The dynamics of welfare entry and exit among natives and immigrants

Preliminary - work in progress

Comments welcome

Christoph Wunder[a,*], Regina T. Riphahn[a]

May 30, 2011

Abstract

This paper uses panel data from the German Socio-Economic Panel (SOEP) to analyze welfare entry and exit and to determine the relevance of state dependence. We separately consider natives and immigrants after a substantial reform of the German welfare system ("Hartz reform"). Based on results from dynamic multinomial logit models, we calculate transition matrices between three mutually exclusive labor market states (inactivity, employment, welfare receipt). We find that temporal persistence in welfare participation can for the most part be explained by observed and unobserved characteristics. In general, immigrants appear to have a higher risk of welfare entry and a lower probability of welfare exit compared to natives. On average, they are three times more likely to remain welfare recipients over time than natives. The analysis identifies non-EU citizens, who are mostly of Turkish origin or citizens of the successor states of former Yugoslavia, as the group with the lowest employment stability, the highest persistence in welfare participation, the highest welfare entry rate, and the lowest welfare exit rate. The results do not yield strong evidence of state dependence or of an overall welfare trap.

Keywords: immigration, unemployment benefit II, transfers, welfare state, welfare trap

JEL Classification: I38, J61

[a] University of Erlangen-Nuremberg
[*] Corresponding author: Christoph Wunder, University of Erlangen-Nuremberg, Department of Economics, Lange Gasse 20, 90403 Nuremberg, Germany. Tel.: +49 911 5302 260; Fax: +49 911 5302 178. Email: christoph.wunder@wiso.uni-erlangen.de

Acknowledgements: We thank the participants of the CESifo area conference "Employment and Social Protection" for helpful comments.

1 Introduction

Recent research shows that in many countries immigrants have a higher propensity to receive welfare benefits than natives (for an overview, cf. Barrett and McCarthy 2008). It is important to understand the mechanisms driving this difference because the population share of immigrants and their descendants is destined to rise in most aging societies and because continued immigration may put substantial pressures on existing welfare systems (e.g., Jean et al. 2010, OECD 2010).

The literature studying immigrant-native differences in welfare receipt uses three approaches. A first approach focuses on observable characteristics and their relevance. A frequent finding is that immigrants with little host country-specific human capital have poor labor market prospects and a high risk of welfare receipt. A second approach separates the probability of entering and of exiting transfer dependence for immigrants and natives. The third approach refines models of welfare entry and exit and accounts for possible state dependence: past welfare receipt itself may have a direct effect on individual preferences or constraints that determine subsequent exit and entry behavior. If there is state dependence in welfare receipt the welfare system generates a welfare trap (e.g., Plant 1984).[1]

When studying state dependence, it is important to distinguish whether correlations in labor market states over time are due to true or spurious state dependence. State dependence is called spurious if the correlation in labor market states over time results from observed or unobserved individual-specific heterogeneity. Only after accounting for such heterogeneities can we reliably identify true state dependence and the existence of a welfare trap (cf. Heckman 1981a). With true state dependence policy measures to reduce welfare dependence can be more effective than in a situation without true state dependence.

In this study we investigate state dependence as a determinant of temporary persistence in welfare participation as well as other potential mechanisms behind immigrant-native differences in welfare receipt. We apply dynamic multinomial logit models with controls for unobserved

[1] Persistence in welfare participation is a common observation. Welfare recipients often experience welfare participation for prolonged and repeated periods (e.g., Blank 1989, Moffitt 1992, Blank and Ruggles 1994, Green and Warburton 2004).

heterogeneity and endogenous initial conditions to analyze transition probabilities between employment, inactivity, and welfare receipt. We separately consider the patterns of welfare exit and welfare entry for native and immigrant subsamples.

While various contributions have studied immigrant-native differences in welfare participation only few authors applied dynamic estimation approaches to distinguish true and spurious state dependence. The studies which are most closely related to our analysis consider dynamic discrete choice models to estimate true state dependence in welfare receipt.

Hansen and Lofstrom (2009) study the transition between welfare receipt, unemployment, and employment among male Swedes (1990-1996). Jointly with a dynamic multinomial logit model, the authors model the endogenous initial state using Heckman's (1981a) procedure. They consider unobserved heterogeneity using a discrete factor approximation (Heckman and Singer 1984). The authors find for immigrants and natives that true state dependence in welfare receipt is far lower than the observed temporal persistence in welfare receipt. However, since true state dependence is higher among immigrants than natives they confirm the existence of a welfare trap for immigrants. These findings for Sweden are confirmed by Andrén (2007). He also uses Swedish register data (1990-1999) and finds significantly higher state dependence among immigrants compared to natives.

In their 2006 analysis, Hansen and Lofstrom separately model welfare exit and entry of Swedish natives and immigrants between 1991 and 2001. They conclude that the difference in welfare receipt between natives and immigrants results from differences in entry to rather than in exit from welfare. The authors do not present the extent of true state dependence. They conclude that unobserved rather than observable characteristics are a main contributor to differences in welfare participation.

In a recent contribution, Bratsberg et al. (2010) study the process by which immigrants drop out of employment over time in Norway. Compared to natives, immigrants have substantially higher exit rates from employment and significantly higher state dependence in nonemployment, i.e. the loss of employment is more permanent among immigrants. This is in part driven by differences in household characteristics, immigrants' selection into weak industries, the sensitivity of their jobs to the business cycle, and by weak work incentives of the Norwegian welfare system.

There are additional contributions to the literature on state dependence of welfare receipt that do not focus on the immigrant-native welfare gap. Hansen et al. (2006) study Canadian welfare participation using panel data. They apply dynamic probit estimators for transitions in and out of welfare receipt and use similar econometric methods as Hansen and Lofstrom (2009). The authors find substantial true state dependence in particular in regions with high benefit levels.

Using Californian data and dynamic fixed effects logit models, Chay et al. (2004) test for the existence of first and second order state dependence in welfare receipt, which they confirm for all subsamples. The magnitude of state dependence varies across population groups with substantially higher effects among blacks, old, and single parent households than among whites, young, and dual parent households. The aggregation of monthly data to quarterly and annual observations attenuates the state dependence estimates.

Finally, Cappellari and Jenkins (2009) study welfare receipt in Britain (1991-2005) using a dynamic random effects probit model. The model allows for different covariate effects on entry to versus exit from welfare receipt. The results yield only few statistically significant interaction effects and thus little evidence on state dependence. The authors control for endogenous initial conditions using the Wooldridge (2005) estimator and consider Mundlak (1978)-type fixed effect controls. They argue that the overall decline in British welfare participation was driven by declining entry rates, which are correlated with falling unemployment and reforms of the welfare system.

The German literature on welfare participation is limited. One group of contributions studies take-up behavior.[2] Transition processes in and out of welfare receipt have been analyzed by Wilde (2003) using a probit estimator and data from 1999. Aldashev and Fitzenberger (2009) simulate the probability of welfare entry using administrative data for 2006. Schels (2009) studies the exit behavior of a cross-section of young welfare recipients in January 2005. Bruckmeier and Wiemers (2010) look at the duration of welfare payments as an earnings subsidy for employed individuals. Riphahn (2004) compared native and immigrant social assistance receipt between 1984 and 1996. Accounting for unobserved heterogeneity and endogenous

[2] See e.g. Riphahn (2001), Kayser and Frick (2001), Wilde and Kubis (2005), Frick and Groh-Samberg (2007), or Bruckmeier and Wiemers (2010).

panel attrition, she concludes that the welfare gap is connected to immigrants' higher financial vulnerability in the event of unemployment. So far, no contribution on German welfare receipt considers the dynamics and extent of state dependence for transitions after 2005, when the welfare system was reformed.

Except for Hansen and Lofstrom (2006, 2009) and Bratsberg et al. (2010) the difference in welfare dynamics for natives and immigrants has remained largely unexplored. We contribute to this literature and study welfare entry and exit among natives and immigrants in Germany. We focus on the years after the reform of 2005. While there are a few contributions on transitions in the social assistance system prior to this reform, we know little about the more recent situation.

We find that the high temporal persistence in welfare participation observed in the raw data for the most part can be explained by observed and unobserved characteristics. In comparison, immigrants have a higher risk of welfare entry and a lower probability of welfare exit than natives. In particular, non-EU citizens have the lowest employment stability, the highest persistence in welfare participation, the highest welfare entry rate, and the lowest welfare exit rate among all subsamples. A simulation exercise shows that immigrant-native differences in labor market transitions narrow when differences in characteristics are taken into account. However, for non-EU citizens a significant unexplained immigrant-native gap remains. Gender-specific analyses suggest that immigrant-native differences are particularly pronounced among men. Overall, true state dependence is of moderate magnitude even in the subsample of non-EU immigrants where it is the largest. Thus there is little evidence for a welfare trap.

These findings are of interest for the design of welfare policies, as they enhance our understanding of immigrant-native differences in welfare entry and exit and identify immigrant groups with insufficient labor market integration. Lessons from the experience of Europe's largest economy and labor market may be relevant for the situation in countries with similar population structures.

2 Institutions

The German income support system was reformed between 2002 and 2005 (for a summary see e.g., Caliendo 2009, Riphahn and Wunder 2011). This section briefly describes post-reform

minimum income protection for natives and immigrants. The two institutions relevant to our analyses are the unemployment insurance and the welfare system.

Among the eligibility requirements for the receipt of unemployment insurance (UI) benefits are a minimum prior duration of insurance contributions and active job search. UI benefits replace up to 67 percent of prior net labor earnings. The benefits are provided for up to 12 months for those who worked 24 out of the last 48 months prior to unemployment.[3] The duration of benefit eligibility increases with the age of the unemployed. Benefits (labeled unemployment benefits I) are financed based on insurance contributions. They are not means-tested and are available for immigrants and natives, if they established a contributory record.

The objective of the German welfare system is to guarantee that legal residents can lead a dignified life based on a socio-culturally determined minimum income. This minimum income is calculated for a given household based on the number and age of household members. The benefit amount is independent of past earnings. Since the 2005 reform, the German welfare system distinguishes between those who are able to work and those who are not. Those able to work but with insufficient income can claim means-tested unemployment benefits II (UB II), i.e. welfare benefits, from the tax-financed welfare system.[4] UB II are available, both, for those without (sufficient) claims to the unemployment insurance and for those who are employed but whose earnings do not meet their minimum income needs. Eligibility requirements for UB II receipt are (a) a means-tested need, (b) the ability to work at least 15 hours per week, (c) being between age 15 and 65, and (d) having permanent residence rights in Germany, which excludes tourists, seasonal workers, and asylum seekers. In addition, individuals living with a welfare recipient receive welfare, if they are a dependent child, a partner, or parent in the same household (see BMAS 2010). One element of the 2005 welfare reform was to strengthen work incentives, to activate welfare recipients, and to enable them to re-enter the labor market.

Individuals without German citizenship can claim UB II if they are allowed to take up employment, which again depends on their formal immigrant status: asylum seekers, e.g., are

[3] The definition of the 48 months reference period changed at several occasions in the past.

[4] Those who are too old or not healthy enough to work receive minimum income transfers e.g. from the social assistance program (Soziahilfe) or income support for the elderly (Grundsicherung).

not eligible for welfare and receive separate asylum seeker benefits. Ethnic Germans[5] and naturalized immigrants are treated just like natives. Immigrants residing in Germany in order to find employment are not eligible, which also affects other European Union citizens. However, a long list of circumstances renders EU citizens (and those treated like them, such as citizens of Switzerland, Norway, Iceland, and Liechtenstein) eligible for UB II receipt (for details, see Classen 2009). Generally, those immigrants who are not eligible for UB II, are likely to be eligible for welfare benefits from the social assistance scheme.

An important question is, whether immigrants run the risk of losing their right to stay in Germany in connection with receiving welfare benefits. In some situations the prolongation of the right to stay or an improvement in immigrant status can be refused if an immigrant is in need of public means-tested support. The receipt of unemployment benefit I is not relevant in this respect, as it is not means-tested and based on prior contributions. Special protection is granted to migrants from signatory states of the European Convention on Social and Medical Assistance as of 1953, which covers immigrants from EU member states, Iceland, Norway, and—importantly—Turkey. Immigrants from these states generally cannot lose their right to stay in Germany as a consequence of welfare receipt.[6]

Aggregate information on welfare participation for natives and immigrants is limited because the unemployment insurance uses citizenship as the only indicator of immigrant status. In addition, a sizeable immigrant share of about 10 percent (Statistisches Bundesamt 2009, p. 50) enters the country as ethnic Germans which makes them indistinguishable from natives for official statistics. Nevertheless, the share of foreigners among the unemployed reached 15 percent (in 2009), while they made up 8.2 percent in the population. This is reflected in unemployment rates, which amount to 19.1 percent for foreigners compared to 8.3 percent among German citizens as of 2009 (cf. BA 2010a). Official statistics indicate that in 2009 of all unemployed individuals about 35 percent received unemployment benefit I and 65 percent were funded based on the means tested UB II transfer. These shares have been roughly constant since 2006.

[5] The term ethnic Germans is used for Germans, who moved to Eastern Europe before World War II. They and their descendants automatically receive German citizenship when entering Germany.

[6] The regulations are summarized by Classen (2009).

In 2009, 3.59 million households with 6.73 million individuals, about 8.2% of the population, received UB II (cf. BA 2010c). Total expenditures for unemployment benefit I in 2009 amounted to 17.3 billion Euro, expenditures for UB II reached 31.1 billion Euro (cf. BA 2010b). As of 2010, an average UB II recipient household received about 850 Euro for on average 1.9 individuals. This covers expenditures for rent and heating and other expenses including health insurance. About 20 percent of the individuals receiving UB II are foreign citizens (cf. BA 2010c).

3 Data

The data used in this paper are taken from the Socio-Economic Panel Study (SOEP). The SOEP is a longitudinal household study that provides information about natives and immigrants in Germany (cf. Haisken-DeNew and Frick 2005, Wagner et al. 2007). Its sample design makes the SOEP one of the most important data sets for immigration research in Germany. Respondents from typical guest-worker countries (Turkey, Greece, (ex-)Yugoslavia, Spain, and Italy) were oversampled and provide large samples of immigrant subgroups. Furthermore, since 1994 the SOEP additionally interviews households with persons who had immigrated to Germany after 1984, which mainly includes ethnic Germans.

We focus on labor market transitions among immigrants and natives after the 2005 reform came into effect. Our data cover the period 2005-2009 and include individuals conditional on being part of the sample in 2005, which is our initial state. We study working age adults (aged 25-65) and exclude disabled persons because UB II is only granted to individuals with full earning capacity. The sample is restricted to West Germany because the proportion of immigrant households is negligible in East Germany (for similar sample selection criteria, cf. Kogan 2004 and Riphahn 2004).

We use a broad concept of "migration background" to delineate our immigrant sample. In principle, this combines first and second generation immigrants independent of citizenship.[7] We distinguish three immigrant groups: EU citizens (excluding Germans), non-EU citizens, and

[7] We apply the migration background indicator provided in the data which is discussed in Frick and Lohmann (2010).

immigrants with German citizenship.[8] Descriptive statistics for our subsamples are presented in Table 1. Obvious immigrant-native differences exist with respect to education and the number of children. The differences are most pronounced for non-EU citizens, who have, on average, at least two years less of education and approximately twice as many children as natives.

We categorize individuals in three mutually exclusive labor market states based on their status at the time of the interview: first, all respondents who receive welfare benefits (UB II) are coded as welfare recipients.[9] The remaining individuals are coded as employed if they are full-time or part-time employed, or participate in vocational training are considered. The third category comprises inactive persons that are neither defined as welfare recipients nor as employed. In addition to non-working individuals, this group includes the unemployed who receive unemployment insurance benefits. The rationale behind this definition of inactive persons is that they do not rely on tax-financed welfare benefits but instead have non-welfare incomes from contributory unemployment insurance or savings, for instance.

Using weighted data to reflect the population of interest, Table 2 reports the observed distribution of the three labor market states by immigrant group for the years 2006-2009. In general, we observe rising employment and falling inactivity over time. These figures reflect a positive labor market trend that was accompanied by a decrease in the overall unemployment rate from 10.2% to 7.8% (cf. BA 2010a). Figure 1 illustrates this trend in the aggregate unemployment rate over the 2005-2009 period separately for natives and foreign citizens. In Table 2, the increase in employment cannot be observed for non-EU citizens, suggesting that this immigrant group did not benefit from the improvement of the labor market.

[8] Individuals with EU citizenship are defined as citizens of EU member states (excluding Germany) and citizens of states that are treated as legally equivalent. The corresponding states are: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Great Britain, Greece, Holland, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland. Persons of Italian or Greek nationality dominate this group with a share of 38% and 22%, followed by Spaniards (9%). All other nationalities are regarded as immigrants with non-EU citizenship. They are predominantly from Turkey (58%) and the successor states of former Yugoslavia (29%). Immigrants with German citizenship are primarily second generation immigrants and ethnic Germans.

[9] The information about welfare receipt is taken from a question about incomes that the respondent personally receives at the time of the interview. Although UB II is actually a household level benefit, we chose individuals as the unit of observation because dynamic transitions between labor market states cannot be defined consistently for households. Since individuals leave the household and new persons move into existing households, household compositions change over time, so that it is not possible to follow a household *as a unit* (for a similar approach, cf. Cappellari and Jenkins 2009).

The data show important differences between immigrants and natives. First, the share of employed immigrants is clearly smaller than that of employed natives (Table 2, panels A and B): while the employment rate among natives amounts to up to 79% in 2009, this number is approximately 11 percentage points lower for all immigrants. Accordingly, immigrants are more often inactive or welfare recipients. On average, the share of immigrants receiving welfare is more than twice as large as that of natives. Second, the figures indicate heterogeneity in labor market participation patterns between immigrant groups (Table 2, panels C-E). While, e.g. in 2009, the distribution of labor market states of EU citizens is similar to that of native Germans, immigrants with German citizenship are employed slightly less and are more often on welfare. The case of immigrants with non-EU citizenship is particularly noteworthy, as their employment rate is 25 percentage points below that of natives. They are 3.5 times more likely to receive welfare benefits than natives.

Table 3 describes the observed patterns of labor market transitions. Employment is the most stable state. The probability of being employed in two successive years is similar for EU citizens (93.7%), immigrants with German citizenship (92.7%), and natives (94.3%). In contrast, the employment persistence of non-EU citizens is as low as 88.2%. They have the highest probability of transiting from employment to welfare. Persistence in welfare participation is frequent as approximately 75% of those who received welfare benefits in $t-1$ are also recipients in t. Using the terminology of Cappellari and Jenkins (2002, 2004), we observe an aggregate state dependence (ASD) of welfare receipt of at least 70% among both, natives and immigrants.[10] This indicates strong persistence when compared e.g. to 46% ASD of unemployment found by Stewart (2007), 53% ASD of poverty in Cappellari and Jenkins (2004) and about 60% ASD of welfare receipt in Sweden (Hansen and Lofstrom 2009).

The high degree of persistence in labor market states observed in Table 3 may be attributed to the fact that persons with specific transition patterns differ in their characteristics. Table 4 shows the average values for selected characteristics by labor market transition. It is evident, for example, that natives who receive welfare in t and $t-1$ have, on average, 1.7 less years of education than continuously employed persons (Table 4, panel A). For immigrants, this difference

[10] The authors define aggregate state dependence of state j as the difference in the probability of being in state j in period t conditional on being there in $t-1$ as well minus the probability of being in state j in period t conditional on not being in state j in period $t-1$.

amounts to 0.7 years. Furthermore, the share of females among permanent welfare recipients is higher than among continuously employed persons (63% vs. 45% for natives, 56% vs. 47% for immigrants). Thus, one may suspect that a lack of human capital and/or gender-specific labor market opportunities are connected to the persistence in welfare participation. In order to study the extent of true state dependence, we next introduce a statistical model that allows us to control for observed and unobserved characteristics.

4 Estimation strategy

Our dependent variable describes individuals' labor market state in period t, where we distinguish inactivity, employment, and welfare receipt. We model the probability of being in a particular state as a utility maximization problem where the individual chooses the state that yields the highest utility. We specify the utility of individual i choosing alternative j at time t as

$$U_{ijt} = \beta'_j \mathbf{x}_{it} + \gamma'_j \mathbf{y}_{i,t-1} + \alpha_{ij} + \varepsilon_{ijt}. \tag{1}$$

The nonstochastic part of equation 1 consists of a linear function of socioeconomic characteristics, $\mathbf{x}_{it}$, which can vary over individuals and time. β_j is a vector of alternative-specific coefficients. In addition, utility at time t can vary with the previous labor market state, $\mathbf{y}_{i,t-1}$; γ_j is the corresponding coefficient vector that indicates the relevance of state dependence. We control for individual-specific unobserved heterogeneity by including the random error α_{ij}, which relaxes the restrictive independence of irrelevant alternatives (IIA) assumption of the simple multinomial logit model.[11] Finally, ε_{ijt} denotes an unobservable error term that is assumed to be independently distributed with a type I extreme value distribution.

We are interested in the conditional distribution of labor market states. For each period t, this distribution can be described by the conditional density $f_t(\mathbf{y}_t|\mathbf{x}_t, \mathbf{y}_{t-1}, \alpha; \theta)$, where the vector θ represents unknown parameters. Dynamic models of labor market state choice which allow for the presence of an unobserved effect raise the problem of endogenous initial conditions: while transitions within the panel of observations are modelled, the transition to the very first observed

[11] The IIA assumption implies that the probability ratio (or odds) of any two alternatives does not depend on available alternatives (cf. McFadden 1974).

state has no observed predecessor. Because this initial state, $\mathbf{y}_{i0}$, may be correlated with the individual-specific unobserved heterogeneity, it is potentially endogenous (cf. Heckman 1981b). An appropriate treatment of $\mathbf{y}_{i0}$ is required to avoid inconsistent estimates.

Two alternative solutions to the problem of endogenous initial conditions are applied in the literature. Some authors jointly model state transitions and the endogenous initial condition (Heckman 1981b).[12] We apply the second solution, namely the conditional maximum likelihood estimator suggested by Wooldridge (2005).[13] Comparing the two approaches, several authors show that the Wooldridge estimator, which is more convenient to implement, performs similar to the estimator proposed by Heckman (1981a,b).[14]

The starting point of the Wooldridge estimator is a density for the unobserved heterogeneity conditional on the explanatory variables and the initial state, $h(\boldsymbol{\alpha}|\mathbf{x},\mathbf{y}_0;\boldsymbol{\delta})$, where $\boldsymbol{\delta}$ represents the unknown parameters of this density. A convenient choice for this density is to assume that $\alpha_{ij} \sim N(\boldsymbol{\delta}'_{j1}\mathbf{y}_{i0} + \boldsymbol{\delta}'_{j2}\mathbf{x}_i, \sigma_a^2)$, where $\mathbf{y}_{i0}$ reflects the initial state of individual i. While Wooldridge (2005) includes all time varying variables of all time periods in the vector $\mathbf{x}_i$, many applications use individual-specific averages of a subset of the explanatory variables, which allows one to use unbalanced panel data.[15] A consequence of this specification is that the model coincides with the Mundlak (1978) fixed effects approach.

The Wooldridge approach models the unobserved heterogeneity α_{ij} as a function of the initial state $\mathbf{y}_{i0}$, the set of averages of a subset of explanatory variables, $\mathbf{x}_i$, and a new random error, a_{ij}, that is uncorrelated with the initial state, such that

$$\alpha_{ij} = \boldsymbol{\delta}'_{j1}\mathbf{y}_{i0} + \boldsymbol{\delta}'_{j2}\mathbf{x}_i + a_{ij} \; . \tag{2}$$

We assume a_{ij} to be normally distributed with zero mean and variance σ_a^2, i.e. $a_{ij}|(\mathbf{y}_{i0},\mathbf{x}_i) \sim N(0,\sigma_a^2)$. Hence, the probability that individual i is in state j at time t conditional on observed

[12] For examples in the literature on welfare transitions, see Hansen and Lofstrom (2009) or Hansen et al. (2006).
[13] This procedure has been applied to welfare and low income transition problems by Cappellari and Jenkins (2009) or Hansen and Lofstrom (2006).
[14] For details, see Arulampalam and Stewart (2009), Stewart (2007), Cappellari and Jenkins (2008), and Akay (2009).
[15] See e.g., Stewart (2007), Caliendo and Uhlendorff (2008), Mosthaf et al. (2009), Cappellari and Jenkins (2009), Prowse (2010). Akay (2009) shows that even in extreme cases of sample unbalance the Wooldridge estimator generates only very slight biases.

and unobserved characteristics and the labor market state in $t-1$ can be written as

$$P(Y_{it} = j|\mathbf{x}_i, \mathbf{y}_{i,t-1}, \mathbf{y}_{i0}, \boldsymbol{a}_i) = \frac{\exp(\boldsymbol{\beta}'_j\mathbf{x}_{it} + \boldsymbol{\gamma}'_j\mathbf{y}_{i,t-1} + \boldsymbol{\delta}'_{j1}\mathbf{y}_{i0} + \boldsymbol{\delta}'_{j2}\mathbf{x}_i + a_{ij})}{\sum_{k=1}^{J=3} \exp(\boldsymbol{\beta}'_k\mathbf{x}_{it} + \boldsymbol{\gamma}'_k\mathbf{y}_{i,t-1} + \boldsymbol{\delta}'_{k1}\mathbf{y}_{i0} + \boldsymbol{\delta}'_{k2}\mathbf{x}_i + a_{ik})}. \quad (3)$$

Normalizing the coefficient vectors $\boldsymbol{\beta}_1, \boldsymbol{\gamma}_1, \boldsymbol{\delta}_{11}, \boldsymbol{\delta}_{12}$, and the unobserved heterogeneity, a_{i1}, to zero for the first alternative (k=1), we can estimate a dynamic multinomial logit model with random effects. This procedure was also applied by Erdem and Sun (2001).

To obtain the unconditional likelihood function of our dynamic model of state transitions with endogeneous initial conditions and individual-specific unobserved heterogeneity, the random effect can be integrated out of the likelihood:

$$L = \prod_{i=1}^{N} \int \prod_{t=1}^{T} f_t(\mathbf{y}_t|\mathbf{x}_t, \mathbf{y}_{t-1}, \boldsymbol{\alpha}; \theta) h(\boldsymbol{\alpha}|\mathbf{x}, \mathbf{y}_0; \boldsymbol{\delta}) d\boldsymbol{\alpha}\,. \quad (4)$$

Here, the density of the observed heterogeneity takes the endogeneity of the initial state into account. Since the integral has no analytical solution, we use Gauss-Hermite quadrature to integrate the random effect out of the corresponding log-likelihood and maximize the resulting marginal log-likelihood by the Newton-Raphson method.[16]

The estimation results can be interpreted based on the coefficient estimates themselves, as well as using predicted transition probabilities. Below, we will predict probabilities $\overline{P}$ of transitions between labor market states for an individual randomly sampled from the population. The predicted probability of being in state j at time t given the state attained in $t-1$ can be obtained by integrating over the distribution of the random effect (cf. Skrondal and Rabe-Hesketh 2009):

$$\overline{P}(Y_{it} = j|\mathbf{y}_{i,t-1}, \mathbf{x}^0) = \int \hat{P}(Y_{it} = j|\mathbf{y}_{i,t-1}, \mathbf{x}^0, \boldsymbol{\alpha}) h(\boldsymbol{\alpha}|\mathbf{x}, \mathbf{y}_0; \boldsymbol{\delta}) d\boldsymbol{\alpha}, \quad (5)$$

where we set the vector $\mathbf{x}^0$ to equal the sample average of the control variables. $\hat{P}$ is the conditional probability. Equation 5 has to be evaluated with respect to the nine possible labor market

[16] These procedures are available in the Stata program -gllamm-, which is used for the estimation of the models presented in this paper (cf. Skrondal and Rabe-Hesketh 2003, Rabe-Hesketh et al. 2004). Maximum simulated likelihood (MSL) estimators could be used as an alternative method (e.g., Uhlendorff 2006, Stewart 2007, Mosthaf et al. 2009). Haan and Uhlendorff (2006) compare different approaches.

transitions that can be observed.[17] The uncertainty of the prediction can be assessed by approximate 95% confidence intervals for the predicted population-averaged probability. Using a parametric bootstrap approach, we simulate $\overline{P}(Y_{it} = j|\mathbf{y}_{i,t-1}, \mathbf{x}^0)$ using 1000 random draws from the sampling distribution of parameters and use the 25th- and the 976th-largest values.[18]

5 Results

This section discusses the estimation results obtained separately for five groups—natives, all immigrants, EU citizens, non-EU citizens, and immigrants with German citizenship. Tables 5 to 8 present the estimates. In Subsection 5.1 we describe the results with respect to the unobserved heterogeneity and the control variables. We then turn to the issue of state dependence in Subsection 5.2. Finally, we discuss extensions of the model and additional robustness tests in Subsection 5.3.

5.1 Unobserved heterogeneity and control variables

In order to be able to identify true state dependence, we control for observables and for unobserved heterogeneity in our model of state transitions. Allowing for unobserved heterogeneity significantly improves all models at the 1% level. The estimated variance of the individual random effect is generally larger for the transition to welfare receipt than for the transition to employment (see, e.g., the bottom rows of Table 5). This suggests that individual-specific unobserved heterogeneity plays a greater role in the transition to welfare receipt than in the transition to employment. The estimated covariances of the random effects are small and imprecisely es-

[17] In nonlinear models the population-averaged probabilities which consider the entire distribution of the random effect are usually not identical to the conditional probabilities with a random effect of zero, i.e. $\overline{P}(Y_{it} = j|\mathbf{y}_{i,t-1}, \mathbf{x}^0) \neq \hat{P}(Y_{it} = j|\mathbf{y}_{i,t-1}, \mathbf{x}^0, \boldsymbol{\alpha} = \mathbf{0})$. Although the latter expression is computationally less demanding, Skrondal and Rabe-Hesketh (2009) recommend to use population-averaged probabilities. Monte Carlo simulations show a considerably increased mean square error of prediction for conditional probabilities with $\boldsymbol{\alpha} = \mathbf{0}$. In addition, the interpretation of the two predictions differs. While the population-averaged probability represents a prediction for an individual randomly sampled from the population, the conditional probability provides a prediction for a specific hypothetical individual.

[18] The calculation of predictions and confidence interval is implemented in the Stata ado-files -gllapred- and -ci_marg_mu- (cf. Rabe-Hesketh et al. 2004, Skrondal and Rabe-Hesketh 2009).

timated. Except for native females, they generally show the expected negative correlation of the unobservables in the transitions to employment and to welfare receipt.

As part of the specification of the unobserved heterogeneity, α_{ij}, and to allow for a potential correlation of the individual unobserved heterogeneity with explanatory variables, our model incorporates individual-specific averages of a subset of variables (see variables labeled M in Tables 5 to 8); we consider the health and number of children variables because they vary sufficiently over time to identify both, the parameters of their average and annual values. Wald tests indicate the joint significance of the coefficients of the individual-specific averages.[19]

In addition, we consider control variables for the potentially endogenous initial condition as of $t = 0$ in our model. The estimations yield highly significant coefficient estimates for these indicators. This suggests that the initial state is strongly correlated with the current labor market state.[20]

As control variables, our specification includes age as a measure of potential labor market experience, the number of years of education as an indicator of human capital, and the self-assessed health status as a proxy for health capital. In addition, the socio-economic background is controlled for using information on family status, sex, and the number of children. We separately consider the number of children below age 6 and those aged 6 and older.

Next, we discuss the statistical significance and sign of the coefficients. To determine the direction of the change in the probability ratio between the j-th outcome and the base category (inactivity) that is associated with a change in an explanatory variable we look at

$$\frac{\partial \ln(P_j/P_1)}{\partial \mathbf{x}} = \boldsymbol{\beta}_j. \tag{6}$$

P_1 is the probability of inactivity and P_j is the probability of either employment or welfare receipt. We denote the logarithm of the probability ratio, $\ln(P_j/P_1)$, as the log-odds of alternative

[19] For natives, all immigrants, non-EU citizens, and immigrants with German citizenship, we obtain p-values below 0.01. The model for EU citizens is an exception, with $p = 0.27$, which might be connected to the small number of observations in this subsample.

[20] As a check of robustness, we repeated the estimations using 2006 (instead of 2005) to define the initial condition for natives and all immigrants. The estimation results are essentially identical to that presented, indicating that our findings are robust to a change in the initial year.

j. Regarding the variables with additionally included individual-specific averages, we interpret the sum of the coefficients for their average and their annual value, $\beta_j + \delta_{j2}$, which describes the long-term relationship between the log-odds and these variables.[21]

Generally, we obtain similar correlation patterns among natives and immigrants for most of the control variables (see Tables 5 to 8). Females and married individuals have lower odds of being employed or on welfare relative to inactivity than men and single persons. Higher education increases the probability ratio of employment to inactivity and makes welfare receipt less likely relative to inactivity. In the long-term, the probability ratio of employment to inactivity decreases and that of welfare receipt increases with the number of children. Individuals with permanent good health are more likely to be employed and less likely to receive welfare relative to inactivity. The year indicators reflect a positive labor market trend for natives, which we saw before in Table 2 and Figure 1: compared to 2006, natives' log-odds of employment are significantly higher in later years.

Since age enters the estimation equation as a second-order polynomial, we calculate predicted transition probabilities over the life cycle. We consider a person with the average characteristics of a given subsample and who received welfare in the previous period.[22] The age profiles of the transition rate from welfare to either of the three labor market states are presented in Figures 2 and 3 for natives and immigrants, respectively. In general, the young have a high probability of a transition from welfare to employment, which increases until about age 40. Starting at age 50, the probability of a transition to employment declines. This pattern is mirrored in the probability of transiting from welfare receipt to inactivity, which decreases for the young and sharply increases for the old. Among immigrants, the probability of staying on welfare declines over the life cycle: it is higher for young individuals than for those age 60 and above. For natives, this decline is less pronounced and the probability of staying on welfare

[21] Ferrer-i-Carbonell and Van Praag (2003) show how the interpretation of explanatory variables that enter the estimation equation with their individual-specific average and their annual value can be decomposed into a transitory and a permanent component. The idea is that $\beta x_{it} + \delta \overline{x}_{i\cdot} = \beta(x_{it} - \overline{x}_{i\cdot}) + (\beta + \delta)\overline{x}_{i\cdot}$, where $\overline{x}_{i\cdot}$ denotes the individual-specific average of x_{it}. Thus, β describes the transitory relationship and $\beta + \delta$ is the permanent relationship. The transitory component represents the short-term relationship because it abstracts from a variation of the individual-specific average. A change in the individual-specific average represents a permanent change in the variable and hence $\beta + \delta$ describes the long-term relationship.

[22] This choice facilitates a comparison of the predicted transition probabilities over the life cycle with results presented in Table 9 below.

hardly varies by age.[23] The figures show that the predicted probability of staying in welfare receipt for an immigrant with average characteristics is more than twice that of natives. Correspondingly, immigrants have a smaller probability of transiting to employment than natives.

5.2 State dependence and labor market transitions

The highly significant coefficients of lagged labor market states in Tables 5 to 8 suggest that current state choice is correlated with past experience. Thus, employment in $t-1$ is associated with higher log-odds of employment in t and welfare receipt in $t-1$ is associated with higher log-odds of welfare receipt in t. Interestingly, the log-odds of employment in t also are higher for those who received welfare in the previous period than for those who were inactive. This might reflect effective work incentives of the welfare system for welfare recipients.

The predicted transition probabilities between period $t-1$ to t in Table 9 provide more detailed insights. As mentioned above, these probabilities are calculated for an individual with sample-average characteristics. The random effects are integrated out over the estimated distribution of the unobserved heterogeneity. Table 9 provides simulated 95% confidence intervals of the transition rates.

The predicted transition probabilities confirm that the probability of a current labor market state varies with the previous labor market state. This indicates the existence of true state dependence. Generally, the probability of attaining any given state at time t is highest when the individual was already in that state in the previous period. For example, the probability of staying inactive is approximately four times higher than the probability of moving from employment to inactivity for natives. Likewise, the probability of employment (welfare receipt) in the current year is highest for those who worked (received welfare) in the previous year.

It is interesting to compare the observed transition probabilities in Table 3 with their predicted values in Table 9: after controlling for observed and unobserved heterogeneity, the persistence in welfare receipt reflected in Table 3 is considerably reduced from 75% and 77% to

[23] A more detailed, semi-parametric analysis of life cycle probabilities of transfer receipt among natives and first generation immigrants in Germany can be found in Riphahn and Wunder (2011).

3% and 9% for natives and immigrants, respectively (Table 9, panels A and B). This suggests that the high degree in persistence in welfare participation observed in the raw data can be attributed, for the most part, to observed and unobserved characteristics. The decline in welfare persistence corresponds to the probability of welfare exit to employment, which increases from 17% and 16% in the observed transition rates to 86% and 79% (Tables 3 and 9, panels A and B).

With respect to welfare entry, we find that, compared to natives, immigrants have on average a substantially higher risk to move from inactivity to welfare (3.8% vs. 1.6%, cf. Table 9, panels A and B). Since we consider persons receiving unemployment insurance benefits as inactive, this result may imply that immigrants are more likely to move from short-term unemployment to long-term unemployment which is accompanied by welfare benefits. While the transition from employment to welfare plays virtually no role for natives—the transition probability is estimated to be only 0.5%— all immigrants face on average a 1.8% risk of moving from employment to welfare. Since an individual is typically entitled to unemployment insurance benefits in the case of job loss (cf. Section 2), a possible explanation for this discrepancy is that unemployment insurance benefits are not sufficient to provide the minimum income for immigrant households. Since immigrants have, on average, lower wages—for a discussion of the immigrant-native wage gap see Aldashev et al. (2008) and Basilio and Bauer (2010)—and live in larger households, they both, receive lower unemployment benefits and have a higher need for minimum income transfers. Hence, they are more likely to receive welfare benefits in addition to unemployment insurance benefits than natives.

Considering the probability of exiting welfare, it is noteworthy that for all groups the probability of moving from welfare to employment is higher than the probability of moving from inactivity to employment. This finding is consistent with the hypothesis that welfare recipients have stronger work incentives than inactive persons. However, immigrants are less likely than natives to take up employment after welfare receipt. Their probability of transiting from welfare receipt to employment is on average 6.5 percentage points lower compared to natives (Table 9, panels A and B), though this difference is not statistically significant.

In addition to these general patterns, the results suggest considerable heterogeneity among immigrant subgroups. Non-EU citizens, who are mostly of Turkish origin or citizens of the suc-

cessor states of former Yugoslavia, exhibit the lowest employment stability among all groups. Their predicted probability of staying employed is estimated to be only 79%, compared to over 90% for all other groups. Accordingly, they have an increased risk of unemployment: their probability to move from employment to inactivity is clearly higher than that of the other groups. In correspondence to their poor labor market prospects, non-EU citizens have the highest persistence in welfare participation, the highest welfare entry rates, and the lowest welfare exit rates.

This leads us to the question of whether individuals are more likely to receive welfare in the current year if they have received welfare in the previous year, i.e. whether there is true state dependence and evidence for a welfare trap. The observed transitions (see Table 3) indicated a probability of more than 70% to stay on welfare in period t conditional on welfare receipt in period $t-1$. We obtained statistically significant coefficient estimates for the lagged state indicators (see e.g. Table 5). However, in multinomial logit models these coefficient estimates are not immediately informative with respect to state dependence.[24] The predictions in Table 9 show that the probability of a transition to welfare in period t is highest if our average individual was in the state of welfare receipt in period $t-1$, as well. Compared to the observed probabilities in Table 3 the probabilities of staying in welfare receipt are rather low. Also, while the point estimates of the predicted probabilities are suggestive of true state dependence, an inspection of the confidence intervals yields that the probability of moving from inactivity to welfare is not significantly different from the probability of continuing welfare receipt: the confidence intervals clearly overlap for all subsamples.

Therefore, the evidence for true state dependence is rather weak. Individuals who received welfare benefits in the past are not significantly more likely to participate in welfare in the future compared to individuals who were inactive.[25] In conjunction with the work incentives of welfare recipients mentioned above, these results do not provide convincing evidence for the welfare trap hypothesis.

[24] The coefficient merely describes the difference in log-odds. For a similar discussion, see Uhlendorff (2006), Caliendo and Uhlendorff (2008), Hansen and Lofstrom (2009), and Haan (2010).

[25] We do not regard the transition from employment to welfare as an appropriate benchmark against which to compare the probability of welfare persistence since workers who become unemployed are at first entitled to unemployment insurance benefits (cf. Section 2). Hence, the difference between the probability of moving from employment to welfare and the probability of welfare persistence is supposed to arise from unemployment insurance regulations and is not induced by the welfare system.

In addition to studying the overall evidence for a person that is randomly drawn from the population, it is interesting to study state dependence conditional on the initial state attained in period $t = 0$. The coefficient estimates for the initial state indicators suggest that these are strongly correlated with subsequent labor market transitions. Table 10 presents the predicted labor market transitions. Again, we assume the average characteristics of the subsamples and integrate over the distribution of the unobserved heterogeneity now conditioning on the initial state. The results suggest that controlling for the endogenous initial condition explains a substantial part of the aggregate state dependence observed in the raw data in Table 3. The probability of remaining in welfare receipt now amounts to 49.1% for natives and to 64.7% for immigrants, if the initial state was welfare receipt, which compares to 2.0% and 4.1% if the initial state was employment. Therefore the virtual disappearance of significant true state dependence in our estimation results is connected in large part to the control for endogenous initial conditions.

Next, we study the extent to which immigrant-native differences in labor market transitions are connected to differences in characteristics, such as human capital endowment and household composition. We calculate a transition matrix using immigrants' characteristics and natives' coefficients to simulate natives' transition probabilities if they had immigrants' characteristics.[26] The results are presented in Table 11. If we find that the simulated probabilities for natives converge to those originally predicted for immigrants, then the immigrant-native gap can be attributed to differences in covariates. If, on the other hand, the immigrant-native gap persists, behavioral differences between immigrants and natives are not due to their characteristics but instead may be explained by differences in preferences or in unobservable constraints.

The simulation exercise suggests that differences in the transition probabilities diminish once differences in characteristics are taken into account. Natives would have a higher probability of welfare persistence if they had immigrants' characteristics instead of their own: the originally predicted value of 3.1% (Table 9) increases to 4.6% and 4.5% (Table 11) assuming characteristics of EU citizens and of immigrants with German citizenship, respectively. Remarkably, natives would perform worse than EU citizens if they had their characteristics.[27]

[26] This provides reliable results to the extent that native behavior remains constant if their distribution of observable characteristics shifts to immigrants' distribution, which we assume as a first approximation.

[27] In general, we obtain similar simulation results using natives' characteristics and immigrants' coefficients.

However, with respect to non-EU citizens substantial parts of the observed immigrant-native differences remain unexplained. This suggests that group-specific labor market choices can only partly be explained by differences in characteristics. If natives had the same characteristics as non-EU citizens, their welfare entry rates would be smaller and their welfare exit rates would be higher than those of non-EU citizens. For example, the probability of welfare exit into employment is 8.5 percentage points higher for natives with characteristics of non-EU citizens (73.2% vs. 64.7%). In addition, the probability of welfare persistence would increase to only 7% for natives with characteristics of non-EU citizens (Table 11, panel C), while the original value for non-EU citizens is 21.3% (Table 9, panel D). Hence, with a remaining gap of 14.3 percentage points almost 80% of the original gap in welfare persistence between the two groups of 18.2 points in Table 9 remains unexplained after accounting for differences in characteristics.

5.3 Model extensions

Finally, we analyze heterogeneities in transition behaviors by gender and over time and report on robustness checks. Table 12 shows the probabilities of labor market transitions based on gender-specific estimations. For natives, we find that irrespective of the previous labor market state, females have a higher probability of inactivity and a lower probability of employment than males. Moreover, females are more likely to remain welfare recipients than males: their probability of receiving welfare benefits in two successive years is more than 2.5-times larger than males' (Table 12, panels A and B). We further find significant gender differences in welfare exit. In correspondence to traditional gender roles, women are less likely to take up employment and are more likely to move from welfare receipt to inactivity than men. We find no evidence for gender differences in welfare entry among natives.

More striking gender-differences are observed for immigrants: the persistence of male immigrants in welfare participation is estimated to be twice as large as that of female immigrants, and 6.5 times higher than that of male natives. The high probability of welfare persistence is mirrored by the fact that male immigrants are less likely to move from welfare to employment than male natives (86% vs. 95%). In contrast to males, we find neither significant immigrant-native differences for welfare persistence nor for welfare exit among females. Thus,

the immigrant-native gap appears to be driven mainly by the high degree of welfare persistence and the lower welfare exit rates among male immigrants.

A second model extension investigates whether the transition probabilities changed over time during our observation period. This part of the analysis is based on models in which the year indicators are interacted with the lagged labor market states. The key changes in transition probabilities in the 2006-2009 period are similar for immigrants and natives. For parsimony, the results are summarized graphically in Figures 4.1 to 4.3.[28] Figure 4.1 shows a high degree of persistence in employment that does not change over time. However, persistence in employment is generally lower for immigrants than for natives. Furthermore, persistence in welfare receipt clearly declines from 2006 to 2009. Figure 4.2 does not indicate a time trend for welfare entry. Figure 4.3 reveals a clear increase in the probability of welfare exit to employment since 2006.

The decline in welfare persistence in conjunction with the increase in welfare exit to employment may be explained by the consequences of the welfare reform which encompassed a wide range of activation and training measures. Additionally, it may be connected to the positive economic development on the West German labor market (see Figure 1).

Similar to other household panel surveys, the SOEP data suffer from panel attrition. In order to test whether potential non-random panel mortality affects our estimation results, we re-estimated our models adding a variable to the specification which indicates whether an individual leaves the sample in the period after the observed next transition. We obtained statistically insignificant coefficient estimates for these attrition indicators. Uhlendorff (2006) formally tests and rejects the correlation of panel attrition with labor market transitions in the SOEP. Based on these results, we conclude that panel attrition is unlikely to affect our results.

6 Conclusion

We study welfare participation in Germany and try to explain the gap in immigrant-native welfare recipiency rates. We apply dynamic multinomial logit models, estimate transition probabilities between three mutually exclusive labor market states, and determine the extent of true

[28] The complete estimation results are available upon request.

state dependence. The empirical method accounts for the endogeneity of the initial condition and for unobserved heterogeneity.

The results confirm that unobserved heterogeneity, the endogenous initial state, and correlations of unobservables with covariates affect state transition patterns. Generally, the correlation of covariates with state transition patterns is similar for natives and immigrants. The estimated models yield that the probability of a transition to a given labor market state depends on the previous labor market state. The state dependence in welfare receipt differs between natives and immigrant subgroups and is higher among immigrants.

Nevertheless, three findings challenge the hypothesis that the transfer system generates a welfare trap: first, the predicted probability of welfare receipt in two successive periods is small once background characteristics are controlled for. This suggests that mostly these characteristics explain the high persistence in welfare that is observed in the raw data. Second, our model-based predictions show high rates of exit from welfare into employment for all groups. In particular, the probability of moving from welfare to employment is significantly higher than the probability of moving from inactivity to employment. Thus, welfare recipients appear to have stronger work incentives than inactive persons. Such work incentives may emerge, for example, from tight budget constraints, or active labor market and job creation programs (e.g., Hohmeyer and Wolff 2010). Third, the probability of moving from inactivity to welfare is not statistically significantly different from the probability of staying in the state of welfare participation. In sum, we interpret these results as evidence against a welfare trap in the German welfare program.

The analysis identified non-EU citizens, who are mostly of Turkish origin or citizens of the successor states of former Yugoslavia, as those with the least stable employment, the highest persistence in welfare participation, the highest welfare entry rate, and the lowest welfare exit rate. Further results reveal that the immigrant-native differences are particularly pronounced among men; we do not find significant differences between female immigrants and natives. Our simulation exercise suggests that a large part of the immigrant-native difference in labor market transitions can be explained by socioeconomic characteristics, particularly for natives, EU citizens, and immigrants with German citizenship. However, we find a substantial unexplained part of the immigrant-native gap in welfare persistence for non-EU citizens.

The problematic situation of non-EU citizens might be explained by several factors: first, as these person are employed frequently in industries that are particularly vulnerable to economic downturns (cf. Kogan 2004), economic fluctuations may exert a particularly destabilizing effect on their employment situation.[29] Second, discrimination and the exclusion from employment as civil servants could present obstacles to employment (e.g., Kogan 2007). Third, Uhlendorff and Zimmermann (2006) report evidence that unemployed immigrants, in particular those from Turkey, experience a longer duration of unemployment because they need more time to find a job. Fourth, higher unemployment among immigrants may be attributed to immigrant-native differences in risk attitudes. In a recent study on second generation immigrants in Germany, Constant et al. (2010) report lower risk aversion of immigrants that is supposed to result, e.g., in higher reservation wages. Finally, Bratsberg et al. (2010) report that the replacement ratio of public transfers with respect to own income differs substantially depending on human capital and the number of dependent children. These patterns also exist in Germany and generate substantial disincentives to take up employment for those with many children and low human capital, a characteristic of many immigrant households.

Our analysis leads us to the following policy recommendations. First, as background characteristics are important in explaining welfare persistence, an improvement of the relevant characteristics, for example through further education, could support exit from welfare receipt. Second, a transparent recognition of foreign qualifications might help to reduce potential labor market discrimination. In Germany, current regulations lack transparency because there is no nationwide system, and responsibility lies with federal states. Common standards for the recognition of foreign degrees and qualifications might support the employability of non-EU citizens.

Finally, our analysis does not indicate a general failure of the welfare system in the sense that it creates a welfare trap. The immigrant-native gap in welfare participation is mostly connected to observable characteristics. Overall, work incentives appear to reach welfare recipients. Given the current population composition and considering the demographic changes ahead, aging societies in the end cannot not afford to underuse the potential of their workforce. Therefore, the primary policy goal should be to foster employment continuity, which is particularly pressing for non-EU citizens.

[29] This is what Bratsberg et al. (2010) confirm for the case of Norwegian immigrants.

References

Akay, A. (2009). The Wooldridge method for the initial values problem is simple: What about performance?, *IZA Discussion Papers 3943*, Institute for the Study of Labor (IZA), Bonn. forthcoming: *Journal of Applied Econometrics*.

Aldashev, A. and Fitzenberger, B. (2009). Der Zugang von Arbeitnehmern in den Bezug von Arbeitslosengeld II, *ZEW Discussion Papers 09-063*, ZEW - Zentrum für Europäische Wirtschaftsforschung / Center for European Economic Research, Mannheim.

Aldashev, A., Gernandt, J. and Thomsen, S. L. (2008). The immigrant wage gap in Germany, *ZEW Discussion Papers 08-089*, ZEW - Zentrum für Europäische Wirtschaftsforschung / Center for European Economic Research, Mannheim.

Andrén, T. (2007). The persistence of welfare participation, *IZA Discussion Papers 3100*, Institute for the Study of Labor (IZA), Bonn.

Arulampalam, W. and Stewart, M. B. (2009). Simplified implementation of the Heckman estimator of the dynamic probit model and a comparison with alternative estimators, *Oxford Bulletin of Economics and Statistics* **71**(5): 659–681.

BA (Bundesagentur für Arbeit) (2010a). *Arbeitslosigkeit im Zeitverlauf*, Bundesagentur für Arbeit, Nürnberg.

BA (Bundesagentur für Arbeit) (2010b). *Arbeitsmarkt in Deutschland. Zeitreihen bis 2009*, Bundesagentur für Arbeit, Nürnberg.

BA (Bundesagentur für Arbeit) (2010c). *Der Arbeits- und Ausbildungsmarkt in Deutschland – Monatsbericht August 2010*, Bundesagentur für Arbeit, Nürnberg.

Barrett, A. and McCarthy, Y. (2008). Immigrants and welfare programmes: exploring the interactions between immigrant characteristics, immigrant welfare dependence, and welfare policy, *Oxford Review of Economic Policy* **24**(3): 543–560.

Basilio, L. and Bauer, T. (2010). Transferability of human capital and immigrant assimilation: An analysis for Germany, *IZA Discussion Papers 4716*, Institute for the Study of Labor (IZA), Bonn.

Blank, R. M. (1989). Analyzing the length of welfare spells, *Journal of Public Economics* **39**(3): 245–273.

Blank, R. M. and Ruggles, P. (1994). Short-term recidivism among public-assistance recipients, *American Economic Review* **84**(2): 49–53.

BMAS (Bundesministerium für Arbeit und Soziales) (ed.) (2010). *Übersicht über das Sozialrecht*, BW Bildung und Wissen, Nürnberg.

Bratsberg, B., Raaum, O. and Røed, K. (2010). When minority labor migrants meet the welfare state, *Journal of Labor Economics* **28**(3): 633–676.

Bruckmeier, K. and Wiemers, J. (2010). A new targeting - a new take-up?: Non-take-up of social assistance in Germany after social policy reforms, *SOEPpapers 294*, DIW Berlin, The German Socio-Economic Panel (SOEP), Berlin.

Caliendo, M. (2009). Income support systems, labor market policies and labor supply: The German experience, *IZA Discussion Papers 4665*, Institute for the Study of Labor (IZA), Bonn.

Caliendo, M. and Uhlendorff, A. (2008). Self-employment dynamics, state dependence and cross-mobility patterns, *IZA Discussion Papers 3900*, Institute for the Study of Labor (IZA), Bonn.

Cappellari, L. and Jenkins, S. P. (2002). Modelling low income transitions, *IZA Discussion Papers 504*, Institute for the Study of Labor (IZA), Bonn.

Cappellari, L. and Jenkins, S. P. (2004). Modelling low pay transition probabilities, accounting for panel attrition, non-response, and initial conditions, *CESifo Working Paper Series 1232*, CESifo Group Munich.

Cappellari, L. and Jenkins, S. P. (2008). The dynamics of social assistance receipt: Measurement and modelling issues, with an application to Britain, *OECD Social, Employment and Migration Working Papers 67*, OECD, Directorate for Employment, Labour and Social Affairs.

Cappellari, L. and Jenkins, S. P. (2009). The dynamics of social assistance benefit receipt in Britain, *IZA Discussion Papers 4457*, Institute for the Study of Labor (IZA), Bonn.

Chay, K. Y., Hoynes, H. and Hyslop, D. (2004). True state dependence in monthly welfare participation: A nonexperimental analysis, *Working Papers 05-33*, University of California at Davis, Department of Economics.

Classen, G. (2009). Leistungen für Ausländer nach SGB II, SGB XII und AsylbLG.
URL: *http://www.fluechtlingsinfo-berlin.de/fr/pdf/Eckpunkte_SGB_II_XII_Auslaender.pdf*

Constant, A. F., Krause, A., Rinne, U. and Zimmermann, K. F. (2010). Economic preferences and attitudes of the unemployed: Are natives and second generation migrants alike?, *IZA Discussion Papers 5380*, Institute for the Study of Labor (IZA), Bonn.

Erdem, T. and Sun, B. (2001). Testing for choice dynamics in panel data, *Journal of Business and Economic Statistics* **19**(2): 142–152.

Ferrer-i-Carbonell, A. and Van Praag, B. M. S. (2003). Income satisfaction inequality and its causes, *Journal of Economic Inequality* **1**(2): 107–127.

Frick, J. R. and Groh-Samberg, O. (2007). To claim or not to claim: Estimating non-take-up of social assistance in Germany and the role of measurement error, *Discussion Papers of DIW Berlin 734*, DIW Berlin, German Institute for Economic Research.

Frick, J. R. and Lohmann, H. (2010). Biography and life history data in the German Socio Economic Panel, *Data Documentation 52*, DIW Berlin, German Institute for Economic Research.

Green, D. A. and Warburton, W. P. (2004). Tightening a welfare system: the effects of benefit denial on future welfare receipt, *Journal of Public Economics* **88**(7-8): 1471–1493.

Haan, P. (2010). A multi-state model of state dependence in labor supply: Intertemporal labor supply effects of a shift from joint to individual taxation, *Labour Economics* **17**(2): 323–335.

Haan, P. and Uhlendorff, A. (2006). Estimation of multinomial logit models with unobserved heterogeneity using maximum simulated likelihood, *Stata Journal* **6**(2): 229–245.

Haisken-DeNew, J. P. and Frick, J. R. (2005). DTC. Companion to the German Socio-Economic Panel Study (GSOEP).
URL: *http://www.diw.de/english/sop/service/dtc/*

Hansen, J. and Lofstrom, M. (2006). Immigrant-native differences in welfare participation: The role of entry and exit rates, *IZA Discussion Papers 2261*, Institute for the Study of Labor (IZA), Bonn.

Hansen, J. and Lofstrom, M. (2009). The dynamics of immigrant welfare and labor market behavior, *Journal of Population Economics* **22**(4): 941–970.

Hansen, J., Lofstrom, M. and Zhang, X. (2006). State dependence in Canadian welfare participation, *IZA Discussion Papers 2266*, Institute for the Study of Labor (IZA), Bonn.

Heckman, J. J. (1981a). Heterogeneity and state dependence, *in* S. Rosen (ed.), *Studies in Labor Markets*, University of Chicago Press, Chicago, pp. 91–140.

Heckman, J. J. (1981b). The incidental parameters problem and the problem of initial conditions in estimating a discrete time-discrete data stochastic process, *in* C. F. Manski and D. McFadden (eds), *Structural Analysis of Discrete Data with Econometric Applications*, MIT Press, Cambridge, Massachusetts, chapter 4, pp. 179–195.

Heckman, J. J. and Singer, B. (1984). A method for minimizing the impact of distributional assumptions in econometric models for duration data, *Econometrica* **52**(2): 271–320.

Hohmeyer, K. and Wolff, J. (2010). Direct job creation in Germany revisited: Is it effective for welfare recipients and does it matter whether participants receive a wage?, *IAB Discussion Paper 21*, Institute for Employment Research (IAB), Nuremberg.

Jean, S., Causa, O., Jimenez, M. and Wanner, I. (2010). Migration and labour market outcomes in OECD countries, *OECD Journal: Economic Studies* **2010**(1): 1–34.

Kayser, H. A. and Frick, J. R. (2001). Take it or leave it: (non-)take-up behavior of social assistance in Germany, *Schmollers Jahrbuch* **121**(1): 27–58.

Kogan, I. (2004). Last hired, first fired? The unemployment dynamics of male immigrants in Germany, *European Sociological Review* **20**(5): 445–461.

Kogan, I. (2007). Continuing ethnic segmentation in Austria, *in* A. F. Heath and S. Y. Cheung (eds), *Unequal Chances: Ethnic Minorities in Western Labour Markets*, Oxford University Press, Oxford, pp. 103–141.

McFadden, D. (1974). Conditional logit analysis of qualitative choice behavior, *in* P. Zarembka (ed.), *Frontiers in Econometrics*, Academic Press, New York, pp. 105–142.

Moffitt, R. (1992). Incentive effects of the U.S. welfare system: A review, *Journal of Economic Literature* **30**(1): 1–61.

Mosthaf, A., Schank, T. and Schnabel, C. (2009). Low-wage employment versus unemployment: Which one provides better prospects for women?, *IZA Discussion Papers 4611*, Institute for the Study of Labor (IZA), Bonn.

Mundlak, Y. (1978). On the pooling of time series and cross section data, *Econometrica* **46**(1): 69–85.

OECD (Organisation for Economic Co-operation and Development) (2010). *International Migration Outlook*, Organisation for Economic Co-operation and Development, Paris.

Plant, M. W. (1984). An empirical analysis of welfare dependence, *American Economic Review* **74**(4): 673–684.

Prowse, V. L. (2010). Modeling employment dynamics with state dependence and unobserved heterogeneity, *IZA Discussion Papers 4889*, Institute for the Study of Labor (IZA), Bonn.

Rabe-Hesketh, S., Skrondal, A. and Pickles, A. (2004). Gllamm manual, *U.C. Berkeley Division of Biostatistics Working Paper Series 1160*, Berkeley Electronic Press.

Riphahn, R. T. (2001). Rational poverty or poor rationality? The take-up study of social assistance benefits, *Review of Income and Wealth* **47**(3): 379–98.

Riphahn, R. T. (2004). Immigrant participation in social assistance programs: evidence from German guestworkers, *Applied Economics Quarterly* **50**(4): 329–362.

Riphahn, R. T. and Wunder, C. (2011). Patterns of welfare dependence before and after a reform: Evidence from first generation immigrants and natives in Germany, *Discussion Paper 47*, Labor and Socio-Economic Research Center (LASER), University of Erlangen-Nuremberg, Nuremberg.

Schels, B. (2009). Job entry and the ways out of benefit receipt of young adults in Germany, *IAB Discussion Paper 200916*, Institute for Employment Research (IAB), Nuremberg.

Skrondal, A. and Rabe-Hesketh, S. (2003). Multilevel logistic regression for polytomous data and rankings, *Psychometrika* **68**(2): 267–287.

Skrondal, A. and Rabe-Hesketh, S. (2009). Prediction in multilevel generalized linear models, *Journal Of The Royal Statistical Society Series A* **172**(3): 659–687.

Statistisches Bundesamt (ed.) (2009). *Statistisches Jahrbuch für die Bundesrepublik Deutschland mit Internationalen Übersichten*, Statistisches Bundesamt, Wiesbaden.

Stewart, M. B. (2007). The interrelated dynamics of unemployment and low-wage employment, *Journal of Applied Econometrics* **22**(3): 511–531.

Uhlendorff, A. (2006). From no pay to low pay and back again? A multi-state model of low pay dynamics, *IZA Discussion Papers 2482*, Institute for the Study of Labor (IZA), Bonn.

Uhlendorff, A. and Zimmermann, K. F. (2006). Unemployment dynamics among migrants and natives, *IZA Discussion Papers 2299*, Institute for the Study of Labor (IZA), Bonn.

Wagner, G. G., Frick, J. R. and Schupp, J. (2007). The German Socio-Economic Panel Study (SOEP) – scope, evolution and enhancemants, *Schmollers Jahrbuch (Journal of Applied Social Science Studies)* **127**(1): 139–169.

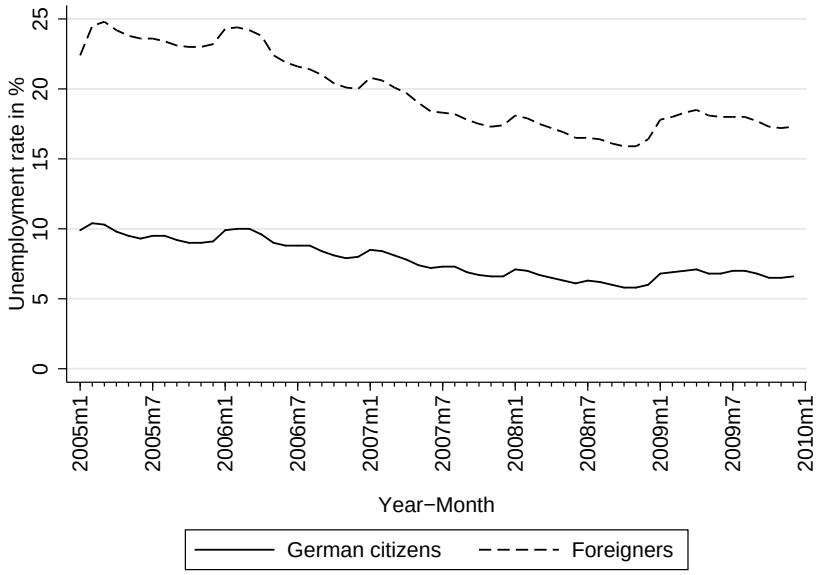
Wilde, J. (2003). Was reizt Sozialhilfeempfänger zum Ausstieg? Eine empirische Untersuchung mit dem Niedrigeinkommens-Panel, *Journal of Economics and Statistics (Jahrbuecher fuer Nationaloekonomie und Statistik)* **223**(6): 719–742.

Wilde, J. and Kubis, A. (2005). Nichtinanspruchnahme von Sozialhilfe. Eine empirische Analyse des Unerwarteten, *Journal of Economics and Statistics (Jahrbücher für Nationaloekonomie und Statistik)* **225**(3): 347–373.

Wooldridge, J. M. (2005). Simple solutions to the initial conditions problem in dynamic, nonlinear panel data models with unobserved heterogeneity, *Journal of Applied Econometrics* **20**(1): 39–54.

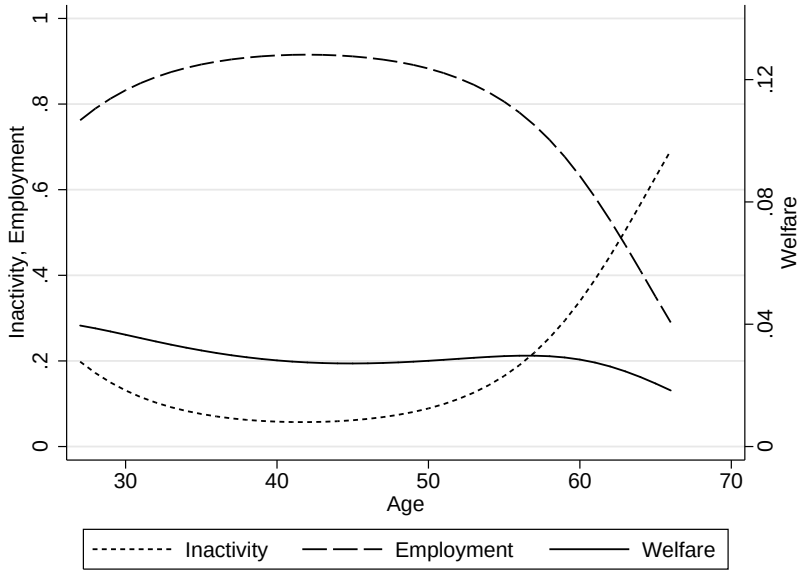
A Figures and Tables

Figure 1
Unemployment rates by citizenship (West Germany)



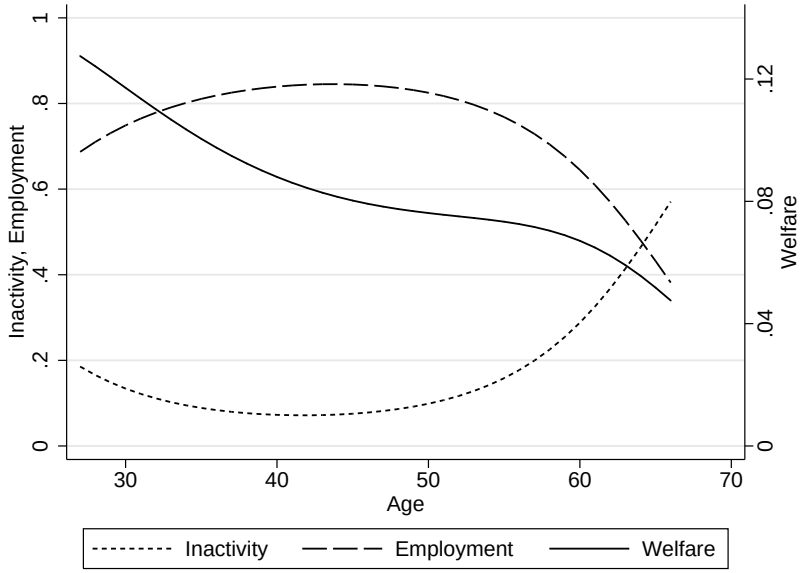
Source: BA (2010a).

Figure 2
Predicted probabilities of transitions from welfare receipt over the life span (natives)



Note: Calculations are based on the estimation results in Table 5. The probability of a persistence in welfare is denoted on right-hand-side vertical axis.

Figure 3
Predicted probabilities of transitions from welfare receipt over the life span (all immigrants)



Note: Calculations are based on the estimation results in Table 5. The probability of a persistence in welfare is denoted on right-hand-side vertical axis.

Figure 4
Labor market transitions 2006-2009

Fig. 4.1: Persistence in employment and welfare participation

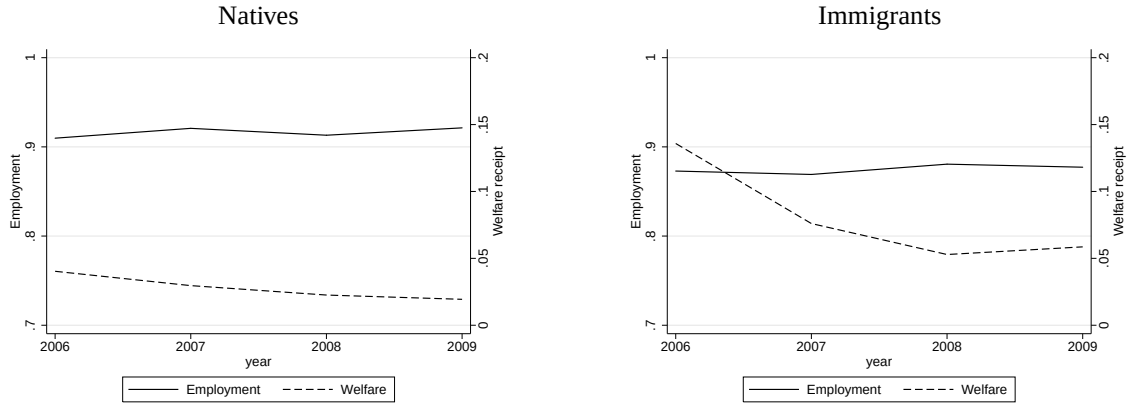


Fig. 4.2: Welfare entry

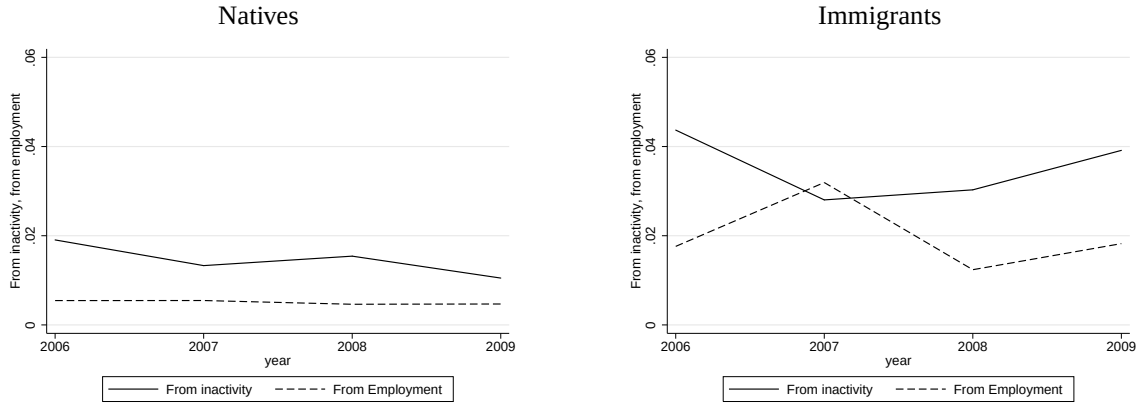
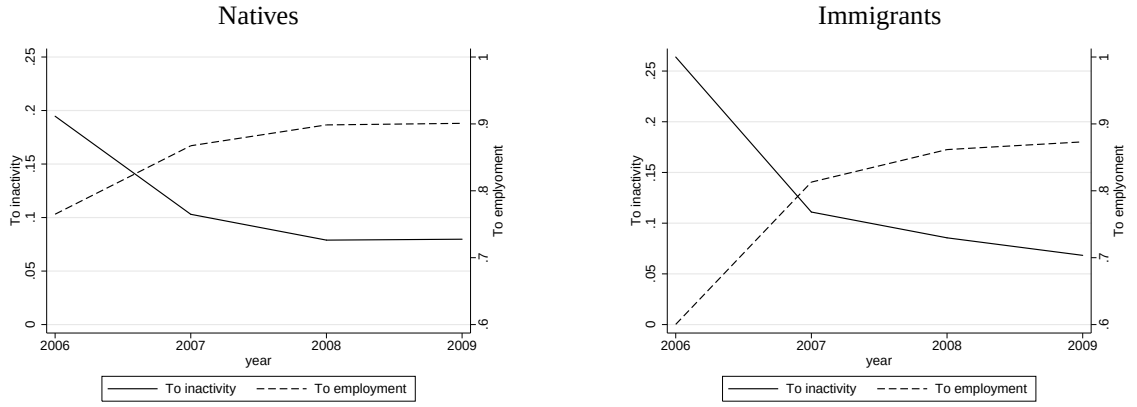


Fig. 4.3: Welfare exit



Note: Figures 4.1 and 4.3 use secondary vertical axes to indicate transition probabilities.

Table 1
Descriptive Statistics

	Natives		All immigrants		EU citizens		Non-EU citizens		Immigrants with German citizenship	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Inactivity	0.182	0.386	0.228	0.419	0.184	0.388	0.316	0.465	0.196	0.397
Employment	0.792	0.406	0.698	0.459	0.763	0.425	0.582	0.493	0.736	0.441
Welfare receipt	0.030	0.171	0.079	0.270	0.053	0.225	0.106	0.308	0.074	0.261
Age	45.56	9.806	43.42	10.471	45.14	10.11	42.86	10.66	43.07	10.44
Female	0.530	0.499	0.545	0.498	0.536	0.499	0.530	0.499	0.558	0.497
Education in years	12.51	2.674	11.30	2.594	11.04	2.550	10.34	2.378	11.92	2.547
Married	0.688	0.463	0.755	0.430	0.743	0.437	0.830	0.375	0.719	0.450
Health status: good	0.549	0.498	0.545	0.498	0.552	0.498	0.549	0.498	0.540	0.498
School in Germany: no	—	—	0.429	0.495	0.460	0.499	0.546	0.498	0.354	0.478
Number of children LT6	0.157	0.441	0.228	0.518	0.165	0.421	0.237	0.519	0.247	0.548
Number of children GE6	0.487	0.810	0.671	0.920	0.570	0.774	0.843	1.023	0.616	0.900
Year 2007	0.261	0.439	0.266	0.442	0.260	0.439	0.275	0.447	0.263	0.441
Year 2008	0.237	0.426	0.233	0.423	0.230	0.421	0.226	0.419	0.239	0.426
Year 2009	0.213	0.409	0.198	0.398	0.202	0.402	0.177	0.382	0.207	0.405
Initial condition (in 2005)										
Inactivity	0.185	0.388	0.262	0.440	0.217	0.412	0.347	0.476	0.233	0.423
Employment	0.790	0.407	0.679	0.467	0.736	0.441	0.576	0.494	0.713	0.453
Welfare receipt	0.025	0.155	0.060	0.237	0.047	0.212	0.077	0.267	0.055	0.227
Number of person-year observations	20,973		5,678		1,124		1,609		2,945	

Source: SOEP 2005-2009.

Table 2
Observed distribution of labor market states by immigrant group and year

Year	State at time *t*			Sample size
	Inactivity	Employment	Welfare	
A. Natives				
2006	0.206	0.748	0.046	6063
2007	0.187	0.766	0.047	5472
2008	0.172	0.782	0.046	4980
2009	0.171	0.791	0.039	4458
B. All immigrants				
2006	0.248	0.645	0.107	1721
2007	0.231	0.652	0.117	1510
2008	0.230	0.677	0.094	1325
2009	0.219	0.683	0.098	1122
C. EU citizens				
2006	0.214	0.727	0.060	347
2007	0.176	0.738	0.086	292
2008	0.174	0.787	0.040	258
2009	0.206	0.765	0.029	227
D. Non-EU citizens				
2006	0.310	0.548	0.143	518
2007	0.300	0.552	0.148	442
2008	0.298	0.561	0.141	364
2009	0.315	0.548	0.137	285
E. Immigrants with German citizenship				
2006	0.215	0.684	0.102	856
2007	0.203	0.688	0.109	776
2008	0.204	0.712	0.084	703
2009	0.149	0.744	0.107	610

Note: Percentage of individuals weighted using cross-sectional weights.
Source: SOEP 2006-2009.

Table 3
Observed probabilities of labor market transitions by immigrant group

State in $t-1$	State at time t		
	Inactivity	Employment	Welfare
A. Natives			
Inactivity	0.771	0.188	0.041
Employment	0.050	0.943	0.007
Welfare receipt	0.085	0.167	0.748
B. All immigrants			
Inactivity	0.733	0.186	0.082
Employment	0.071	0.916	0.013
Welfare receipt	0.084	0.149	0.768
C. EU citizens			
Inactivity	0.742	0.217	0.041
Employment	0.053	0.937	0.010
Welfare receipt	0.045	0.255	0.701
D. Non-EU citizens			
Inactivity	0.770	0.141	0.089
Employment	0.098	0.882	0.020
Welfare receipt	0.094	0.126	0.780
E. Immigrants with German citizenship			
Inactivity	0.681	0.222	0.096
Employment	0.063	0.927	0.011
Welfare receipt	0.083	0.140	0.777

Note: Percentage of individuals weighted using cross-sectional weights.
Source: SOEP 2005-2009.

Table 4
Average characteristics by labor market transitions

State in $t-1$	Variable	State at time t		
		Inactivity	Employment	Welfare
A. Natives				
Inactivity	Age	51.4	42.1	43.6
	Female	0.78	0.76	0.66
	Education	11.8	12.5	11.0
Employment	Age	45.0	43.7	45.1
	Female	0.70	0.45	0.57
	Education	12.3	12.6	11.2
Welfare receipt	Age	49.4	44.0	44.5
	Female	0.68	0.58	0.63
	Education	10.5	11.6	10.9
B. All immigrants				
Inactivity	Age	46.7	38.5	46.4
	Female	0.75	0.74	0.67
	Education	10.3	11.4	11.0
Employment	Age	44.7	42.4	41.0
	Female	0.63	0.47	0.50
	Education	10.8	11.5	10.8
Welfare receipt	Age	47.0	40.2	44.0
	Female	0.68	0.50	0.56
	Education	11.1	10.7	10.8

Note: Weighted data using cross-sectional weights.
Source: SOEP 2005-2009.

Table 5
Estimation results: natives and all immigrants

Variable	Natives				All immigrants			
	Employment		Welfare receipt		Employment		Welfare receipt	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Employed in t-1	2.031***	(0.121)	-0.114	(0.285)	2.404***	(0.204)	0.292	(0.359)
Welfare receipt in t-1	1.372***	(0.312)	1.813***	(0.330)	2.022***	(0.368)	2.356***	(0.388)
Age	0.722***	(0.047)	0.422***	(0.105)	0.500***	(0.067)	0.251**	(0.114)
Age squared	-0.009***	(0.001)	-0.005***	(0.001)	-0.006***	(0.001)	-0.003***	(0.001)
Female	-1.153***	(0.103)	-0.963***	(0.243)	-0.859***	(0.147)	-1.238***	(0.284)
Education	0.074***	(0.017)	-0.242***	(0.052)	0.091***	(0.027)	-0.092*	(0.056)
Married	-0.362***	(0.107)	-2.770***	(0.264)	-0.225	(0.168)	-2.325***	(0.336)
Health status: good	0.057	(0.101)	-0.540**	(0.238)	-0.207	(0.163)	0.543*	(0.292)
No. of kids LT 6	-2.080***	(0.180)	-1.844***	(0.451)	-0.870***	(0.234)	-0.636	(0.394)
No. of kids GE 6	-0.886***	(0.149)	-0.544*	(0.331)	0.015	(0.192)	-0.344	(0.294)
School in Germany: no	—		—		-0.176	(0.143)	0.386	(0.292)
Year 2007	0.277***	(0.085)	-0.052	(0.197)	-0.029	(0.140)	-0.293	(0.239)
Year 2008	0.283***	(0.089)	-0.130	(0.210)	0.105	(0.149)	-0.693**	(0.269)
Year 2009	0.224**	(0.093)	-0.416*	(0.233)	-0.036	(0.156)	-0.434	(0.284)
Employed in t=0	3.190***	(0.215)	0.112	(0.460)	2.412***	(0.329)	-1.310**	(0.527)
Welfare receipt in t=0	0.437	(0.407)	4.462***	(0.561)	0.188	(0.465)	3.360***	(0.652)
M: Health status: good	0.345**	(0.157)	-0.697*	(0.389)	0.872***	(0.249)	-1.989***	(0.495)
M: No. of kids LT 6	1.626***	(0.227)	2.324***	(0.536)	0.497*	(0.284)	0.284	(0.488)
M: No. of kids GE 6	0.686***	(0.161)	0.761**	(0.365)	-0.262	(0.206)	0.645**	(0.320)
Constant	-15.47***	(1.036)	-6.758***	(2.384)	-11.83***	(1.473)	-3.326	(2.468)
$Var(a_{ij})$	2.898	(0.370)	5.290	(1.047)	1.344	(0.438)	3.557	(1.183)
$Cov(a_{i,empl}, a_{i,welf})$	0.358	(0.646)			-0.969	(0.630)		
log likelihood	-5585.0267				-2098.8874			
No. of person-year observations	20,973				5,678			
No. of indivdiuals	6,215				1,779			

Note: Dynamic multinomial logit models with random effects. Dependent variable: labor market state (inactivity, employment, welfare receipt). M: denotes individual-specific averages of a variable. Significance level: *<0.1, **<0.05, ***<0.01.
Source: SOEP 2005-2009.

Table 6
Estimation results: immigrant subgroups

Variable	EU citizens				Non-EU citizens				German citizens			
	Employment		Welfare receipt		Employment		Welfare receipt		Employment		Welfare receipt	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Employed in t-1	2.875***	(0.346)	2.397	(1.581)	2.458***	(0.408)	0.325	(0.533)	2.292***	(0.267)	-0.145	(0.564)
Welfare receipt in t-1	2.119**	(0.842)	1.131	(1.471)	2.306***	(0.563)	2.921***	(0.565)	1.535***	(0.562)	1.844***	(0.621)
Age	0.200*	(0.120)	-1.268*	(0.766)	0.440***	(0.125)	0.305*	(0.156)	0.617***	(0.099)	0.321*	(0.191)
Age squared	-0.003**	(0.001)	0.012	(0.008)	-0.005***	(0.001)	-0.003**	(0.002)	-0.007***	(0.001)	-0.004**	(0.002)
Female	-1.000***	(0.281)	-0.402	(1.321)	-1.096***	(0.282)	-1.234***	(0.365)	-0.618***	(0.207)	-0.744	(0.473)
Education	0.069	(0.054)	-1.506**	(0.633)	0.035	(0.048)	-0.002	(0.070)	0.094**	(0.040)	-0.187*	(0.103)
Married	0.022	(0.310)	-16.85***	(5.323)	-0.137	(0.323)	-1.591***	(0.470)	-0.384	(0.239)	-2.954***	(0.617)
Health status: good	-0.064	(0.368)	-3.671**	(1.552)	0.059	(0.298)	0.726*	(0.426)	-0.379	(0.235)	0.744	(0.479)
No. of kids LT 6	-0.410	(0.695)	-4.088	(3.178)	-0.492	(0.402)	-1.060**	(0.535)	-1.404***	(0.346)	0.142	(0.759)
No. of kids GE 6	0.183	(0.525)	-4.189	(2.888)	0.194	(0.296)	0.101	(0.354)	-0.399	(0.325)	-0.985*	(0.584)
School in Germany: no	0.330	(0.285)	3.888**	(1.923)	-0.618**	(0.281)	-0.892**	(0.404)	0.050	(0.215)	1.378***	(0.526)
Year 2007	-0.064	(0.322)	3.213**	(1.369)	0.028	(0.247)	-0.821**	(0.355)	-0.030	(0.203)	-0.144	(0.387)
Year 2008	0.142	(0.345)	-1.241	(1.285)	0.129	(0.268)	-0.608	(0.387)	0.119	(0.214)	-0.763*	(0.438)
Year 2009	-0.070	(0.348)	-0.329	(1.387)	-0.121	(0.287)	-0.763*	(0.429)	0.070	(0.229)	0.034	(0.448)
Employed in t=0	1.522***	(0.398)	-19.86***	(6.560)	2.430***	(0.675)	-0.952	(0.783)	2.483***	(0.437)	-1.110	(0.890)
Welfare receipt in t=0	0.066	(0.813)	27.80***	(9.078)	0.399	(0.724)	2.035**	(0.819)	0.059	(0.730)	4.636***	(1.228)
M: Health status: good	0.734	(0.517)	2.107	(2.575)	0.510	(0.440)	-2.080***	(0.676)	1.049***	(0.365)	-2.081**	(0.840)
M: No. of kids LT 6	-0.497	(0.809)	11.02*	(6.301)	0.316	(0.500)	1.123*	(0.629)	1.067**	(0.415)	-0.834	(0.971)
M: No. of kids GE 6	-0.065	(0.563)	-4.622	(3.493)	-0.401	(0.320)	0.223	(0.384)	0.074	(0.342)	0.987	(0.622)
Constant	-4.499	(2.828)	33.31*	(19.18)	-10.40***	(2.644)	-5.520*	(3.319)	-14.18***	(2.177)	-3.938	(4.228)
$Var(a_{ij})$	0.172	(0.257)	248.1	(160.2)	1.215	(0.864)	1.264	(1.103)	1.500	(0.619)	5.546	(2.717)
$Cov(a_{i,empl}, a_{i,welf})$	-6.540	(5.210)			-0.533	(0.795)			-1.123	(1.133)		
log likelihood	-346.73791				-705.26851				-996.40358			
No. of person-year obs.	1,124				1,609				2,945			
No. of indivdiuals	356				542				929			

Note: Dynamic multinomial logit models with random effects. Dependent variable: labor market state (inactivity, employment, welfare receipt). M: denotes individual-specific averages of a variable. Significance level: *<0.1, **<0.05, ***<0.01.
Source: SOEP 2005-2009.

Table 7
Estimation results: natives by sex

Variable	Males				Females			
	Employment		Welfare receipt		Employment		Welfare receipt	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Employed in t-1	2.372***	(0.249)	0.041	(0.441)	1.862***	(0.139)	-0.357	(0.382)
Welfare receipt in t-1	2.359***	(0.526)	2.043***	(0.546)	0.866**	(0.396)	1.679***	(0.464)
Age	0.793***	(0.086)	0.548***	(0.166)	0.642***	(0.057)	0.342**	(0.138)
Age squared	-0.010***	(0.001)	-0.007***	(0.002)	-0.008***	(0.001)	-0.004***	(0.002)
Education	0.105***	(0.030)	-0.317***	(0.090)	0.071***	(0.022)	-0.172***	(0.066)
Married	0.357*	(0.186)	-1.290***	(0.426)	-0.716***	(0.134)	-3.534***	(0.357)
Health status: good	-0.172	(0.188)	-0.689*	(0.389)	0.143	(0.120)	-0.563*	(0.309)
No. of kids LT 6	-0.665*	(0.394)	0.636	(0.761)	-2.586***	(0.216)	-3.131***	(0.617)
No. of kids GE 6	-0.413	(0.299)	0.823	(0.642)	-1.110***	(0.176)	-1.194***	(0.415)
Year 2007	0.478***	(0.159)	-0.026	(0.319)	0.213**	(0.102)	0.039	(0.259)
Year 2008	0.316*	(0.163)	-0.604*	(0.352)	0.287***	(0.108)	0.186	(0.272)
Year 2009	0.165	(0.169)	-0.572	(0.371)	0.281**	(0.113)	-0.324	(0.312)
Employed in t=0	3.129***	(0.443)	-1.538**	(0.754)	3.121***	(0.242)	1.042*	(0.585)
Welfare receipt in t=0	-0.541	(0.684)	3.428***	(0.838)	0.953*	(0.530)	5.141***	(0.928)
M: Health status: good	1.254***	(0.289)	0.184	(0.613)	-0.077	(0.190)	-0.969*	(0.505)
M: No. of kids LT 6	0.443	(0.496)	0.066	(0.980)	2.025***	(0.266)	3.534***	(0.712)
M: No. of kids GE 6	0.212	(0.321)	-0.742	(0.711)	0.907***	(0.190)	1.431***	(0.467)
Constant	-18.158***	(1.944)	-8.883**	(3.726)	-14.380***	(1.258)	-6.588**	(3.157)
$Var(a_{ij})$	2.941	(0.732)	3.890	(1.498)	2.738	(0.415)	6.004	(1.566)
$Cov(a_{i,empl}, a_{i,welf})$	-1.018	(1.031)			1.049	(0.842)		
log likelihood	-1817.2422				-3687.4130			
No. of person-year observations	9,847				11,126			
No. of indivdiuals	2,933				3,282			

Note: Dynamic multinomial logit models with random effects. Dependent variable: labor market state (inactivity, employment, welfare receipt). M: denotes individual-specific averages of a variable. Significance level: *<0.1, **<0.05, ***<0.01.
Source: SOEP 2005-2009.

Table 8
Estimation results: immigrants by sex

Variable	Males				Females			
	Employment		Welfare receipt		Employment		Welfare receipt	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Employed in t-1	2.393***	(0.360)	0.253	(0.441)	2.188***	(0.231)	-0.012	(0.549)
Welfare receipt in t-1	2.584***	(0.515)	3.223***	(0.500)	1.309***	(0.497)	1.131**	(0.561)
Age	0.536***	(0.123)	0.164	(0.141)	0.446***	(0.083)	0.304	(0.189)
Age squared	-0.007***	(0.001)	-0.002	(0.001)	-0.005***	(0.001)	-0.004**	(0.002)
Education	0.074	(0.050)	-0.241***	(0.082)	0.120***	(0.034)	0.023	(0.080)
Married	0.298	(0.315)	-1.038**	(0.449)	-0.569**	(0.221)	-3.760***	(0.651)
Health status: good	-0.183	(0.296)	0.588	(0.438)	-0.265	(0.202)	0.359	(0.425)
School in Germany: no	-0.047	(0.279)	0.849**	(0.425)	-0.243	(0.179)	0.269	(0.607)
No. of kids LT 6	0.198	(0.435)	-0.469	(0.550)	-1.561***	(0.317)	-0.971	(0.644)
No. of kids GE 6	0.110	(0.346)	-0.069	(0.402)	-0.132	(0.251)	-0.752	(0.512)
Year 2007	-0.030	(0.247)	-0.902**	(0.360)	-0.027	(0.174)	0.406	(0.365)
Year 2008	0.301	(0.270)	-0.728*	(0.394)	0.042	(0.184)	-0.408	(0.400)
Year 2009	-0.009	(0.283)	-0.392	(0.412)	-0.022	(0.192)	-0.168	(0.422)
Employed in t=0	2.647***	(0.598)	-1.272**	(0.607)	2.413***	(0.379)	-1.790**	(0.783)
Welfare receipt in t=0	-0.757	(0.598)	1.360**	(0.627)	1.017	(0.673)	5.921***	(1.528)
M: Health status: good	0.812*	(0.452)	-1.542**	(0.666)	1.040***	(0.317)	-2.495***	(0.786)
M: No. of kids LT 6	-0.284	(0.530)	0.634	(0.641)	0.861**	(0.369)	-0.473	(0.875)
M: No. of kids GE 6	-0.105	(0.372)	0.475	(0.435)	-0.232	(0.267)	0.987*	(0.538)
Constant	-12.642***	(2.698)	-0.708	(3.184)	-11.430***	(1.892)	-5.397	(4.112)
$Var(a_{ij})$	1.941	(0.913)	0.961	(0.822)	1.391	(0.503)	8.756	(4.493)
$Cov(a_{i,empl}, a_{i,welf})$	-1.366	(0.551)			-0.330	(1.023)		
log likelihood	-753.04697				-1295.3627			
No. of person-year observations	2,582				3,096			
No. of indivdiuals	816				963			

Note: Dynamic multinomial logit models with random effects. Dependent variable: labor market state (inactivity, employment, welfare receipt). M: denotes individual-specific averages of a variable. Significance level: *<0.1, **<0.05, ***<0.01.
Source: SOEP 2005-2009.

Table 9
Population-averaged probabilities of labor market transitions by immigrant group

State at time $t-1$	State at time t								
	Inactive			Employment			Welfare		
	Mean	95%-CI		Mean	95%-CI		Mean	95%-CI	
A. Natives									
Inactivity	0.264	0.232	0.302	0.720	0.681	0.753	0.016	0.011	0.026
Employment	0.076	0.069	0.083	0.919	0.911	0.927	0.005	0.003	0.007
Welfare	0.114	0.073	0.168	0.855	0.792	0.902	0.031	0.020	0.052
B. All immigrants									
Inactivity	0.446	0.368	0.531	0.516	0.428	0.586	0.038	0.026	0.073
Employment	0.106	0.086	0.127	0.877	0.850	0.895	0.018	0.013	0.031
Welfare	0.121	0.071	0.194	0.790	0.686	0.853	0.090	0.059	0.161
C. EU citizens									
Inactivity	0.493	0.361	0.636	0.499	0.357	0.634	0.008	0.001	0.010
Employment	0.056	0.040	0.082	0.935	0.909	0.952	0.009	0.004	0.010
Welfare	0.111	0.028	0.428	0.881	0.564	0.964	0.008	0.002	0.010
D. Non-EU citizens									
Inactivity	0.591	0.452	0.727	0.352	0.208	0.462	0.057	0.036	0.144
Employment	0.180	0.120	0.252	0.791	0.706	0.849	0.030	0.018	0.083
Welfare	0.140	0.060	0.263	0.647	0.408	0.781	0.213	0.109	0.442
E. Immigrants with German citizenship									
Inactivity	0.369	0.282	0.482	0.595	0.471	0.674	0.036	0.019	0.092
Employment	0.086	0.067	0.110	0.901	0.870	0.921	0.012	0.007	0.032
Welfare	0.136	0.064	0.269	0.798	0.603	0.882	0.066	0.034	0.196

Note: Calculations are based on estimation results in Tables 5 and 6. Simulation-based 95% confidence intervals are calculated using 1000 replications.

Table 10
Population-averaged probabilities of labor market transitions by initial state

State at time $t-1$	State at time t								
	Inactive			Employment			Welfare		
	Mean	95%-CI		Mean	95%-CI		Mean	95%-CI	
Initial state: inactivity									
A. Natives									
Inactivity	0.647	0.617	0.676	0.322	0.292	0.347	0.031	0.023	0.044
Employment	0.336	0.286	0.382	0.648	0.601	0.699	0.016	0.010	0.027
Welfare	0.406	0.308	0.503	0.517	0.414	0.608	0.077	0.053	0.122
B. All immigrants									
Inactivity	0.697	0.646	0.733	0.220	0.185	0.256	0.082	0.064	0.119
Employment	0.296	0.209	0.381	0.642	0.555	0.727	0.062	0.038	0.110
Welfare	0.276	0.160	0.393	0.500	0.355	0.604	0.225	0.160	0.343
C. EU citizens									
Inactivity	0.734	0.640	0.808	0.252	0.173	0.339	0.014	0.010	0.043
Employment	0.148	0.081	0.256	0.830	0.714	0.896	0.022	0.011	0.092
Welfare	0.269	0.073	0.618	0.715	0.363	0.904	0.016	0.010	0.090
D. Non-EU citizens									
Inactivity	0.764	0.662	0.802	0.140	0.094	0.188	0.096	0.073	0.208
Employment	0.386	0.185	0.542	0.536	0.365	0.715	0.078	0.038	0.196
Welfare	0.236	0.092	0.418	0.361	0.159	0.531	0.403	0.239	0.656
E. Immigrants with German citizenship									
Inactivity	0.659	0.590	0.714	0.271	0.209	0.322	0.070	0.047	0.128
Employment	0.279	0.173	0.374	0.682	0.569	0.786	0.040	0.018	0.109
Welfare	0.344	0.161	0.523	0.505	0.306	0.668	0.151	0.087	0.328
Initial state: employment									
A. Natives									
Inactivity	0.186	0.157	0.220	0.803	0.768	0.832	0.011	0.007	0.019
Employment	0.046	0.041	0.051	0.951	0.946	0.956	0.003	0.002	0.004
Welfare	0.073	0.045	0.114	0.907	0.857	0.938	0.020	0.012	0.039
B. All immigrants									
Inactivity	0.318	0.238	0.424	0.664	0.555	0.740	0.019	0.011	0.043
Employment	0.058	0.050	0.068	0.935	0.923	0.944	0.007	0.005	0.013
Welfare	0.073	0.039	0.126	0.886	0.804	0.927	0.041	0.022	0.094
C. EU citizens									
Inactivity	0.405	0.260	0.597	0.595	0.403	0.740	0.000	0.000	0.005
Employment	0.039	0.029	0.058	0.961	0.942	0.971	0.000	0.000	0.002
Welfare	0.080	0.018	0.320	0.920	0.680	0.982	0.000	0.000	0.003
D. Non-EU citizens									
Inactivity	0.421	0.261	0.644	0.552	0.321	0.694	0.027	0.012	0.107
Employment	0.088	0.066	0.117	0.903	0.862	0.923	0.010	0.005	0.036
Welfare	0.082	0.028	0.195	0.827	0.582	0.912	0.091	0.039	0.299
E. Immigrants with German citizenship									
Inactivity	0.259	0.174	0.380	0.722	0.596	0.802	0.019	0.009	0.066
Employment	0.049	0.039	0.062	0.946	0.929	0.955	0.005	0.003	0.017
Welfare	0.085	0.030	0.189	0.882	0.709	0.944	0.034	0.014	0.128

Note: Calculations are based on estimation results in Tables 7 and 8. Simulation-based 95% confidence intervals are calculated using 1000 replications.

Table 10
Population-averaged probabilities of labor market transitions by initial state (cont.)

State at time $t-1$	State at time t								
	Inactive			Employment			Welfare		
	Mean	95%-CI		Mean	95%-CI		Mean	95%-CI	
Initial state: welfare									
A. Natives									
Inactivity	0.379	0.273	0.485	0.278	0.195	0.377	0.344	0.252	0.436
Employment	0.200	0.128	0.289	0.587	0.477	0.693	0.213	0.135	0.305
Welfare	0.164	0.114	0.220	0.345	0.267	0.416	0.491	0.414	0.572
B. All immigrants									
Inactivity	0.383	0.258	0.540	0.175	0.099	0.266	0.443	0.295	0.568
Employment	0.156	0.087	0.262	0.506	0.372	0.639	0.337	0.202	0.468
Welfare	0.086	0.054	0.138	0.268	0.190	0.350	0.647	0.554	0.727
C. EU citizens									
Inactivity	0.334	0.152	0.479	0.166	0.051	0.348	0.500	0.399	0.509
Employment	0.052	0.014	0.183	0.448	0.324	0.492	0.500	0.464	0.508
Welfare	0.099	0.027	0.274	0.401	0.235	0.477	0.500	0.467	0.514
D. Non-EU citizens									
Inactivity	0.501	0.284	0.715	0.145	0.046	0.289	0.354	0.158	0.572
Employment	0.227	0.097	0.436	0.507	0.282	0.711	0.266	0.094	0.478
Welfare	0.076	0.036	0.175	0.218	0.121	0.345	0.706	0.562	0.809
E. Immigrants with German citizenship									
Inactivity	0.309	0.159	0.524	0.176	0.073	0.329	0.515	0.296	0.676
Employment	0.144	0.054	0.293	0.494	0.304	0.703	0.362	0.164	0.547
Welfare	0.102	0.048	0.188	0.241	0.138	0.357	0.657	0.526	0.772

Note: Calculations are based on estimation results in Tables 7 and 8. Simulation-based 95% confidence intervals are calculated using 1000 replications.

Table 11
Simulated population-averaged probabilities of labor market transitions for immigrants' characteristics and natives' coefficients

State at time $t-1$	State at time t								
	Inactive			Employment			Welfare		
	Mean	95%-CI		Mean	95%-CI		Mean	95%-CI	
A. Characteristics of all immigrants									
Inactivity	0.338	0.306	0.382	0.635	0.591	0.666	0.027	0.019	0.039
Employment	0.111	0.099	0.124	0.880	0.867	0.892	0.009	0.006	0.013
Welfare	0.157	0.106	0.221	0.792	0.713	0.846	0.052	0.036	0.085
B. Characteristics of EU citizens									
Inactivity	0.308	0.272	0.344	0.668	0.631	0.703	0.024	0.017	0.036
Employment	0.096	0.086	0.106	0.896	0.885	0.907	0.008	0.006	0.011
Welfare	0.139	0.093	0.198	0.816	0.747	0.867	0.046	0.029	0.077
C. Characteristics of non-EU citizens									
Inactivity	0.403	0.365	0.442	0.562	0.524	0.597	0.035	0.026	0.052
Employment	0.148	0.129	0.166	0.839	0.819	0.859	0.013	0.009	0.019
Welfare	0.198	0.140	0.268	0.732	0.647	0.794	0.070	0.049	0.112
D. Characteristics of immigrants with German citizenship									
Inactivity	0.315	0.281	0.351	0.661	0.625	0.695	0.024	0.017	0.036
Employment	0.099	0.089	0.110	0.893	0.882	0.904	0.008	0.006	0.011
Welfare	0.143	0.098	0.203	0.812	0.738	0.864	0.045	0.030	0.075

Note: Calculations are based on estimation results for natives in Table 5. Simulation-based 95% confidence intervals are calculated using 1000 replications.

Table 12
Population-averaged probabilities of labor market transitions by immigration status and sex

State at time $t-1$	State at time t								
	Inactive			Employment			Welfare		
	Mean	95%-CI		Mean	95%-CI		Mean	95%-CI	
A. Natives: men									
Inactivity	0.172	0.125	0.260	0.816	0.726	0.863	0.012	0.007	0.028
Employment	0.032	0.026	0.038	0.965	0.958	0.970	0.003	0.002	0.007
Welfare	0.030	0.014	0.067	0.954	0.899	0.975	0.016	0.008	0.043
B. Natives: females									
Inactivity	0.368	0.327	0.411	0.614	0.571	0.652	0.018	0.012	0.033
Employment	0.137	0.121	0.151	0.858	0.843	0.874	0.005	0.003	0.009
Welfare	0.235	0.147	0.335	0.724	0.602	0.812	0.042	0.024	0.094
C. Immigrants: males									
Inactivity	0.299	0.190	0.428	0.670	0.502	0.754	0.032	0.021	0.184
Employment	0.061	0.043	0.079	0.927	0.846	0.941	0.013	0.009	0.098
Welfare	0.036	0.014	0.083	0.860	0.671	0.906	0.104	0.063	0.293
D. Immigrants: females									
Inactivity	0.524	0.448	0.605	0.437	0.348	0.501	0.040	0.025	0.094
Employment	0.170	0.134	0.210	0.812	0.764	0.843	0.019	0.012	0.044
Welfare	0.281	0.156	0.448	0.666	0.484	0.781	0.054	0.032	0.133

Note: Calculations are based on estimation results in Tables 7 and 8. Simulation-based 95% confidence intervals are calculated using 1000 replications. The estimations used 9847, 11126, 2582, and 3096 person-year observations for the subsamples presented in panels A, B, C, and D, respectively.