Differences in Unemployment Dynamics between Migrants and Natives in Germany

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Abstract

Unemployment is higher among immigrants than among natives in Germany. This higher rate of unemployment could result from longer periods of unemployment, as well as from shorter periods of employment. In this paper differences in the duration of unemployment and subsequent employment between natives and immigrants are examined jointly. Using the SOEP we estimate bivariate discrete time hazard rate models. We find that immigrants stay longer unemployed than natives. The probability of leaving unemployment differs with ethnicity and especially immigrants from Turkey stay longer unemployed. Moreover the second generation of guest workers still has a significantly lower probability of leaving unemployment than natives. However, once immigrants find a new job, we observe no significant differences in the employment stability compared to natives.

Keywords: Unemployment duration, employment stability, bivariate hazard rate models, immigration

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1 Introduction

Compared to natives, the share of unemployed individuals is higher among immigrants in Germany. 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 and which individuals leave and reenter unemployment and whether these processes differ between natives and immigrants. This study investigates both sources of higher unemployment rate, 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 estimate unemployment and subsequent employment duration simultaneously and allow for correlation between unobserved terms.

In the year 2002 around 7.3 million foreigners lived in Germany, i.e. 9% of the total population did not have a German citizenship. This share is relatively stable since the mid 1990s. Despite this stable share, there are underlying dynamics within the stock of foreigners, e.g. in 2001 700,000 foreigners immigrated to, 500,000 foreigners emigrated from Germany and around 200,000 foreigners received German citizenship. These numbers indicate that migration plays an important role in Germany. The assimilation of immigrants into the German economic system is subject to several studies. For a recent overview see Bauer, Dietz, Zimmermann, and Zwintz (2005). In general, these studies deal with differences in wages and labor market participation between natives and migrants and their assimilation over time. There exist only a few studies dealing with unemployment experience of migrants in Germany and to our knowledge only one study dealing with unemployment and employment duration of immigrants (Kogan, 2004).

In this analysis data from the German Socio-Economic Panel (SOEP) for individuals aged between 20 and 55 and entering unemployment between 1984 and 2003 is used. Individuals living in East Germany are excluded from the analysis because in this region the share of immigrants is very low and the data set includes only a few unemployed immigrants. Two states are analyzed: unemployment and employment. 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. In fact we find strong evidence that both processes are not independent from each other. Ignoring this would create a sample selection problem and thereby yield biased estimates.

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 results show that immigrants stay longer unemployed than natives. The probability of leaving unemployment differs with ethnicity and especially immigrants from Turkey stay longer unemployed. Moreover members of the second generation of guest workers still have a significantly lower probability of leaving unemployment than natives. However, once immigrants find a new job, we observe no significant differences in the employment stability compared to natives.

Section 2 of this paper gives a description of the data, section 3 provides information on the econometric methods, Section 4 presents empirical results and section 5 concludes.

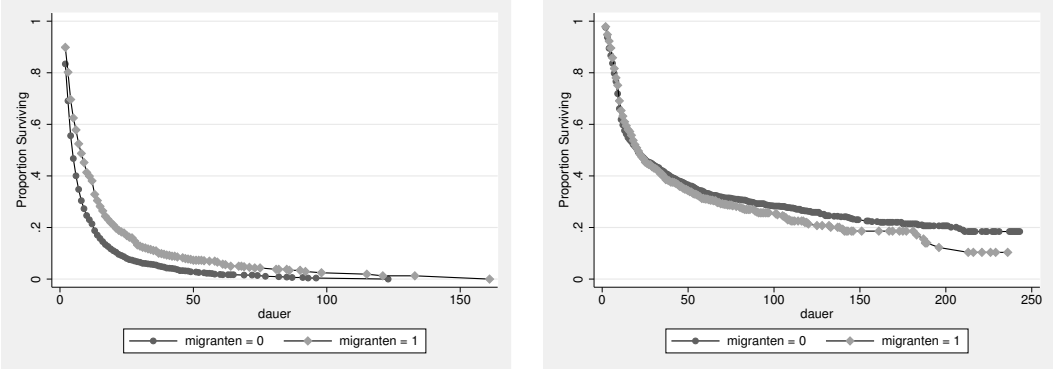
2 Data

This study uses data from the German Socio-Economic Panel study (SOEP). The yearly repeated SOEP started 1984 in West Germany with a sample of about 5,900 households, 1,400 of them with a head of household belonging to one of the main foreigner groups of "guest workers": Turks, Greeks, Italians, Yugoslavians or Spaniards. These immigrants were over-sampled in the SOEP. In the years 1994/1995 a new sample of immigrants started consisting of households in which at least one household member had moved from abroad to Germany within the last ten years. In 1990 the SOEP was expanded to East Germany and several refreshment samples have been added between 1998 and 2002. In all panel waves, the head of the household provides information about the household and every household member aged 16 or older provides additional individual information (for details on the SOEP see e.g. Haisken De-New and Frick (2005)). In addition to that the SOEP contains biographical information of all respondents including conditions upon initial arrival of immigrants in Germany.

The main groups of immigrants in the SOEP came originally from the five main "guest worker countries" Turkey, Greece, Yugoslavia or former Yugoslavia, Italy and Spain or are ethnic Germans mainly from Eastern Europe. We assume that immigrants coming from the "guest worker countries" behave fundamentally different than immigrants from other regions like North Europe, UK or Eastern Europe. Therefore only immigrants from the guest worker countries are included in the sample. This enables us to analyze the labor market assimilation of a group of relatively similar immigrants, but to take account of potential differences between the ethnicities because of sufficient numbers of cases. In East Germany the share of immigrants is very low and according to this low share only a few observations of unemployed immigrants are included in the SOEP. In addition to that East and West German labor markets differ due to the transformation process in the East. Therefore we exclude individuals living in East Germany from the analysis. The sample of immigrants includes individuals who are born in Germany but who do not have a German citizenship. These are members of the so called second generation of guest workers, i.e. the children of the immigrated guest workers. Naturalized children of the guest workers are not part of the immigrants in our sample.

In every wave retrospective monthly information about the individual employment status for each month of the previous calendar year is asked. We distinguish three categories: Employment, unemployment and out of labor force. The category em-

Figure 1: Survivor Functions in Unemployment and Employment, Men



Source: SOEP, waves 1984-2004, the left side refers to unemployment, the right side to employment.

ployment includes full time and half time employment. Out of labor force includes retirement, maternity leave, school, university, vocational training, military service and being housewife or house husband. We exclude individuals younger than 18 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 56th birthday.[1]

Individuals entering unemployment between 1983 and 2003 are included in the analysis. Our sample consists of unemployment spells and subsequent employment spells. Both durations are observed on a monthly basis. Individuals who are unemployed several times between 1983 and 2003 enter our sample with several spells of unemployment and, if a transition to employment occurs, subsequent employment. Note, employment spells enter our sample only if we observe a transition from unemployment to employment, i.e. this selected sample of employment spells is smaller than the sample of unemployment spells. A transition from unemployment to employment defined as a situation with an employment spell at the latest beginning three months after the unemployment spell ending, a transition from employment to unemployment is defined vice versa.

In Figure 1 product-limit estimates of the survival functions for both groups, immigrants 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

[1]We only have the information of the year of birth, therefore we right-censor spells at the beginning of the corresponding year and not at the month of birthday.

Table 1: Length and Destination states,unemployment spells

Destination state	Freq.	Percent	Average Length
Natives			
Right censored	375	12.0	12.67
Transitions out of Labor Force	509	16.2	9.13
Transitions to employment	2252	71.8	5.87
Migrants			
Right censored	206	16.3	19.39
Transitions out of Labor Force	172	13.6	17.31
Transitions to employment	883	70.0	8.79
Total	4397		8.49

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 5% level. Natives and immigrants seem to differ mainly in their unemployment duration and to be more similar in their employment duration.

The data set consists of 4397 unemployment and 3173 employment spells, distributed on 2453 individuals. 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 till a transition to employment occurs is 5.9 months for natives and 8.8 months for migrants, the corresponding mean length for transitions out of labor force are 9.1 months for natives and 17.3 months for migrants.[2] Around 70% of the observed unemployment spells end due to a transition into employment. In Table 2 the average lengths of employment spells are reported. The average length of employment spells is clearly higher than the length of unemployment spells in our sample and the differences between migrants and natives are not as striking as in the case of unemployment, which corresponds to the similar survivor functions.

Descriptive Statistics of covariables are documented in Table 3. To control for seasonal effects within one year dummies for the quarter in which the spell begins are included (quarter1 to quarter4). For both groups most unemployment spells begin in the first quarter of the respective year, i.e. between January and March. On average, foreign and native men have the same age (around 33 years). We include

[2]This observed mean length till a transition occurs is not an estimate of the mean length because it does not take the censored spells and competing risks into account. However, the different observed "mean lengths" give us a good description of our data set.

Table 2: Length and Destination states,employment spells

Destination state	Freq.	Percent	Average Length
Natives			
Right censored	890	39.0	56.0
Transitions out of Labor Force	193	8.5	35.8
Transitions to unemployment	1200	52.6	16.3
Migrants			
Right censored	327	36.7	49.3
Transitions out of Labor Force	60	6.7	36.6
Transitions to unemployment	503	56.5	18.6
Total	3173		33.72

educational dummies for having the dual-system apprenticeship, additional vocational training or holding a university degree. Natives have on average a higher education, while more immigrants are married and live together with their spouse and have more often children. 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 the natives than for immigrants 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 to control for business cycle effects. Natives and immigrants have a similar share of disabled persons of around 6%. The share of disabled individuals decreases to 3% among immigrants and to 5% among natives among subsequent employment spells. To be disabled means that the individual answers the question whether he is officially registered as having a reduced capacity for work or of being severely disabled with yes. With respect to unemployment spells 16% of the immigrants are born in Germany and members of the so called second generation, 42% come from Turkey, 19% come from Ex-Yugoslavia, 15% from Italy, 6% from Greece and 3% from Spain. 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. Some of the covariables are time-variant and updated on a yearly level (age, marriage status, children in the household, gnp and local unemployment rate).

Immigrants and natives 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. On the other hand the fact of being an immigrant itself could cause a longer duration of unemployment, e.g. due to discrimination or dif-

Table 3: Descriptive Statistics

	Natives		Migrants	
	unemployment	employment	unemployment	employment
Quarter1	0.31	0.29	0.33	0.31
Quarter2	0.18	0.32	0.21	0.31
Quarter3	0.24	0.21	0.21	0.23
Quarter4	0.27	0.18	0.25	0.15
age	32.81 (9.98)	33.18 (9.39)	33.43 (10.68)	32.75 (10.0)
apprenticeship	0.51	0.52	0.17	0.19
vocational training	0.16	0.18	0.22	0.20
university	0.12	0.13	0.04	0.03
handicap	0.06	0.05	0.06	0.03
local unemployment rate	9.16 (2.49)	9.12 (2.49)	8.61 (2.68)	8.51 (2.63)
GNP	1.67 (1.65)	1.85 (1.59)	1.91 (1.70)	2.06 (1.62)
married	0.41	0.44	0.62	0.61
children aged < 4	0.14	0.16	0.26	0.27
children aged $> 3 < 15$	0.24	0.25	0.42	0.43
previous unemp. duration	-	5.88 (7.35)	-	8.79 (11.88)
Greece	-	-	0.06	0.06
Italy	-	-	0.15	0.16
Spain	-	-	0.03	0.03
Turkey	-	-	0.42	0.39
Yugoslavia/ Ex-Yugoslavia	-	-	0.19	0.20
Second Generation	-	-	0.16	0.17
Migration before 1973	-	-	0.42	0.39
n	3136	2283	1261	890

Source: SOEP, descriptives with respect first month of each spell, standard deviations in brackets

ficulties with the native language. To analyze these differences in detail we apply econometric methods introduced in the following section.

3 Econometric Approach

The process of leaving unemployment in favor of paid labor and the duration of subsequent employment spells can appropriately be modelled by a multivariate hazard rate model. In this study, we are interested in the duration of two states: unemployment and employment. However, we distinguish three states: unemployment, employment and out of the labor force. 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 supplying labor 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. This ends up in a bivariate hazard rate model consisting of two potentially correlated states, unemployment and employment. For a discussion of multivariate mixed pro-

portional 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), Jenkins (2004)).

The duration of unemployment and employment is generated by a continuous time process, but observed or grouped in monthly intervals. The overall hazard rate 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 to employment and unemployment ($d = 1$), respectively, and transitions out of labor force ($d = 2$).

$$\lambda_s(t \mid x(t), \eta_i) = \sum_{d=1}^{2} \lambda_{sd}(t \mid x(t), \eta_{isd}) \tag{2}$$

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

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

$\lambda_{0sd}(t)$ denotes the state and destination specific baseline transition rate, $x(t)$ a time variant row vector of covariates, β_{sd} a column vector of parameters and η_{isd} a time invariant individual and destination specific unobserved term. The unobserved heterogeneity is assumed to be independent of the observed individual characteristics. There exist two types of potential correlations: A correlation of the unobserved heterogeneity between the competing risks and a correlation across the two analyzed states unemployment and employment. In this study we take the latter one into account and assume independent competing risks.

Further 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 in the German case 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.

Interval-censoring leads to the consequence that instead of continuous levels of $x(t)$ 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 $k-th$ subspell covers a range from $t = k-1$ to $t+1$, but excluding $t+1$. The interval specific levels of $x(t)$ and the observed interval baseline hazard $\lambda_{0sd}(t)$ are then denoted as x_k and $h_{0sd}(k)$.

For the state-specific survivor function this implies:

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

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. The probability $h_{sd}(j)$ of a transition from state s to destination d in interval j corresponds to:

$$h_{sd}(j|x(t),\eta_i) = 1-\exp(-\exp(x_j\beta_{sd}+h_{0sd}(j)+\eta_{isd}). \tag{5}$$

$\delta_{s1}=1$ and $\delta_{s2}=1$ indicate a transition to risk 1 and risk 2 in interval j, respectively, otherwise the indicators are zero. For a given η_i the likelihood contribution of one spell L_s is given by

$$L_s = \Big[\frac{h_{s1}(j)}{1-h_{s1}(j)}\Big]^{\delta_{s1}}\Big[\frac{h_{s2}(j)}{1-h_{s2}(j)}\Big]^{\delta_{s2}}S_{s1}(j)S_{s2}(j). \tag{6}$$

The risk-specific unobserved heterogeneity terms are assumed to be uncorrelated within each state, which ends up in a separable likelihood with respect to the two independent risks. Therefore one can estimate the transition processes separately within each state.[3]

[3]For us this implies that the transitions from unemployment to employment are independent

In this study, the focus lies 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_u is the unobserved heterogeneity influencing the transition process from unemployment to employment, while the unobserved term η_e effects the employment stability. Following Heckman and Singer (1984) these error terms or random intercepts are assumed to follow a discrete probability distribution with a finite number of mass points η_s^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, η_u and η_e is:

$$\begin{aligned} l(x, \eta_u, \eta_e) = \quad & S_{u1}(j_u - 1|x, \eta_u) h_{u1}(j_u|x, \eta_u)^{\delta_u} (1 - h_{u1}(j_u|x, \eta_u))^{(1-\delta_u)} \\ & S_{e1}(j_e - 1|x, \eta_e)^{\delta_u} h_{e1}(j_e|x, \eta_e)^{\delta_e \delta_u} (1 - h_{e1}(j_e|x, \eta_e))^{(1-\delta_e)\delta_u}. \quad (7) \end{aligned}$$

The unobserved heterogeneity is assumed to follow a multivariate distribution $G(\eta_u, \eta_e)$ with a finite number of points of support. Each term has two points of support. This results in 4 points of support for G: (η_{u1}, η_{e1}), (η_{u1}, η_{e2}), (η_{u2}, η_{e1}) and (η_{u2}, η_{e2}). For each of these combinations there exists a probability or a share of individuals having these values of unobserved heterogeneity. The likelihood contribution of an unemployment and a subsequent employment spell for a given x but unknown η_u and η_e can be written as

$$\begin{aligned} l(x) = \quad & \pi_1 * l(x, \eta_{u1}, \eta_{e1}) + \pi_2 * l(x, \eta_{u1}, \eta_{e2}) + \\ & \pi_3 * l(x, \eta_{u2}, \eta_{e1}) + \pi_4 * l(x, \eta_{u2}, \eta_{e2}). \quad (8) \end{aligned}$$

from transitions out of the labor force and that transition from employment into unemployment are also independent from transitions from employment out of the labor force, given the observed characteristics.

For the estimation procedure the probabilities π_i are specified as logistic probabilities[4]

$$\pi_i = \frac{\exp(p_i)}{\sum_{j=1}^{4} \exp(p_j)}, \quad i = 1, 2, 3, 4, \quad \sum_{j=1}^{4} \pi_j = 1 \tag{9}$$

The hazard rates contain a constant term, one of the mass points of each unobserved heterogeneity term η_u and η_e are normalized to 0 and the three parameters p_1, p_2 and p_3 have to be estimated, p_4 is fixed to 0.

The correlation between η_u and η_e corresponds to the following expression (Belzil, 2001)

$$Corr(\eta_u, \eta_e) = \frac{\pi_1\pi_4 - \pi_2\pi_3}{(\pi_1 + \pi_3)(\pi_2 + \pi_4)(\pi_1 + \pi_2)(\pi_3 + \pi_4)}. \tag{10}$$

This correlation provides information in how far unobserved heterogeneity reducing the length of unemployment goes along with unobserved individual specific characteristics increasing the employment stability.

In addition to this model we estimate models with a more restrictive distribution of the error terms, i.e. we allow for different mass points for each error term but estimate only two probabilities. This results in two points of support for G: (η_{u1}, η_{e1}) and (η_{u2}, η_{e2}). In this more restrictive model two groups are differentiated instead of four in the more flexible one.

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 multiple spells per individual see e.g. Steiner (2001) or Roed and Zhang (2005).

The sample likelihood is given by

$$L = \prod_{i=1}^{n} \sum_{j=1}^{4} \pi_j \prod_{q=1}^{Q_i} l(x, \eta_u, \eta_e) \tag{11}$$

[4]The model is estimated using the -ml- command in Stata version 8.2

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 rate. The inclusion of unobserved heterogeneity does significantly improve the model fit, compared to the model without unobserved heterogeneity and the model with two groups of support for G (The results of the alternative model are not reported here) .[5] The results are reported in Table 4.

Immigrants from Turkey and Greece have a significantly lower hazard rate from unemployment to employment than natives, but the effect for the Greeks is significant only at a 10% level. The point estimate for the Turks suggest that they have a reduction in the hazard rate of 50% compared to the natives. The hazard rates of immigrants 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 immigrants coming from the guest worker countries, have a by around 28% reduced hazard rate from unemployment to employment. This indicates that job finding difficulties do not disappear for individuals who grow up and are educated in Germany.

Once immigrants find a new job, we observe no significant disadvantage in the employment stability compared to natives. Greek men even seem to stay longer in employment, but this effect is only weakly significant. 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.

We differentiate between two cohorts of immigrants: Immigrants who came to Germany before 1974, i.e. before the recruitment policy for guest workers was terminated, and persons who immigrated afterwards. There seems to be no difference between these two cohorts with respect both processes.

In the regressions we control for several covariables. The results indicate that the probability of finding a job increases in the months 4-6 and decreases afterwards. For employed individuals we observe a higher exit rate from jobs to unemployment

[5]The Akaike Information Criterion (AIC) is used to evaluate the model fit and its improvement compared to the model without unobserved heterogeneity: $AIC = lnL - k$, lnL is the log Likelihood and k the number of parameters, see e.g. Greene (2003).

in the months 7-12, compared to the first half year of employment, and a decreasing exit rate afterwards. Younger and older unemployed persons stay longer in unemployment, while the age is not significant in the process of reentering unemployment. The existence of young children in the household goes along with a higher probability of staying unemployed, while the coefficient of having older children is not significantly different from zero. The existence of children does not have a significant impact on the duration of employment, while married men have a higher probability of leaving unemployment as well as a more stable employment. Higher education goes along with a higher probability of leaving unemployment and a more stable employment spell. The comparison group of the three categories "apprenticeship", "further vocational training" and "university" consists of individuals with no vocational training at all. Moreover, 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. Both, the business cycle and the local unemployment rate have an impact on the unemployment duration but no impact on the employment stability.

Both estimated mass-points are significantly different from 0. The coefficients indicate that there exist two groups in both processes which differ significantly from each other with respect to the baseline hazard rate. The point estimates suggest that the hazard rate from unemployment to employment is for one group reduced by 74% and that the probability of staying employed is increased by 78% for one group. All estimated probabilities of the joint distribution of the two random terms are significantly different from 0. 24% of the sample belong to the group with a lower probability of leaving unemployment and a higher probability of staying employed once they find a job while 12% leave unemployment faster and stay longer employed. The highest share of individuals have a high probability of staying long unemployed and leave subsequent employment relatively fast (44%) and 21% have in contrast to that a higher probability of leaving unemployment and a high probability of staying employed. The corresponding correlation of the unobserved heterogeneity is -0.27, i.e. on average unobserved factors increasing the duration of unemployment go along with unobserved factors decreasing the employment stability.

The results indicate that unemployed immigrants from the guest worker countries and especially Turkish men have difficulties to leave unemployment for paid work. These differences between natives and immigrants are evaluated by allowing for shifts in the baseline hazard rate. Alternatively one could analyze whether the processes differ from each other by allowing different slope parameters for natives

and immigrants by estimating the model separately for both groups. This will be subject to further research.

5 Conclusion

This paper examines the differences in unemployment dynamics between natives and immigrants in Germany. Using spell information of the SOEP waves 1984-2004 and an inflow sample into unemployment we estimate a bivariate hazard rate model with two states: Unemployment and employment.

Our results show that immigrants stay longer unemployed than natives. The probability of leaving unemployment differs with ethnicity and especially immigrants from Turkey stay longer unemployed. Moreover we find that members of the second generation of guest workers still have a significantly lower probability of leaving unemployment than natives. However, once immigrants find a new job, we observe no significant differences 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. The policy implication of these results is that policy measures should concentrate on the job finding process of immigrants if the aim is to decrease their disadvantages on the labor market. However, further research is needed to identify the sources of a lower job finding probability.

Table 4: Estimation results

	Coef.	Std. Err.	z	Coef.	Std. Err.	z
	Unemployment to Employment			Employment to Unemployment		
month4-6	0.12	0.05	2.30	0.13	0.09	1.45
month7-12	-0.10	0.06	-1.63	0.55	0.08	7.23
month13-18	-0.20	0.09	-2.24	-0.28	0.10	-2.66
month19+	-0.89	0.10	-8.96	-1.13	0.09	-12.23
quarter1	0.06	0.07	0.93	0.05	0.09	0.51
quarter2	-0.15	0.07	-2.14	0.22	0.09	2.46
quarter3	-0.09	0.07	-1.33	0.06	0.10	0.58
December	0.20	0.06	3.32	1.01	0.06	16.20
age	0.06	0.02	3.02	-0.04	0.03	-1.27
age squared *100	-0.13	0.03	-4.97	0.06	0.04	1.49
married	0.35	0.07	5.34	-0.28	0.08	-3.52
children aged $> 3 < 15$	-0.08	0.05	-1.52	0.08	0.07	1.13
children aged < 4	-0.13	0.06	-2.05	0.06	0.08	0.72
apprenticeship	0.20	0.06	3.48	-0.31	0.08	-3.91
vocational training	0.22	0.07	3.30	-0.37	0.09	-4.00
university	0.51	0.11	4.49	-0.64	0.13	-5.07
handicap	-0.67	0.11	-6.36	0.09	0.14	0.62
local unemp. rate	-0.06	0.01	-5.84	0.02	0.01	1.32
gnp	0.09	0.01	7.53	-0.02	0.02	-1.34
previous unemp. duration				0.00	0.00	-0.53
second generation	-0.33	0.12	-2.64	-0.17	0.17	-0.97
Turkey	-0.69	0.10	-7.18	0.08	0.12	0.63
Spain	0.19	0.26	0.75	-0.30	0.39	-0.76
Italy	-0.10	0.14	-0.73	0.04	0.17	0.24
Ex-Yugoslavia	-0.19	0.13	-1.38	-0.04	0.16	-0.27
Greece	-0.37	0.20	-1.88	-0.52	0.30	-1.72
Migration before 1974	-0.08	0.10	-0.78	-0.09	0.13	-0.68
constant	-1.40	0.36	-3.91	-2.40	0.49	-4.91
η_s^2	-1.34	0.07	-18.72	-1.52	0.11	-14.11
π_1: P(0,0)	0.12	0.03				
π_2: P(-1.34,0)	0.44	0.06				
π_3: P(0,-1.52)	0.21	0.04				
π_4: P(-1.34,-1.52)	0.24	0.05				
Observations						
number of spells	4397			3173		
number of months	37,346			103,970		
Log-Likelihood	-17377.75					

Unobserved heterogeneity is assumed to follow a non parametric distribution. For both processes 1 mass points is freely estimated. To guarantee plausible results a multinomial specification of the probabilities, rather than the probabilities p2-p4, has been estimated. The standard errors of the probabilities are derived using the delta method.

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