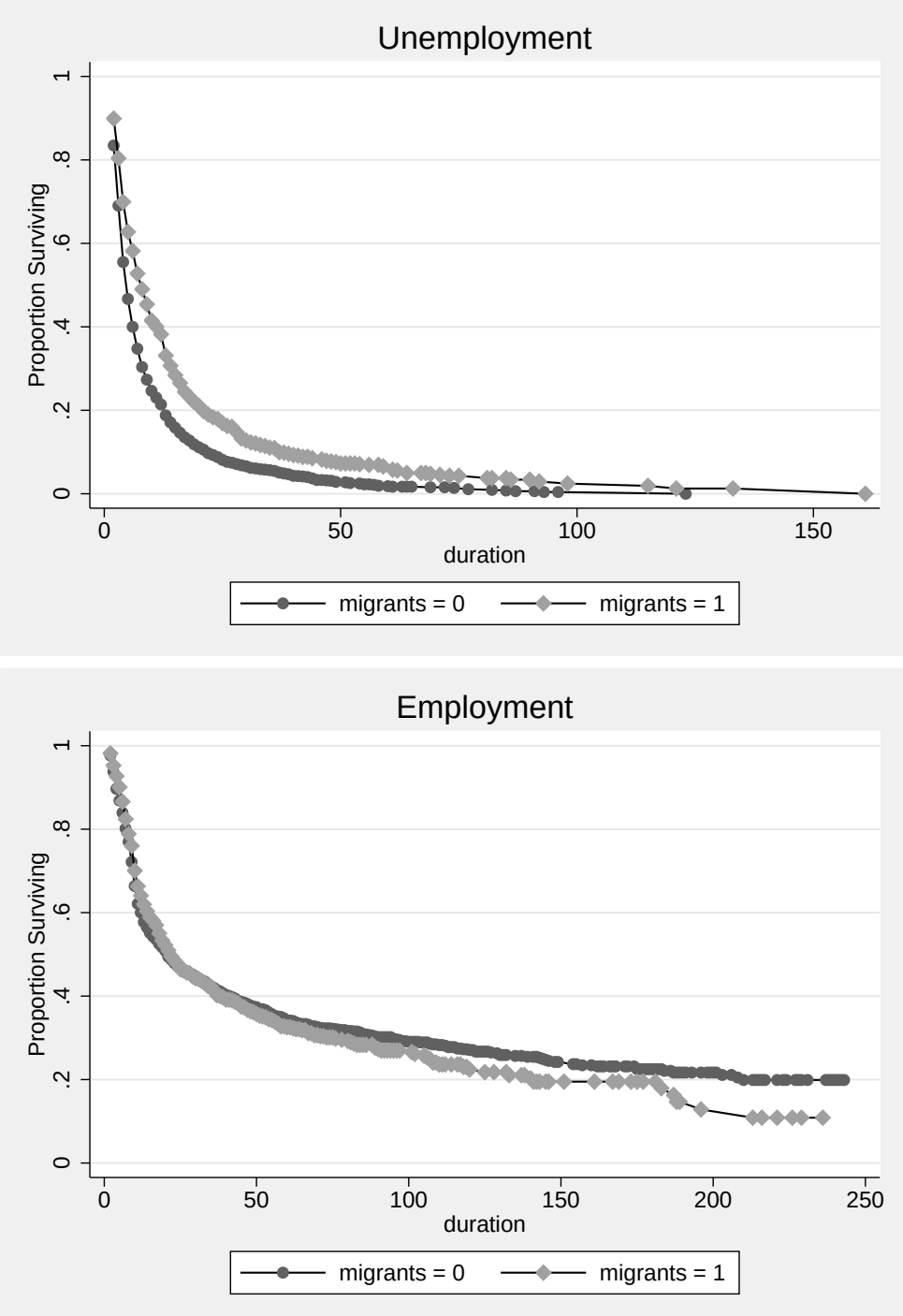
Two processes are analyzed: Transitions from unemployment to employment and transitions from employment to unemployment. The durations of both states are estimated jointly and the state specific unobserved heterogeneity components are allowed to be correlated across the two states. This is important because there is no reason to believe that unobserved characteristics determining the duration of unemployment are independent from unobserved characteristics influencing subsequent employment stability. Ignoring potential dependence could create a sample selection problem and thereby yield biased estimates. We find some evidence that both processes are not independent from each other, but the results do not change qualitatively compared to a model with uncorrelated unobserved heterogeneity.

The results show that migrants stay longer unemployed than natives, but the probability of leaving unemployment differs strongly with ethnicity. While immigrants from Italy, Ex-Yugoslavia and Spain do not differ from natives, Turkish immigrants

have a significantly lower probability of leaving unemployment for a paid job. Moreover Turkish members of the second generation of guestworkers still have a significantly lower probability of leaving unemployment than natives. However, once migrants find a new job, we observe no significant differences in the employment stability compared to natives, independent of the ethnicity.

These results suggest that, compared to natives with the same observable and unobservable characteristics, unemployed immigrants do not find less stable jobs but that they need more time to find these jobs. Predominantly Turks from the first and second generation face the problem of slow integration from unemployment to employment. Therefore, adequate policy measures should concentrate on the job finding process of Turkish migrants to decrease their disadvantages on the labor market.

Figure 1: Survivor Functions in Unemployment and Employment, Men



Source: SOEP, waves 1984-2004.

Table 1: Length and Destination states,unemployment spells

Destination state	Freq.	Percent	Average Length
Natives			
Right censored	371	11.5	12.8
Transitions out of Labor Force	531	17.1	9.3
Transitions to employment	2,209	71.0	5.8
Migrants			
Right censored	208	16.6	19.1
Transitions out of Labor Force	173	13.8	17.4
Transitions to employment	876	69.7	8.8
Total	4,368		8.5

Table 2: Length and Destination states,employment spells

Destination state	Freq.	Percent	Average Length
Natives			
Right censored	885	40.2	55.9
Transitions out of Labor Force	301	13.7	31.0
Transitions to unemployment	1,018	46.2	15.0
Migrants			
Right censored	340	38.8	47.9
Transitions out of Labor Force	97	11.1	35.4
Transitions to unemployment	439	50.1	17.6
Total	3,080		32.9

Table 3: Descriptive Statistics

	Natives		Migrants	
	Unemployment	Employment	Unemployment	Employment
Quarter 1	0.31	0.28	0.33	0.31
Quarter 2	0.18	0.33	0.21	0.31
Quarter 3	0.24	0.22	0.21	0.23
Quarter 4	0.27	0.18	0.25	0.15
Age	32.82 (9.98)	33.25 (9.40)	33.43 (10.71)	32.76 (10.01)
Apprenticeship	0.51	0.52	0.17	0.19
Vocational training	0.14	0.15	0.21	0.19
University	0.12	0.13	0.04	0.03
Married	0.41	0.44	0.62	0.61
Children aged < 4	0.15	0.16	0.26	0.27
Children aged $\geq 4 < 15$	0.24	0.25	0.42	0.43
Handicap	0.06	0.05	0.06	0.03
Previous unemp. duration	-	5.75 (7.32)	-	8.81 (11.92)
Local unemployment rate	9.16 (2.49)	9.13 (2.49)	8.61 (2.68)	8.52 (2.63)
GNP	1.67 (1.65)	1.85 (1.59)	1.91 (1.70)	2.08 (1.61)
Greece	-	-	0.06	0.06
Italy	-	-	0.15	0.16
Spain	-	-	0.03	0.03
Turkey	-	-	0.42	0.39
Ex-Yugoslavia	-	-	0.19	0.19
Second Generation	-	-	0.16	0.17
Second Generation Turkey	-	-	0.07	0.07
Migration before 1974	-	-	0.42	0.39
Number of observations	3,111	2,204	1,257	876

Source: SOEP, numbers refer to first month of each spell, standard deviations in parentheses.

Table 4: Estimation results without unobserved heterogeneity

	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
	Model 1				Model 2				Model 3			
	Unemployment to Employment		Employment to Unemployment		Unemployment to Employment		Employment to Unemployment		Unemployment to Employment		Employment to Unemployment	
Months 4-6	-0.16**	0.05	0.10	0.09	-0.16**	0.05	0.10	0.09	-0.16**	0.05	0.10	0.09
Months 7-12	-0.55**	0.05	0.56**	0.08	-0.55**	0.05	0.56**	0.08	-0.54**	0.05	0.56**	0.08
Months 13-18	-0.78**	0.08	-0.38**	0.11	-0.78**	0.08	-0.38**	0.11	-0.76**	0.08	-0.38**	0.11
Months 19+	-1.57**	0.09	-0.93**	0.11	-1.57**	0.09	-0.93**	0.11	-1.54**	0.09	-0.94**	0.11
Quarter 1	0.01	0.05	-0.03	0.09	0.01	0.05	-0.04	0.09	0.01	0.05	-0.03	0.09
Quarter 2	-0.24**	0.06	0.21*	0.08	-0.23**	0.06	0.21*	0.08	-0.22**	0.06	0.21*	0.08
Quarter 3	-0.17**	0.05	0.05	0.09	-0.17**	0.05	0.05	0.09	-0.18**	0.05	0.05	0.09
December	0.21	0.06	0.87**	0.07	0.21**	0.06	0.87**	0.07	0.21**	0.06	0.88**	0.07
Age	0.04**	0.01	-0.14**	0.02	0.05**	0.01	-0.14**	0.02	0.04**	0.01	-0.14**	0.02
Age squared $*10^{-2}$	-0.10**	0.02	0.21**	0.02	-0.10**	0.02	0.21**	0.02	-0.10**	0.02	0.21**	0.02
Married	0.30**	0.05	-0.31**	0.07	0.30**	0.05	-0.31**	0.07	0.32**	0.05	-0.32**	0.07
Children aged < 4	-0.09	0.05	0.15*	0.07	-0.09	0.05	0.15*	0.07	-0.08	0.05	0.14	0.07
Children aged $\geq 4 < 15$	-0.05	0.04	0.22**	0.06	-0.05	0.04	0.22**	0.06	-0.04	0.04	0.21**	0.06
Apprenticeship	0.24**	0.05	-0.29**	0.07	0.23**	0.05	-0.28**	0.07	0.22**	0.05	-0.29**	0.07
Vocational training	0.23**	0.06	-0.40**	0.0	0.23**	0.07	-0.40**	0.08	0.22**	0.06	-0.41**	0.086
University	0.49**	0.07	-0.65**	0.11	0.49**	0.07	-0.65**	0.11	0.49**	0.07	-0.66**	0.11
Handicap	-0.60**	0.09	0.05	0.13	-0.60**	0.09	0.05	0.13	-0.61**	0.09	0.05	0.13
Local unemp. rate	-0.05**	0.01	0.02	0.01	-0.06**	0.01	0.02	0.01	-0.05**	0.01	0.02	0.01
GNP	0.08**	0.01	-0.04**	0.02	0.08**	0.01	-0.04**	0.02	0.08**	0.01	-0.04**	0.02
Previous unemp. duration $*10^{-2}$	-	-	-0.47	0.53	-	-	-0.47	0.53	-	-	-0.59	0.54
Prev. un. dur. squared $*10^{-3}$	-	-	0.02	0.07	-	-	0.02	0.07	-	-	0.03	0.07
Migrant	-0.34**	0.05	-0.09	0.07	-0.38**	0.05	-0.07	0.07	-	-	-	-
Second generation	-	-	-	-	-0.22*	0.09	-0.14	0.13	-0.06	0.11	-0.11	0.16
Second generation Turkey	-	-	-	-	-	-	-	-	-0.43**	0.14	-0.15	0.21
Turkey	-	-	-	-	-	-	-	-	-0.54**	0.07	0.07	0.10
Spain	-	-	-	-	-	-	-	-	0.23	0.20	-0.29	0.31
Italy	-	-	-	-	-	-	-	-	-0.16	0.10	0.05	0.14
Ex-Yugoslavia	-	-	-	-	-	-	-	-	-0.17	0.09	0.01	0.14
Greece	-	-	-	-	-	-	-	-	-0.31*	0.15	-0.43	0.25
Migration before 1974	-	-	-	-	-	-	-	-	-0.06	0.08	-0.15	0.11
Constant	-1.99**	0.25	-1.38**	0.30	-2.02**	0.25	-1.37**	0.30	-2.00**	0.26	-1.44**	0.30
Log-Likelihood	-16,705.90				-16,703.76				-16,682.13			

Observations: 4,368 unemployment spells (37,174 months), 3,080 employment spells (101,464 months).
*: statistically significant at least at the 5% level; **: statistically significant at least at the 1% level.

Table 5: Estimation results with unobserved heterogeneity

	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
	Model 1				Model 2				Model 3			
	Unemployment to Employment		Employment to Unemployment		Unemployment to Employment		Employment to Unemployment		Unemployment to Employment		Employment to Unemployment	
Months 4-6	0.13*	0.05	0.18	0.09	0.12*	0.05	0.18	0.09	0.13*	0.05	0.18	0.09
Months 7-12	-0.09	0.07	0.79**	0.08	-0.09	0.07	0.79**	0.08	-0.07	0.07	0.79**	0.08
Months 13-18	-0.16	0.09	-0.02	0.12	-0.16	0.09	-0.02	0.12	-0.14	0.09	-0.02	0.12
Months 19+	-0.73**	0.11	-0.39**	0.12	-0.74**	0.11	-0.39**	0.12	-0.70**	0.12	-0.39**	0.12
Quarter 1	0.07	0.06	-0.07	0.10	0.07	0.06	-0.07	0.10	0.08	0.06	-0.07	0.10
Quarter 2	-0.16*	0.07	0.14	0.10	-0.16*	0.07	0.14	0.10	-0.14*	0.07	0.14	0.10
Quarter 3	-0.07	0.07	0.08	0.11	-0.07	0.07	0.08	0.11	-0.07	0.07	0.09	0.11
December	0.20**	0.06	0.90**	0.07	0.20**	0.06	0.90**	0.07	0.20**	0.06	0.90**	0.07
Age	0.06**	0.02	-0.16**	0.02	0.06**	0.02	-0.16**	0.02	0.05**	0.02	-0.16**	0.02
Age squared $*10^{-2}$	-0.13**	0.03	0.22**	0.02	-0.13**	0.03	0.23**	0.02	-0.13**	0.03	0.23**	0.02
Married	0.32**	0.06	-0.30**	0.08	0.33**	0.06	-0.30**	0.08	0.34**	0.06	-0.30**	0.08
Children aged < 4	-0.14*	0.06	0.10	0.08	-0.14*	0.06	0.10	0.08	-0.13*	0.06	0.10	0.08
Children aged $\geq 4 < 15$	-0.04	0.06	0.21**	0.07	-0.04	0.06	0.21*	0.07	-0.02	0.06	0.21**	0.07
Apprenticeship	0.32**	0.07	-0.29**	0.08	0.32**	0.07	-0.28**	0.08	0.30**	0.06	-0.28**	0.08
Vocational training	0.40**	0.08	-0.47**	0.10	0.40**	0.08	-0.48**	0.10	0.39**	0.08	-0.48**	0.11
University	0.65**	0.10	-0.81**	0.14	0.65**	0.10	-0.80**	0.14	0.64**	0.09	-0.80**	0.14
Handicap	-0.71**	0.11	0.11	0.16	-0.71**	0.11	0.11	0.16	-0.74**	0.11	0.12	0.16
Local unemp. rate	-0.06**	0.01	0.04**	0.01	-0.06**	0.01	0.04**	0.01	-0.06**	0.01	0.04**	0.01
GNP	0.10**	0.01	-0.04*	0.02	0.10**	0.01	-0.04*	0.02	0.10**	0.01	-0.04*	0.02
Previous unemp. duration $*10^{-2}$	-	-	-0.25	0.72	-	-	-0.24	0.72	-	-	-0.15	0.73
Prev. un. dur. squared $*10^{-3}$	-	-	0.01	0.09	-	-	0.01	0.09	-	-	0.00	0.10
Migrant	-0.40**	0.07	-0.08	0.08	-0.44**	0.07	-0.05	0.09	-	-	-	-
Second generation	-	-	-	-	-0.31*	0.12	-0.22	0.18	-0.12	0.15	-0.23	0.21
Second generation Turkey	-	-	-	-	-	-	-	-	-0.58**	0.18	-0.18	0.30
Turkey	-	-	-	-	-	-	-	-	-0.67**	0.10	-0.05	0.12
Spain	-	-	-	-	-	-	-	-	0.26	0.27	-0.40	0.44
Italy	-	-	-	-	-	-	-	-	-0.08	0.14	0.08	0.17
Ex-Yugoslavia	-	-	-	-	-	-	-	-	-0.13	0.13	-0.10	0.17
Greece	-	-	-	-	-	-	-	-	-0.35	0.20	-0.42	0.31
Migration before 1974	-	-	-	-	-	-	-	-	-0.14	0.10	0.04	0.14
η_{ue2}, η_{eu2}	-1.16**	0.14	-1.37**	0.10	-1.15**	0.14	-1.38**	0.10	-1.18**	0.15	-1.37**	0.10
η_{ue3}, η_{eu3}	1.19**	0.11	1.57**	0.18	1.18**	0.11	1.58**	0.18	1.21**	0.10	1.59**	0.18
Constant	-2.33**	0.37	-0.73*	0.35	-2.35**	0.37	-0.72*	0.35	-2.33**	0.37	-0.75*	0.35
Log-Likelihood	-16,485.88				-16,484.45				-16,465.87			

Unobserved heterogeneity is assumed to follow a non parametric distribution. For both processes 2 mass points are freely estimated.

Observations: 4,368 unemployment spells (37,174 months), 3,080 employment spells (101,464 months).

*: statistically significant at least at the 5% level; **: statistically significant at least at the 1% level.

Table 6: Distribution of unobserved heterogeneity, Model 3

	Prob.	Std. Err.	Prob.	Std. Err.
$P(\eta^1_{ue}, \eta^1_{eu})$, $P(\eta^1_{ue}, \eta^2_{eu})$	14.1	3.7	45.4	6.3
$P(\eta^1_{ue}, \eta^3_{eu})$, $P(\eta^2_{ue}, \eta^1_{eu})$	1.3	0.4	9.1	3.8
$P(\eta^2_{ue}, \eta^2_{eu})$, $P(\eta^2_{ue}, \eta^3_{eu})$	12.9	6.6	0	-
$P(\eta^3_{ue}, \eta^1_{eu})$, $P(\eta^3_{ue}, \eta^2_{eu})$	7.1	1.6	10.1	3.3
$P(\eta^3_{ue}, \eta^3_{eu})$	0	-		

The standard errors of the probabilities are derived using the delta method. The results refer to model 3, the distributions of model 1 and model 2 are quite similar.

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