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Welfare transitions before and after reforms of the German welfare system

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Abstract

We study state dependence in the German welfare system and compare transition patterns before and after recent reforms of the welfare system (Hartz Reforms). Using data from the German Socio-Economic Panel, we apply dynamic multinomial logit estimators and find that welfare transitions have generally not changed significantly after the reform: the probabilities of welfare entry and welfare exit increased only slightly whereas the probability of welfare persistence declined somewhat. After the reform, welfare persistence and welfare-to-employment transitions of immigrants became more responsive to the labor market situation.

Keywords: Hartz Reforms, state dependence, unemployment benefit II, immigration, dynamic multinomial logit

JEL Classification: I38, J61

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1 Introduction

In recent years, the German labor market has seen impressive developments. Between 2005 and 2011, the unemployment rate dropped from 13.0 to 7.9 percent and employment surged from 38.9 to 41.1 millions (SVR 2012). The labor market was robust to the Great Recession of 2009 and unemployment did not increase during the recent crises. Interestingly, these developments were preceded by substantial reforms of the German welfare system that aimed at enhancing work incentives and labor market flexibility, particularly for the unemployed and for welfare recipients. The German Council of Economic Experts asserted that the reforms contributed to the positive developments by providing incentives that increase welfare exit and reduce welfare persistence (SVR 2011). In addition, the reforms extended administrative demands on search behavior. In combination with easing labor market conditions this may have affected welfare transitions.

This paper analyzes welfare transitions and structural determinants of labor market transitions in the periods before and after the reforms. However, we do not aim at identifying causal reform effects. Instead, we address two research questions: (1) did the patterns and dynamics of welfare transitions change from before to after the reform and (2) are welfare transitions more responsive to the labor market situation after the reforms? In addition, we examine heterogeneities in welfare transitions and in welfare transition changes across population groups. We focus on differences between immigrants and natives because the literature provides evidence that the propensity to receive welfare benefits differs for these groups (Barrett and McCarthy 2008).

Answers to these questions are of substantial interest: first, many observers are specifically interested in the workings of the German "job miracle". While Burda and Hunt (2011) see employer expectations, wage moderation, and working time accounts as the key factors behind the German job miracle, SVR (2011) also discuss the role of recent reforms. We provide evidence on the plausibility of the connection between the 2005-reforms and subsequent employment dynamics. Given that many countries are faced with high unemployment, the German experience may

provide an informative benchmark case. Second, we contribute to the literature that studies the connection between individual welfare transitions and aggregate labor market conditions (e.g., Hoynes 2000 and Hoynes et al. 2012). Hoynes (2000) showed the close connection between unemployment and welfare receipt in the United States between 1987 and 1992 when welfare recipients strongly responded to job opportunities and wage growth: in situations of high unemployment and low wage growth welfare spells became longer and recidivism increased. Third, we add to the international discussion of heterogeneous response patterns across population groups. Particularly in countries with a high proportion of migrants, it is important to understand the difference in responses to incentive mechanisms among natives and immigrants.¹

Using data from the German Socio-Economic Panel Study (SOEP) we estimate dynamic multinomial logit models. This approach allows us to study welfare transitions in the German welfare system. In particular, we gain knowledge about the incidence of true state dependence, i.e. the extent to which the experience of transfer receipt affects subsequent transition patterns. Our results show little evidence of true state dependence in the German welfare system. In general, patterns of welfare transitions did not change significantly in the wake of recent reforms. The probabilities of welfare entry and welfare exit increased only slightly whereas welfare persistence, i.e. state dependence, declined somewhat from before to after the reforms. These changes tend to be more pronounced among immigrants than among natives. We find that welfare transitions depend on the labor market situation: with increasing unemployment, the probabilities of welfare persistence and welfare entry increase whereas the probability of welfare exit to employment declines. Among immigrants, welfare persistence and welfare-employment transitions became more responsive to the labor market after the reform.

This study is related to several discussions in the literature. Some contributions discuss developments of the German labor market and the response to the recent welfare reforms. While Fertig

¹ For a survey of the international literature, see Barrett and McCarthy (2008). Evidence for Germany is provided, e.g., by Castronova et al. (2001), Kogan (2004), Riphahn (2004), Riphahn and Wunder (2012).

et al. (2006) did not find improvements in policy effectiveness after the reforms, Fahr and Sunde (2009) and Klinger and Rothe (2012) find that the early Hartz Reforms significantly improved the efficiency of labor market matching, benefiting particularly the long term unemployed.²

Our approach to the study of labor market flexibility ties in with an international literature on state dependence in transfer receipt. Closest to ours is the contribution by Hansen and Lofstrom (2009) who study the transition between welfare receipt, unemployment, and employment among male Swedes between 1990 and 1996. They find higher state dependence among immigrants than natives. Hansen and Lofstrom (2006) separately study welfare exit and entry of Swedish natives and immigrants and find that the difference in welfare receipt between natives and immigrants results from differences in entry to rather than in exit from welfare. 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 and find substantial state dependence. Using Californian data Chay et al. (2004) provide evidence of state dependence in welfare receipt which varies across population groups. Cappellari and Jenkins (2009) study welfare receipt in Britain; however, their results yield little evidence for state dependence. In another study, we investigate differences in transition patterns in the German welfare system after the reform for natives and several immigrant groups (EU citizens, non-EU citizens, immigrants with German citizenship) (Wunder and Riphahn 2011). We find substantial differences between population groups but little evidence for true state dependence.

A separate literature is concerned with consequences of welfare reforms for recipient behaviors. Following the 1996 reform of the U.S. federal welfare program, studies addressed a variety of outcomes (for a survey, see Blank 2002), among them the propensity to take up work (e.g., Grogger and Karoly 2005), responses to time limited eligibility, and the relevance of the macroeconomy for labor force participation (Bitler and Hoynes 2010, Ziliak et al. 2000). Blank (2002)

² Several government mandated studies evaluated the effects of elements of the reform packages. Caliendo (2009) summarizes that labor market institutions became more efficient and work incentives for the unemployed increased after the reform.

summarizes evidence of substantial changes in welfare transition patterns in response to the U.S. welfare reforms.³ By comparing welfare dynamics before and after the German reform, we contribute to this literature on welfare reforms.

This paper is structured as follows. In section two we summarize the institutional framework and the key reform elements that might affect state dependence. Section three describes the data and section four the empirical approach. The results are shown in section five and section six presents concluding remarks.

2 Institutions

Ever increasing unemployment rates and the apparent failure of prior labor market policies led the German government to implement far-reaching reforms to activate the unemployed, modernize labor market services, and change the philosophy of the German welfare state between 2003 and 2005. The reform changed the welfare and the unemployment insurance system (for a discussion, see Schneider 2012). The reform received substantial public attention and opposition, particularly because it cut back on some claims against the welfare state. Next, we summarize the main components of the German welfare system before and after the reform, discuss why welfare transitions might have changed, and briefly describe the situation of immigrants in the German welfare system.

In Germany, workers who become unemployed are generally covered by the unemployment insurance. Unemployment benefits (*Arbeitslosengeld*) replace up to 67% of previous net earnings. The maximum duration of benefit payment was reduced from 32 months before the reform to 24 months afterwards. The benefit is now labeled unemployment benefit I (UB I). Before the reform, those who had exhausted their unemployment benefit entitlement and those who were not (yet) entitled to unemployment benefits were eligible for unemployment assistance (*Arbeitslosenhilfe*),

³ For evidence on reforms in the UK, Sweden, and Canada, see, e.g., Brewer et al. (2006), Edmark (2009), and Fortin et al. (2004).

a tax-financed means-tested transfer. Unemployment assistance replaced up to 57% of prior net earnings.

The basic tenet of the German welfare state is that those receive public transfers, whose own income falls short of their needs. Thus prior to the reform, individuals could claim social assistance (*Sozialhilfe*) if their total income—independent of its source—fell below the legally defined subsistence level. Social assistance thus was a means-tested program that was provided also to top up labor earnings and unemployment benefits in case of need.⁴

The reform then combined unemployment assistance and social assistance in the so-called unemployment benefit II (UB II), a means-tested and tax-financed benefit. Individuals who are in need of support, independent of whether they are employed, receive UB I, or exhausted their UB I eligibility, may be eligible for UB II. The benefit covers the legally defined minimum income and is not related to prior earnings. Individuals in need can claim UB II if they are able to work at least 15 hours per week. Those who are not able to work, e.g., due to sickness, disability, or care responsibilities, are—as before—entitled to social assistance.

The reform came into effect in January 2005 as the last element of a wider reform project. The overall reform project had several objectives: (a) to improve the effectiveness and efficiency of labor market services. Thus, after the reform, local employment offices introduced differentiated approaches to support the unemployed at an individual level. (b) To activate the unemployed based on the idea ‘fordern and fördern’, i.e. ‘assist and demand.’ Since the reform, the employment offices explicitly demand individual activities and have the unemployed sign ‘agreements on objectives.’ At the same time search incentives were increased by shortened unemployment benefit payouts and by an intensified use of sanctions. (c) Finally, labor market regulations were relaxed, e.g., those governing employment protection, temporary employment, and temporary agency employment (Klinger and Rothe 2012, Caliendo 2009).

⁴ Since the means test considers household size, a given household income renders large households more likely to be eligible for additional social assistance than small households.

The reform adjusted the regulations of earnings allowances and marginal tax rates to increase work incentives (see, e.g., Dietz et al. 2011): the maximum earnings allowance increased and marginal tax rates declined.⁵ In addition to strengthening work incentives, the reform also requires welfare recipients to actively search for jobs: all recipients of UB II have to look for a job and are obliged to discuss their search strategy with the employment office. In contrast, before the reform social assistance benefits were paid independent of labor market status and search effort. These changes should reduce welfare persistence and state dependence in welfare.

Immigrants are treated like natives within the unemployment insurance, i.e., with respect to unemployment benefit and unemployment assistance before the reform and UB I after the reform. As for natives, their eligibility depends on the individual contribution record. The situation for immigrants is more complex in the minimum income support programs of social assistance and UB II. Individuals without German citizenship can receive minimum income support if they are (i) permanently in Germany, (ii) physically able to work (after the reform), and (iii) potentially allowed to take up employment; the last condition excludes, e.g., asylum seekers. Ethnic Germans (*Aussiedler*) as well as naturalized immigrants are treated like natives.⁶ Immigrants residing in Germany in order to find employment are generally not eligible for benefits. However, a long list of circumstances renders EU citizens eligible for UB II receipt even then (BMAS 2009).

Immigrants' right to stay in Germany can be refused if an immigrant is eligible for means-tested public support. Special protection is granted to migrants from signatory states of the European Convention on Social and Medical Assistance of 1953.⁷ These immigrants can stay in Germany even if they receive welfare benefits (Classen 2012).

⁵ For details see, Riphahn and Wunder (2012), where we compare the characteristics associated with benefit receipt among natives and immigrants and provide a non-parametric study of the groups' respective life cycle trajectories of benefit receipt. The paper does not look at state dependence and does not provide a dynamic perspective on the situation before and after the reform.

⁶ Ethnic Germans are former German citizens or those belonging to the German people. After World War II, they migrated to West Germany and were granted German citizenship (Kurthen 1995, Dietz 1999).

⁷ This covers immigrants from EU member states, Iceland, Norway, and—importantly—Turkey.

Prior studies show no difference for natives and immigrants with respect to benefit take-up (see, e.g., Riphahn 2001, Frick and Groh-Samberg 2007, Bruckmeier and Wiemers 2011). However, BMAS (2009) points out that the expiration of UB I generates a substantially higher transition rate to UB II receipt among immigrant than native households: immigrant households and thus their needs are larger while their income and wealth are smaller than natives'. Also, the public debate about the reforms enhanced awareness of the new benefit program. In this situation, many observers expect an overall increase in the propensity to take up benefits given eligibility (e.g., Bruckmeier and Wiemers 2011).

3 Data

Using household data from the German Socio-Economic Panel Study (SOEP) (Wagner et al. 2007), we conduct separate analyses for natives and immigrants. We set the immigration status of the household according to the status of the household head.⁸ Since the number of immigrant households is small in East Germany, our analysis considers households in West German only.⁹

We study welfare transitions before and after the last step of the Hartz Reforms that was implemented in 2005. The pre and post reform samples cover the years 2000 to 2004 and 2005 to 2010, respectively. Households are selected if they are part of the sample in 2000 or 2005, which define the initial states.¹⁰ Recipients of unemployment assistance and UB II are required to be able to work. Therefore, we include only household heads of working age (25-60) and exclude the disabled.

Our dependent variable classifies households into three labor market states that indicate whether the household is (1) receiving welfare, (2) employed, or (3) inactive at the time of the

⁸ This information comes from a "migration background"-indicator in the data, which considers first or second generation immigrant status independent of citizenship (Frick and Lohmann 2010).

⁹ Other studies use similar sample selection criteria (e.g., Kogan 2004, Riphahn 2004, Wunder and Riphahn 2011).

¹⁰ The pre reform sample and the post reform sample cover periods of different length. We decided to use fewer waves for the pre reform period than for the post reform period in order to be able to include the SOEP innovation sample F, which started in 2000.

survey. In a first step, we code all households who receive welfare benefits. Before the reform, we classify a household as receiving welfare if at least one person in the household receives one of the means-tested benefit schemes, i.e., social assistance or unemployment assistance. After the reform, we regard households as welfare recipients if at least one person in the household receives UB II. Non-recipient households are labelled “employed” if the household head is employed and “inactive” otherwise. The latter group includes individuals who are out of the labor force and unemployed individuals who may receive unemployment insurance benefits. The rationale behind this definition of an “inactive group” is that these households neither work nor rely on welfare benefits but instead have other non-welfare income (e.g., unemployment insurance benefits or savings).¹¹ It is possible that welfare receiving households have employed or unemployed heads; in such cases where earnings or unemployment benefits are insufficient to meet the household’s needs and are topped up by welfare benefits we code benefit receipt.

Using weighted data to reflect the population of interest, Table 1 reports the observed annual distribution of the three labor market states for the pre reform years 2000-2004 and the post reform years 2005-2010. In general, welfare recipient rates are higher after the reform with a noticeable jump shortly after the reform came into effect. The increase in reciprocity rates is consistent with the decrease in non-take-up in the after-reform period found by Bruckmeier and Wiemers (2011). After the reform, we observe rising employment and falling inactivity, reflecting the positive labor market trend and falling unemployment during this period (BA 2010a).

There are remarkable differences between immigrants and natives. The share of immigrant households receiving welfare is more than twice as large as that of natives (e.g., in 2006: 15.2% vs. 7.1%). Correspondingly, the share of immigrant households that are classified as employed is considerably lower than that of natives, on average by 10 percentage points.

¹¹ Across all years we observe that 17% and 30% of native and immigrant inactive households have unemployed heads, respectively.

Table 2 reports labor market transitions, as observed in the data. Persistence is evident in all states. In the total population, welfare receipt has a persistence rate of more than 70%. Patterns change slightly from before to after the reform: while the welfare exit rate to employment increases (from 18.4% to 20.3%), welfare exit to inactivity becomes less frequent (from 10.3% to 6.1%). Labor market transitions appear to be less favorable for immigrants than for natives. Immigrants have a much higher risk of welfare entry than natives. Welfare persistence increases among immigrants (from 68.1% to 75.4%), whereas no change occurs among natives.

Table A1 in the appendix shows descriptive statistics of the pre and post reform samples. Compared to natives, immigrant household heads have, on average, 1.5 years less education and are more often married. Also, their number of children is higher. Table A2 shows characteristics by labor market and immigrant status. Comparing welfare recipients and employed households, we observe small differences in the number of children while the share of married household heads is clearly smaller among welfare recipients. The share of single parents is considerably higher among welfare recipients than among households classified as inactive or employed. The figures also indicate a difference in average education between employed households and welfare recipients of two years among natives and one year among immigrants.

Table A3 shows average values for selected characteristics by labor market transition. Native household heads who receive welfare in t and $t - 1$ have, on average, 2.2 years of education less than those continuously employed. For immigrants, this difference amounts to 1.1 years. The share of female household heads among permanent welfare recipients is higher than among continuously employed household heads (68% vs. 34% for natives, 55% vs. 32% for immigrants). Thus, one may suspect that a lack of human capital and/or gender-specific labor market opportunities are connected to persistence in welfare participation.

4 Estimation strategy

The conceptual framework of our analysis uses a dynamic discrete choice model: a household chooses the labor market state (inactivity, employment, or welfare receipt) with the highest utility.

Let U_{ijt} be the utility of household i in state j at time t :

$$U_{ijt} = \beta_j' \mathbf{x}_{it} + \gamma_j' \mathbf{y}_{i,t-1} + \alpha_{ij} + \varepsilon_{ijt}. \quad (1)$$

Utility depends on the observed household characteristics, \mathbf{x}_{it} . β_j is a vector of alternative-specific coefficients. The coefficient vector γ_j captures the effect of the previous state, $\mathbf{y}_{i,t-1}$, on the current state choice. We take account of household-specific unobserved heterogeneity by including a random error α_{ij} . ε_{ijt} is an idiosyncratic error that is assumed to be independently distributed with a type I extreme value distribution.

Dynamic models of labor market state choice which allow for the presence of unobserved effects raise the problem of endogenous initial conditions: while transitions within the panel of observations are modeled, the transition to the very first observed state has no observed predecessor. We apply the conditional maximum likelihood estimator suggested by Wooldridge (2005) to solve this problem.

The specification of the Wooldridge approach models the unobserved heterogeneity α_{ij} as a function of the initial state \mathbf{y}_{i0} , individual-specific averages of a subset of the explanatory variables \mathbf{x}_i ,¹² and a new random error, a_{ij} , that is uncorrelated with the initial state. 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 and unobserved

¹² This approach in the spirit of Mundlak (1978) and follows the literature (see, e.g., Stewart 2007, Caliendo and Uhlenborff 2008, Mosthaf et al. 2009, Cappellari and Jenkins 2009, Prowse 2010, Wunder and Riphahn 2011).

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

$$P(Y_{it} = j | \mathbf{x}_i, \mathbf{y}_{i,t-1}, \mathbf{y}_{i0}, \mathbf{a}_i) = \frac{\exp(\boldsymbol{\beta}'_j \mathbf{x}_{it} + \boldsymbol{\gamma}'_j \mathbf{y}_{i,t-1} + \boldsymbol{\delta}'_{j1} \mathbf{y}_{i0} + \boldsymbol{\delta}'_{j2} \mathbf{x}_i + a_{ij})}{\sum_{k=1}^{J=3} \exp(\boldsymbol{\beta}'_k \mathbf{x}_{it} + \boldsymbol{\gamma}'_k \mathbf{y}_{i,t-1} + \boldsymbol{\delta}'_{k1} \mathbf{y}_{i0} + \boldsymbol{\delta}'_{k2} \mathbf{x}_i + a_{ik})}. \quad (2)$$

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. We use Gauss-Hermite quadrature to integrate the random effect out of the corresponding log-likelihood.¹³

We use predicted probabilities \bar{P} for an individual randomly sampled from the population to describe state dependence in labor market transitions. The calculation requires integrating over the distribution of the random effect (Skrondal and Rabe-Hesketh 2009):

$$\bar{P}(Y_t = j | \mathbf{y}_{t-1}, \mathbf{y}_0, \mathbf{x}^0) = \int \hat{P}(Y_t = j | \mathbf{y}_{t-1}, \mathbf{x}^0, \boldsymbol{\alpha}) h(\boldsymbol{\alpha} | \mathbf{x}, \mathbf{y}_0; \boldsymbol{\delta}) d\boldsymbol{\alpha}, \quad (3)$$

where we set the vector \mathbf{x}^0 to equal the sample average of the control variables. \hat{P} is the conditional probability. We assess the uncertainty of the prediction by approximate 95% confidence intervals for the predicted probabilities.¹⁴

5 Results

This section presents the results obtained from dynamic multinomial logit models. Section 5.1 describes patterns of welfare transitions and highlights changes in dynamics after the reform. Section 5.2 turns to the question of how welfare transitions relate to labor market conditions. The

¹³ We use the Stata program -gllamm- written by Rabe-Hesketh et al. (2004).

¹⁴ We use a parametric bootstrap approach with 1000 random draws from the sampling distribution of parameters. The procedure is available in the Stata ado-files -gllapred- and -ci_marg_mu- (Rabe-Hesketh et al. 2004, Skrondal and Rabe-Hesketh 2009).

discussion addresses differences between immigrants and natives. We report results on robustness checks in section 5.3.

5.1 Welfare transitions and state dependence

Table 3 shows the estimation results for the full sample. The positive estimates of the γ_j coefficients presented in the first rows indicate persistence in labor market states: 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 , both relative to inactivity. Interestingly, welfare receipt in $t - 1$ is linked to higher log-odds of employment in t relative to inactivity.¹⁵ These patterns appear before and after the reform and suggest that the welfare system incentivize welfare recipients to take up employment.

Size and significance of the coefficient of lagged employment as a determinant of welfare receipt change between the pre and post reform periods. While the coefficient estimate is near zero (0.07) and statistically insignificant before the reform, it is larger (0.56) and statistically significant in the post reform period. Thus, employment in $t - 1$ goes along with a significant increase in the log-odds of welfare receipt in t after the reform. We return to the employment-to-welfare transition in greater detail below.

Next, we discuss model-based predictions in Table 4 separately for the entire population (Panels A and B), native households (Panels C and D), and immigrant households (Panels E and F). The calculations are based on separate estimations and average characteristics of the respective pre and post reform subsamples.¹⁶

The predictions reveal four interesting results. First, they confirm the persistence in labor market states in both sample periods. The probability of each labor market state in t is highest when

¹⁵ When we interpret coefficient estimates on the log odds of employment or welfare, these are always meant as relative effects compared to the log odds of inactivity. We omit the formulation from here on to improve readability.

¹⁶ For comparison, we also calculated predicted probabilities as the average of individually predicted probabilities. The results are similar in nature to the discussed and are presented in Table A6 in the Appendix.

the household was already in that state in $t - 1$. Comparing pre and post periods, we observe a decline in the probability of welfare persistence, from 8.3% to 6.0%, i.e. by 28%. At the same time, the probability of welfare entry from inactivity remains almost unchanged between both periods, as countervailing developments for natives and immigrants appear to balance in the full sample. After the reform, welfare persistence is only slightly more likely, by 2.2 percentage points, than new entry from inactivity (Panel B). In contrast, this difference amounts to 4.6 percentage points before the reform (Panel A). Separate analyses for immigrants and natives show that the decline in welfare persistence is particularly pronounced among immigrants (Panels C-F).

Second, we find a clear increase in the probability of employment-to-welfare transitions, from 0.9% to 1.6% (Panels A and B). Judging from the non overlapping confidence intervals, the increase is statistically significant. The same pattern is observed for the separate immigrant and native samples. Although the overall risk of this transition is small, the sharp relative increase by 78 percent for the full sample is noteworthy, because we hardly observe other statistically significant changes over time. In addition, this result is remarkable because individuals are typically entitled to unemployment insurance benefits in the case of job loss (cf. section 2). Hence, one would expect that in the case of a job loss newly unemployed workers move from employment to inactivity, which includes the receipt of unemployment insurance benefits. The increased risk of employment-to-welfare transitions may result from an increased propensity to take up short term or low paid employment. Short-term employment may be insufficient to generate UB I eligibility for the period after the short-term contract expired. Low paid employment may not cover household needs and thus may go along with welfare benefit eligibility in addition to employment.

Third, after the reform transitions to employment became more frequent; in particular, welfare-to-employment transitions are considerably more likely than inactivity-to-employment transitions (before the reform: 82% vs. 72%, Panel A; after the reform: 87% vs. 76%, Panel B). The increase in the probability of welfare exit to employment after the reform is particularly

pronounced among immigrants (from 69% to 83%, Panels E and F). Among immigrants, the probability of inactivity-to-employment transition increased by approximately twenty percentage points, which is the largest absolute change after the reform. For both groups persistence in inactivity declined after the reform. In general, this suggests that work incentives for welfare recipients and inactive households increased after the reform and that newly introduced activation measures might be effective, particularly among immigrants. In addition, this could be an indication of new job opportunities.

Finally, we turn to the control variables and model diagnostics in Table 3. With respect to the control variables, we generally find similar patterns before and after the reform; e.g., higher education increases the log-odds of employment relative to inactivity and makes welfare receipt relatively less likely. After the reform, the gender-specific life cycle patterns of labor market transitions are estimated more precisely and with larger coefficients, as indicated by the significant coefficients of the age-female interaction terms.

Likelihood ratio tests yield that individual-specific error term components significantly improve the model fit. The specification takes account of the potential endogeneity of health and the number of children by including their individual-specific averages (see variables labeled M in Table 3). The initial labor market state as of period $t = 0$ is another component of the unobserved household effect. It yields highly significant coefficients, suggesting that the initial state matters in explaining the current state.

5.2 Welfare transitions and labor market conditions

To address our second research question, this section investigates how welfare transitions relate to the labor market situation. Hoynes (2000) studies this relationship based on Californian administrative data. She confirms significant correlations between local labor markets and the duration of welfare receipt and the probability of recidivism. We add state unemployment rates and their

interactions with lagged labor market states to the specification. This allows us to infer whether welfare transitions tend to vary with labor market conditions.¹⁷ Jointly the three additional coefficients are statistically significant in three out of four models.

In general and again relative to the log-odds of inactivity, the log-odds of employment decrease and the log-odds of welfare receipt increase with rising unemployment, though not all coefficients are statistically significant. To ease comparison between the pre and post reform period, we present transition probabilities as a function of the unemployment rate graphically in Figures 1 and 2 separately for natives and immigrants, after separate estimations for the respective subsamples.

Among natives, state persistence hardly varies with the unemployment rate. Comparing pre and post reform periods, we detect only slight changes in the slope of the more or less flat curves (Figure 1.1). Among immigrants, the curve for welfare persistence has, in contrast, clearly a steeper slope after the reform (see dotted line in Figure 2.1). Thus, welfare persistence became more responsive to unemployment. Moreover, the downward shift of the curve indicates a general decrease in immigrants' welfare persistence.

For both natives and immigrants, the probability of welfare entry (from inactivity as well as from employment) increases with rising unemployment (Figures 1.2 and 2.2). This pattern hardly changed after the reform. Among immigrants welfare entry from inactivity is less sensitive to the unemployment rate after than before the reform. As the overall probability of welfare entry declined, the reform incentives may have fostered additional job search activities.

We find that welfare exit to employment is less likely in periods of high unemployment (Figures 1.3 and 2.3). Overall, the rate of welfare-to-employment transitions increased after the reform. While the responsiveness of welfare exit towards the unemployment rate hardly changed for natives, labor market conditions became more important for immigrants' welfare exit to em-

¹⁷ Tables A7 and A8 show the parameter estimates for the pre and post reform period, respectively.

ployment after the reform: the respective dashed line in Figure 2.3 is considerably steeper in the post than in the pre reform period.

In sum, labor market conditions play an important role for welfare transitions. The unemployment gradients of welfare persistence and welfare exit (to employment) are considerably higher among immigrants after the reform than before the reform. The increased labor market responsiveness of immigrants may indicate that they benefit from the job creation in the economic boom early after the reform.

5.3 Robustness checks

To check the robustness of the results presented above, we re-estimated the dynamic multinomial logit model using four different specifications. First, we address a potential measurement error in the initial labor market state indicator. We use the labor market state as of 2005, which may have been measured shortly after the reform. At that time, former recipients of unemployment insurance benefits might not have been aware of institutional reforms and labeling changes that took effect on January 1, 2005 and they may have falsely indicated their benefit type. As a test, we omitted the 2005 data and started our window of observation in 2006, instead. We re-estimated the model setting the initial condition to 2006 and generated predictions from these estimation results for natives and immigrants.¹⁸ We find that the results are similar to those presented above. In particular, trends in welfare entry and welfare exit are equivalent to those found in the full sample. This indicates that our results are not driven by measurement error in the 2005 data.

Our second robustness check calculates predictions setting the initial state to welfare recipient. This indicates how the choice of the initial condition affects the transition probabilities.¹⁹ Table 5 reports the results. Again, we find substantial declines in the persistence of inactivity and welfare receipt for natives, however, now at higher levels than observed in Table 4. Among

¹⁸ The results are in Table A10 in the Appendix.

¹⁹ The highly statistically significant coefficients of the initial state indicator show a strong correlation with the current labor market state (Table 3).

immigrants a decline in welfare persistence cannot be confirmed. However, their probability of remaining in welfare receipt is again not significantly higher than that of moving from inactivity to welfare. Controlling for the endogenous initial condition explains a substantial part of the overall state dependence observed in the raw data (Table 2). So the small magnitude of the probability of remaining on welfare calculated for households with average characteristics (Table 4) is connected in large part to the control for endogenous initial conditions.

Our third robustness check addresses the definition of the dependent variable. A feature of UB II is that it is paid to all individuals in need of support (see section 2). If earnings are insufficient to meet household needs, households receive welfare payments even if their members are employed. These households are called *Aufstocker*. In the basic definition of the dependent variable used above, *Aufstocker* are coded as welfare recipients. We re-estimate our model using an alternative definition of labor market states where *Aufstocker* are coded as employed households. Table 6 shows the predictions from these estimations. FOKUS AUF ÄNDERUNGEN ÜBER DIE ZEIT. Overall, these results show quite similar probabilities of welfare transitions compared to the basic definition of the dependent variable. However, it also appears that the probability of an employment-to-welfare transition is smaller among natives than it was above. This suggests that the increase in the transition might, in part, be driven by employed households who are at the eligibility margin. Nonetheless, we still observe a considerable increase in the probability of employment-to-welfare transitions among natives and immigrants from before to after the reform.

Finally, we re-estimated our transition models controlling for federal state fixed effects. These fixed effect failed to be jointly statistically significant and the predicted transition patterns hardly differ from the overall pattern described in Table 4 above.²⁰

²⁰ The results are available upon request.

6 Conclusion

In this paper, we use dynamic multinomial logit models to analyze welfare transitions before and after reforms of the German welfare system. We study changes in welfare dynamics and explore the role played by labor market conditions for welfare transitions. We investigate heterogeneities in welfare transitions of immigrants and natives accounting for the endogeneity of initial conditions and unobserved heterogeneity.

We draw three main conclusions: first, true state dependence in welfare receipt is not a dominant factor explaining welfare receipt in Germany. The probability of welfare persistence is not significantly higher than the probability of entering welfare from inactivity. Second, our evidence suggests that the pre- and post-reform transition patterns differ. In particular, the transition to employment became more likely and the persistence in welfare receipt and inactivity declined. This may suggest that the reforms enhanced labor market attachment and work incentives for welfare recipients and inactive individuals. Third, immigrants' responsiveness to the labor market has increased after the reform, e.g. with respect to welfare persistence and welfare exit.

In general, our evidence shows that the labor market situation contributes to explain welfare transitions. In particular, welfare entry is lower and welfare exit is higher when unemployment is low. Our analysis also points to a change after the reform that may not have been intended: there is a substantial increase in the employment-to-welfare transition rate; i.e., the rate at which households start to receive welfare given that the head of the household was employed before increased substantially in relative terms.

Several explanations are plausible: first, households might have become more likely to fall below the eligibility threshold while employed if they earn lower incomes than before. Second, employed households may not acquire sufficient claims for unemployment insurance benefits (UB I) during their employment periods after the reform if short-term employment became more

common. In that case a loss of employment is more likely to generate welfare dependence as a claim against the unemployment insurance for UB I could not be established.²¹

Overall, our findings suggest that the reforms may have contributed to the German job miracle, as non-working individuals have a higher labor market attachment after the reform. As an example, the probability to take up employment in period t following unemployment in $t-1$ increased on average from 52 to 72 percent among immigrants while their propensity to enter welfare following unemployment in $t-1$ dropped from 12 to 8 percent. The propensity to remain unemployed dropped from 36 to 20 percent for an average immigrant and from 22 to 19.5 percent among natives. Based on our analysis we cannot claim that the reforms are the most important or even the only explanation for the impressive development on the German labor market. Nevertheless, the German experience with incentivizing non-working households to take their job opportunities may be instructive for economies with troubled labor markets.

²¹ A recent analysis of the Federal Employment Agency shows that about 18% of those who became unemployed in 2010 moved directly into UB II (Jahn and Stephan 2012). In particular, subcontract and temporary workers had a considerably increased risk to receive UB II after a job loss. More than 40% of these individuals moved directly from employment to welfare. Unfortunately we do not have evidence on these transition patterns for the period prior to the reform. Koller and Rudolph (2011) consider the new job forms that emerged in the wake of the Hartz reforms as unstable as only 55% last longer than six months.

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Figures and Tables

Table 1
Observed distribution of labor market states by year

| Year | State at time t | | | Sample size |
|----------------------------------|-------------------|------------|---------|-------------|
| | Inactivity | Employment | Welfare | |
| A. Total population: pre reform | | | | |
| 2000 | 10.44 | 85.75 | 3.81 | 5,082 |
| 2001 | 9.86 | 86.21 | 3.93 | 4,871 |
| 2002 | 11.52 | 83.73 | 4.75 | 4,268 |
| 2003 | 12.17 | 82.34 | 5.49 | 3,951 |
| 2004 | 11.12 | 82.27 | 6.60 | 3,644 |
| Total | 10.97 | 84.2 | 4.83 | 21,816 |
| B. Total population: post reform | | | | |
| 2005 | 13.14 | 80.72 | 6.14 | 3,873 |
| 2006 | 11.52 | 80.21 | 8.27 | 3,736 |
| 2007 | 10.59 | 82.33 | 7.08 | 3,359 |
| 2008 | 8.87 | 84.70 | 6.43 | 3,057 |
| 2009 | 9.09 | 85.45 | 5.46 | 2,698 |
| 2010 | 8.87 | 84.04 | 7.09 | 2,401 |
| Total | 10.51 | 82.74 | 6.75 | 19,124 |
| C. Natives: pre reform | | | | |
| 2000 | 9.95 | 86.96 | 3.09 | 4,163 |
| 2001 | 9.17 | 87.64 | 3.19 | 3,997 |
| 2002 | 11.09 | 85.16 | 3.75 | 3,510 |
| 2003 | 11.56 | 83.72 | 4.73 | 3,258 |
| 2004 | 10.94 | 83.25 | 5.82 | 3,016 |
| Total | 10.47 | 85.49 | 4.03 | 17,944 |
| D. Natives: post reform | | | | |
| 2005 | 12.57 | 81.86 | 5.57 | 3,260 |
| 2006 | 11.40 | 81.48 | 7.12 | 3,145 |
| 2007 | 10.61 | 83.43 | 5.96 | 2,845 |
| 2008 | 8.54 | 85.70 | 5.76 | 2,603 |
| 2009 | 9.17 | 86.31 | 4.52 | 2,313 |
| 2010 | 8.63 | 85.46 | 5.92 | 2,071 |
| Total | 10.30 | 83.87 | 5.83 | 16,237 |
| E. Immigrants: pre reform | | | | |
| 2000 | 13.73 | 77.55 | 8.71 | 919 |
| 2001 | 14.55 | 76.49 | 8.95 | 874 |
| 2002 | 14.22 | 74.75 | 11.03 | 758 |
| 2003 | 16.04 | 73.67 | 10.29 | 693 |
| 2004 | 12.32 | 75.99 | 11.68 | 628 |
| Total | 14.21 | 75.72 | 10.07 | 3,872 |
| F. Immigrants: post reform | | | | |
| 2005 | 17.38 | 72.23 | 10.40 | 613 |
| 2006 | 12.26 | 72.56 | 15.18 | 591 |
| 2007 | 10.49 | 75.38 | 14.13 | 514 |
| 2008 | 11.02 | 78.21 | 10.77 | 454 |
| 2009 | 8.57 | 79.82 | 11.60 | 385 |
| 2010 | 10.50 | 74.38 | 15.13 | 330 |
| Total | 11.86 | 75.27 | 12.87 | 2,887 |

Note: Percentage of households weighted using cross-sectional weights.

Source: SOEP 2001-2010.

Table 2
Observed probabilities of labor market transitions

| State in $t - 1$ | State at time t | | |
|----------------------------------|-------------------|------------|---------|
| | Inactivity | Employment | Welfare |
| A. Total population: pre reform | | | |
| Inactivity | 0.633 | 0.272 | 0.095 |
| Employment | 0.047 | 0.944 | 0.010 |
| Welfare receipt | 0.103 | 0.184 | 0.712 |
| B. Total population: post reform | | | |
| Inactivity | 0.607 | 0.299 | 0.095 |
| Employment | 0.037 | 0.950 | 0.013 |
| Welfare receipt | 0.061 | 0.203 | 0.736 |
| C. Natives: pre reform | | | |
| Inactivity | 0.645 | 0.281 | 0.075 |
| Employment | 0.043 | 0.949 | 0.008 |
| Welfare receipt | 0.104 | 0.168 | 0.728 |
| D. Natives: post reform | | | |
| Inactivity | 0.616 | 0.305 | 0.079 |
| Employment | 0.034 | 0.954 | 0.011 |
| Welfare receipt | 0.069 | 0.204 | 0.727 |
| E. Immigrants: pre reform | | | |
| Inactivity | 0.590 | 0.242 | 0.169 |
| Employment | 0.066 | 0.915 | 0.019 |
| Welfare receipt | 0.103 | 0.216 | 0.681 |
| F. Immigrants: post reform | | | |
| Inactivity | 0.576 | 0.276 | 0.149 |
| Employment | 0.050 | 0.928 | 0.023 |
| Welfare receipt | 0.045 | 0.201 | 0.754 |

Note: Share of household heads weighted using cross-sectional weights.

Source: SOEP 2000-2010.

Table 3
Estimation results: total population

| Variable | Pre reform | | | | Post reform | | | |
|------------------------------------|------------|------------|-----------------|---------|-------------|------------|-----------------|---------|
| | Employment | | Welfare receipt | | Employment | | Welfare receipt | |
| | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. |
| Employed in t-1 | 2.276*** | (0.142) | 0.071 | (0.220) | 2.182*** | (0.141) | 0.561** | (0.223) |
| Welfare receipt in t-1 | 1.415*** | (0.242) | 2.041*** | (0.281) | 1.485*** | (0.238) | 1.789*** | (0.269) |
| Age | 0.451*** | (0.075) | 0.162 | (0.124) | 0.738*** | (0.089) | 0.550*** | (0.153) |
| Age squared | -0.565*** | (0.083) | -0.196 | (0.137) | -0.884*** | (0.098) | -0.646*** | (0.169) |
| Female | 0.535 | (2.076) | 3.033 | (3.408) | 7.965*** | (2.356) | 13.590*** | (4.026) |
| Age × Female | -0.118 | (0.097) | -0.155 | (0.158) | -0.492*** | (0.110) | -0.672*** | (0.187) |
| Age sq. × Female | 0.170 | (0.110) | 0.155 | (0.178) | 0.610*** | (0.124) | 0.753*** | (0.210) |
| Education | 0.113*** | (0.019) | -0.177*** | (0.036) | 0.055*** | (0.021) | -0.178*** | (0.041) |
| School in Germany: no | -0.421*** | (0.144) | 0.597*** | (0.206) | -0.016 | (0.200) | 0.616** | (0.294) |
| Married | -0.223** | (0.110) | -1.123*** | (0.177) | -0.644*** | (0.125) | -1.673*** | (0.207) |
| Health status: good | 0.018 | (0.105) | -0.473*** | (0.173) | -0.158 | (0.117) | -0.612*** | (0.187) |
| No. of kids LT 6 | 0.542*** | (0.134) | 0.659*** | (0.235) | 0.381*** | (0.146) | 0.186 | (0.246) |
| No. of kids GE 6 | 0.240** | (0.120) | 0.416** | (0.186) | 0.160 | (0.132) | 0.218 | (0.204) |
| Year 2002 | -0.143 | (0.098) | 0.061 | (0.170) | — | — | — | — |
| Year 2003 | -0.322*** | (0.100) | 0.153 | (0.173) | — | — | — | — |
| Year 2004 | -0.136 | (0.106) | 0.586*** | (0.178) | — | — | — | — |
| Year 2007 | — | — | — | — | 0.162 | (0.115) | -0.385** | (0.181) |
| Year 2008 | — | — | — | — | 0.355*** | (0.122) | -0.387** | (0.195) |
| Year 2009 | — | — | — | — | 0.229* | (0.127) | -0.674*** | (0.212) |
| Year 2010 | — | — | — | — | 0.266** | (0.133) | -0.067 | (0.212) |
| Employed in t=0 | 2.301*** | (0.227) | 0.239 | (0.300) | 2.576*** | (0.222) | -0.382 | (0.313) |
| Welfare receipt in t=0 | -0.022 | (0.293) | 2.295*** | (0.396) | 0.402 | (0.293) | 2.991*** | (0.410) |
| M: Health status: good | 0.500*** | (0.176) | -0.401 | (0.293) | 0.696*** | (0.206) | -0.485 | (0.349) |
| M: No. of kids LT 6 | -1.373*** | (0.202) | -0.799** | (0.365) | -1.166*** | (0.265) | 0.040 | (0.421) |
| M: No. of kids GE 6 | -0.227 | (0.156) | -0.250 | (0.241) | 0.182 | (0.145) | 0.194 | (0.230) |
| Constant | -9.783*** | (1.623) | -2.826 | (2.735) | -15.176*** | (1.924) | -9.890*** | (3.348) |
| $Var(a_{ij})$ | 2.394 | (0.380) | 1.914 | (0.563) | 2.440 | (0.365) | 4.203 | (0.847) |
| $Cov(a_{i,empl}, a_{i,welf})$ | 0.092 | (0.399) | | | 0.036 | (0.405) | | |
| log likelihood | | -4936.0963 | | | | -4317.5091 | | |
| No. of household-year observations | | 16,734 | | | | 15,251 | | |
| No. of households | | 5,094 | | | | 3,882 | | |

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 2000-2010.

Table 4
Predicted probabilities of labor market transitions
given period-specific average characteristics

| State at time $t - 1$ | State at time t | | | | | | | | | |
|-----------------------------------|-------------------|--------|-------|------------|--------|-------|---------|--------|-------|--|
| | Inactive | | | Employment | | | Welfare | | | |
| | Mean | 95%-CI | | Mean | 95%-CI | | Mean | 95%-CI | | |
| A. Pre reform | | | | | | | | | | |
| Inactive | 0.246 | 0.206 | 0.292 | 0.718 | 0.667 | 0.757 | 0.037 | 0.027 | 0.053 | |
| Employment | 0.055 | 0.049 | 0.061 | 0.936 | 0.929 | 0.942 | 0.009 | 0.008 | 0.012 | |
| Welfare | 0.089 | 0.064 | 0.126 | 0.828 | 0.762 | 0.868 | 0.083 | 0.056 | 0.133 | |
| B. Post reform | | | | | | | | | | |
| Inactive | 0.195 | 0.161 | 0.237 | 0.767 | 0.724 | 0.800 | 0.038 | 0.029 | 0.053 | |
| Employment | 0.042 | 0.036 | 0.048 | 0.942 | 0.935 | 0.948 | 0.016 | 0.014 | 0.021 | |
| Welfare | 0.066 | 0.046 | 0.095 | 0.874 | 0.835 | 0.901 | 0.060 | 0.045 | 0.085 | |
| C. Natives: pre reform | | | | | | | | | | |
| Inactive | 0.220 | 0.180 | 0.269 | 0.759 | 0.705 | 0.797 | 0.021 | 0.014 | 0.036 | |
| Employment | 0.050 | 0.045 | 0.057 | 0.943 | 0.936 | 0.949 | 0.007 | 0.005 | 0.009 | |
| Welfare | 0.081 | 0.053 | 0.120 | 0.854 | 0.787 | 0.894 | 0.065 | 0.040 | 0.117 | |
| D. Natives: post reform | | | | | | | | | | |
| Inactive | 0.195 | 0.159 | 0.242 | 0.773 | 0.726 | 0.812 | 0.032 | 0.023 | 0.048 | |
| Employment | 0.041 | 0.036 | 0.047 | 0.947 | 0.939 | 0.953 | 0.013 | 0.010 | 0.017 | |
| Welfare | 0.067 | 0.045 | 0.100 | 0.877 | 0.829 | 0.907 | 0.057 | 0.039 | 0.089 | |
| E. Immigrants: pre reform | | | | | | | | | | |
| Inactive | 0.362 | 0.262 | 0.494 | 0.521 | 0.381 | 0.622 | 0.118 | 0.080 | 0.206 | |
| Employment | 0.074 | 0.059 | 0.095 | 0.900 | 0.874 | 0.916 | 0.026 | 0.019 | 0.045 | |
| Welfare | 0.123 | 0.070 | 0.201 | 0.693 | 0.513 | 0.781 | 0.184 | 0.119 | 0.362 | |
| F. Immigrants: post reform | | | | | | | | | | |
| Inactive | 0.204 | 0.127 | 0.326 | 0.721 | 0.591 | 0.793 | 0.076 | 0.047 | 0.134 | |
| Employment | 0.046 | 0.033 | 0.064 | 0.914 | 0.885 | 0.932 | 0.040 | 0.028 | 0.064 | |
| Welfare | 0.056 | 0.027 | 0.105 | 0.830 | 0.735 | 0.884 | 0.115 | 0.074 | 0.188 | |

Note: Calculations are based on estimation results in Tables A4 and A5. Simulation-based 95% confidence intervals are calculated using 1000 replications.

Table 5
Predicted probabilities of labor market transitions
given subsample-period-specific average characteristics of welfare recipients
setting initial state to welfare

| State at time $t - 1$ | State at time t | | | | | | | | |
|----------------------------|-------------------|--------|-------|------------|--------|-------|---------|--------|-------|
| | Inactive | | | Employment | | | Welfare | | |
| | Mean | 95%-CI | | Mean | 95%-CI | | Mean | 95%-CI | |
| A. Natives: pre reform | | | | | | | | | |
| Inactive | 0.374 | 0.270 | 0.505 | 0.207 | 0.140 | 0.284 | 0.419 | 0.282 | 0.539 |
| Employment | 0.190 | 0.126 | 0.284 | 0.509 | 0.401 | 0.617 | 0.301 | 0.187 | 0.415 |
| Welfare | 0.095 | 0.064 | 0.137 | 0.190 | 0.135 | 0.251 | 0.715 | 0.646 | 0.776 |
| B. Natives: post reform | | | | | | | | | |
| Inactive | 0.236 | 0.162 | 0.328 | 0.251 | 0.182 | 0.329 | 0.513 | 0.401 | 0.611 |
| Employment | 0.092 | 0.058 | 0.140 | 0.517 | 0.421 | 0.623 | 0.392 | 0.283 | 0.490 |
| Welfare | 0.070 | 0.045 | 0.102 | 0.270 | 0.203 | 0.337 | 0.660 | 0.592 | 0.731 |
| C. Immigrants: pre reform | | | | | | | | | |
| Inactive | 0.386 | 0.256 | 0.555 | 0.149 | 0.079 | 0.239 | 0.465 | 0.292 | 0.600 |
| Employment | 0.186 | 0.103 | 0.294 | 0.570 | 0.406 | 0.708 | 0.245 | 0.129 | 0.396 |
| Welfare | 0.133 | 0.089 | 0.200 | 0.218 | 0.145 | 0.292 | 0.649 | 0.559 | 0.740 |
| D. Immigrants: post reform | | | | | | | | | |
| Inactive | 0.244 | 0.134 | 0.415 | 0.221 | 0.126 | 0.333 | 0.535 | 0.383 | 0.662 |
| Employment | 0.093 | 0.041 | 0.181 | 0.451 | 0.330 | 0.605 | 0.456 | 0.295 | 0.578 |
| Welfare | 0.063 | 0.033 | 0.119 | 0.261 | 0.168 | 0.358 | 0.676 | 0.570 | 0.772 |

Note: Calculations are based on estimation results in Tables A4 and A5. Simulation-based 95% confidence intervals are calculated using 1000 replications.

Table 6
Predicted probabilities of labor market transitions
given subsample-specific average characteristics (alternative definition of states)

| State at time $t - 1$ | State at time t | | | | | | | | | |
|---|-------------------|--------|-------|------------|--------|-------|---------|--------|-------|--|
| | Inactive | | | Employment | | | Welfare | | | |
| | Mean | 95%-CI | | Mean | 95%-CI | | Mean | 95%-CI | | |
| A. Total population: pre reform | | | | | | | | | | |
| Inactive | 0.253 | 0.212 | 0.301 | 0.723 | 0.671 | 0.763 | 0.025 | 0.017 | 0.038 | |
| Employment | 0.053 | 0.047 | 0.058 | 0.943 | 0.936 | 0.949 | 0.005 | 0.004 | 0.007 | |
| Welfare | 0.104 | 0.073 | 0.149 | 0.850 | 0.788 | 0.888 | 0.047 | 0.029 | 0.084 | |
| B. Total population: post reform | | | | | | | | | | |
| Inactive | 0.194 | 0.160 | 0.236 | 0.782 | 0.739 | 0.816 | 0.024 | 0.017 | 0.037 | |
| Employment | 0.040 | 0.035 | 0.045 | 0.953 | 0.947 | 0.958 | 0.008 | 0.006 | 0.011 | |
| Welfare | 0.095 | 0.066 | 0.134 | 0.853 | 0.801 | 0.887 | 0.052 | 0.036 | 0.081 | |
| C. Natives: pre reform | | | | | | | | | | |
| Inactive | 0.224 | 0.183 | 0.275 | 0.765 | 0.712 | 0.804 | 0.011 | 0.007 | 0.020 | |
| Employment | 0.049 | 0.043 | 0.056 | 0.948 | 0.941 | 0.954 | 0.003 | 0.002 | 0.005 | |
| Welfare | 0.090 | 0.059 | 0.137 | 0.884 | 0.829 | 0.920 | 0.025 | 0.014 | 0.051 | |
| D. Natives: post reform | | | | | | | | | | |
| Inactive | 0.195 | 0.158 | 0.239 | 0.791 | 0.745 | 0.827 | 0.014 | 0.009 | 0.025 | |
| Employment | 0.039 | 0.034 | 0.045 | 0.955 | 0.948 | 0.960 | 0.006 | 0.005 | 0.009 | |
| Welfare | 0.098 | 0.061 | 0.149 | 0.866 | 0.803 | 0.909 | 0.036 | 0.022 | 0.065 | |
| E. Immigrants: pre reform | | | | | | | | | | |
| Inactive | 0.391 | 0.280 | 0.535 | 0.504 | 0.354 | 0.615 | 0.105 | 0.068 | 0.209 | |
| Employment | 0.069 | 0.056 | 0.089 | 0.918 | 0.892 | 0.931 | 0.013 | 0.009 | 0.029 | |
| Welfare | 0.156 | 0.090 | 0.256 | 0.708 | 0.522 | 0.800 | 0.136 | 0.080 | 0.299 | |
| F. Immigrants: post reform | | | | | | | | | | |
| Inactive | 0.201 | 0.132 | 0.316 | 0.722 | 0.584 | 0.802 | 0.077 | 0.045 | 0.153 | |
| Employment | 0.042 | 0.030 | 0.058 | 0.938 | 0.915 | 0.951 | 0.021 | 0.014 | 0.034 | |
| Welfare | 0.071 | 0.033 | 0.131 | 0.796 | 0.661 | 0.867 | 0.134 | 0.079 | 0.256 | |

Note: Calculations are based on estimation results in Tables A11 and A12. Simulation-based 95% confidence intervals are calculated using 1000 replications.

Figure 1 Labor market transitions and unemployment rate (natives)

Fig. 1.1: Persistence in employment and welfare participation

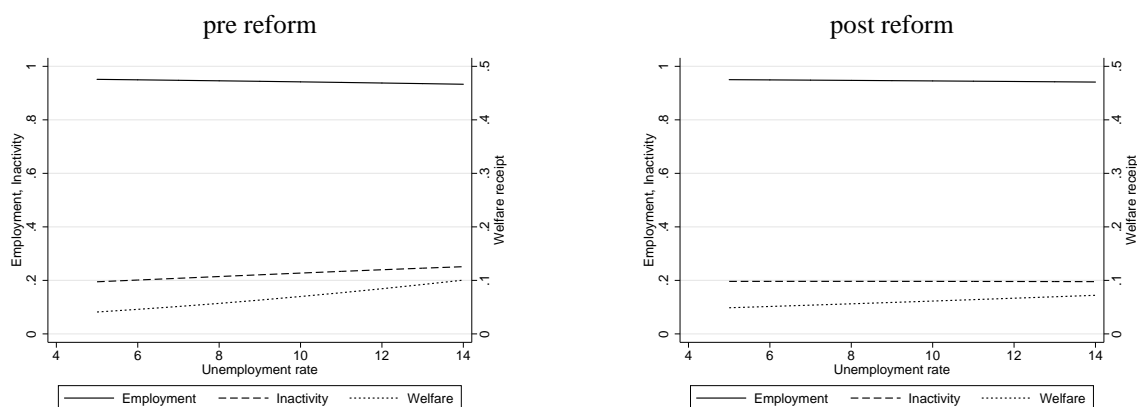


Fig. 1.2: Welfare entry

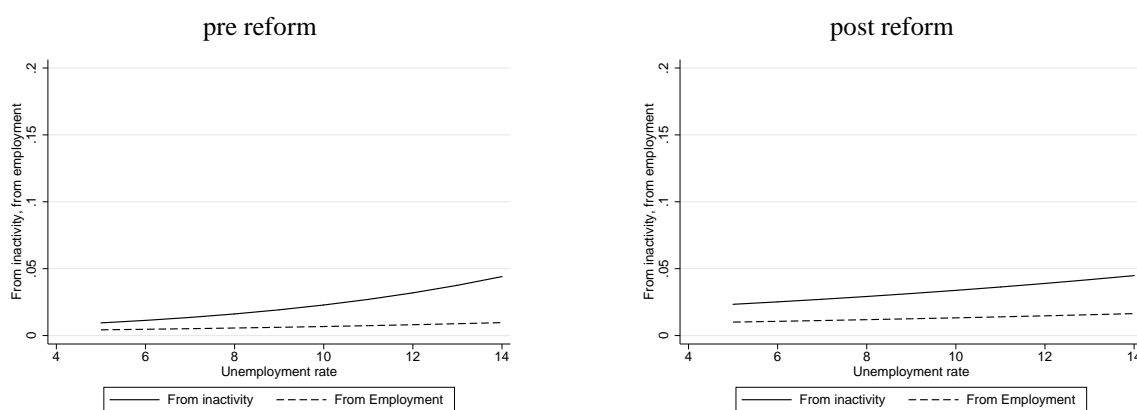
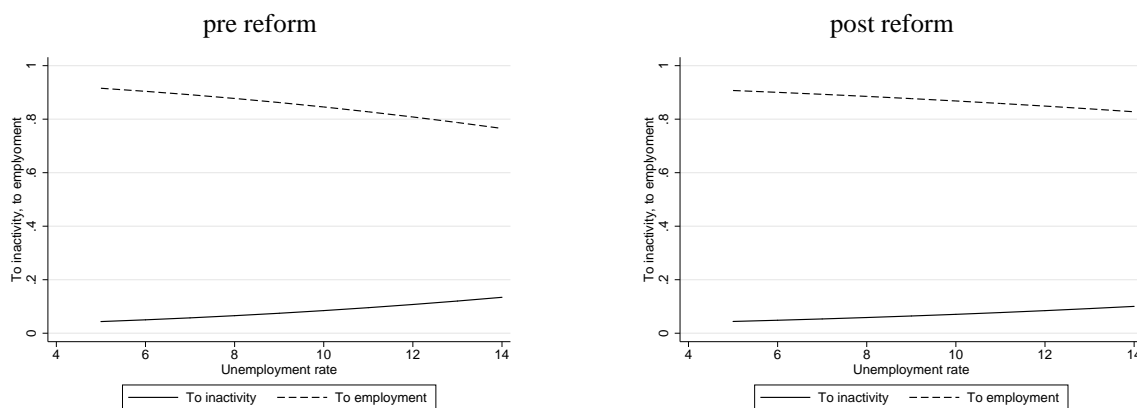


Fig. 1.3: Welfare exit



Note: Predicted probabilities given average characteristics. Figures 1.1 uses a secondary vertical axes to indicate transition probabilities.

Figure 2
Labor market transitions and unemployment rate (immigrants)

Fig. 2.1: Persistence in employment and welfare participation

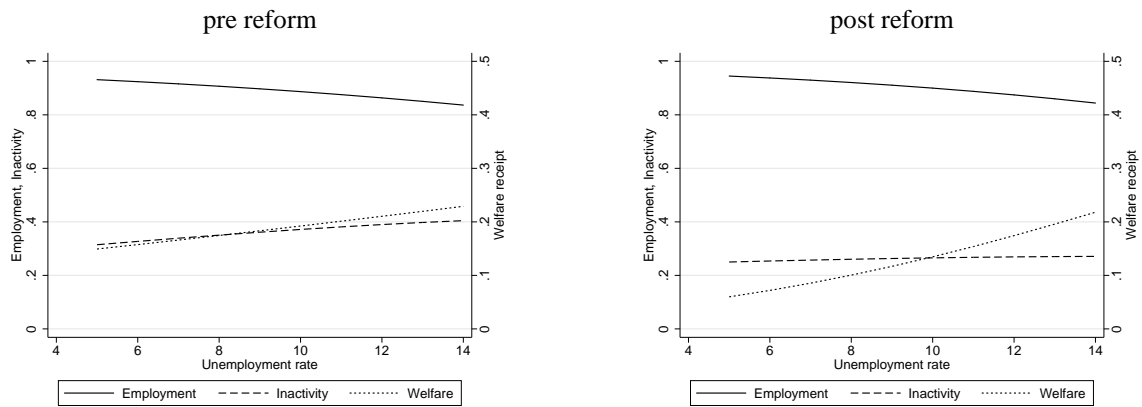


Fig. 2.2: Welfare entry

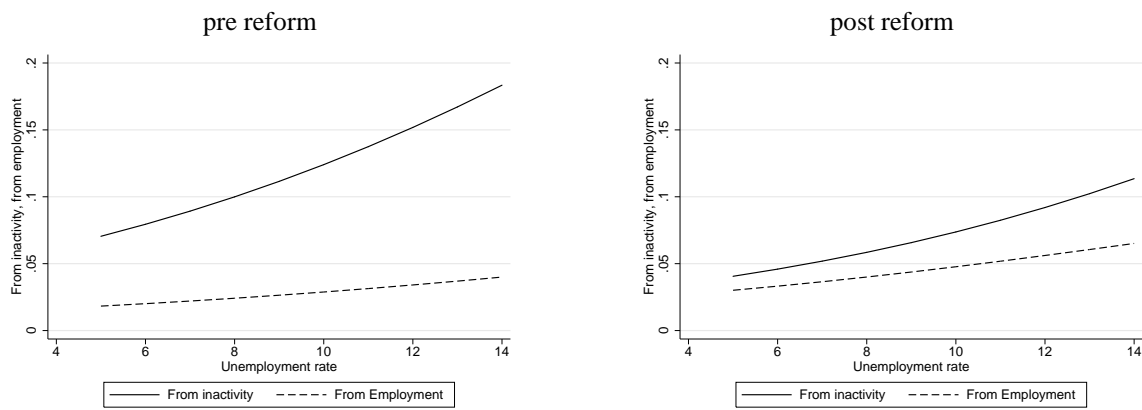
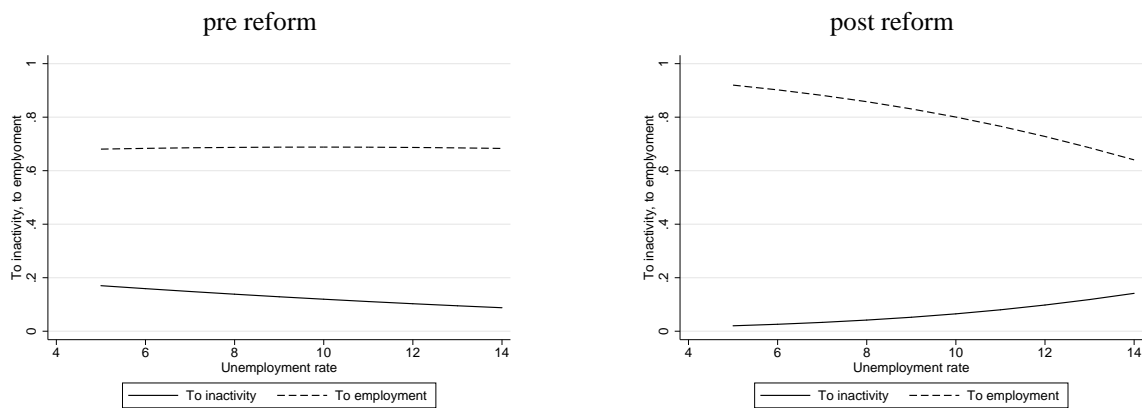


Fig. 2.3: Welfare exit



Note: Predicted probabilities given average characteristics. Figures 2.1 uses a secondary vertical axes to indicate transition probabilities.

A Appendix

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Table A1
Descriptive statistics

| Variable | Pre reform (2000-2004) | | | | Post reform (2005-2010) | | | |
|------------------------------------|------------------------|-----------|------------|-----------|-------------------------|-----------|------------|-----------|
| | Natives | | Immigrants | | Natives | | Immigrants | |
| | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. |
| Inactivity | 0.11 | 0.31 | 0.15 | 0.35 | 0.10 | 0.30 | 0.11 | 0.32 |
| Employment | 0.86 | 0.35 | 0.77 | 0.42 | 0.86 | 0.35 | 0.78 | 0.42 |
| Welfare | 0.04 | 0.18 | 0.09 | 0.28 | 0.05 | 0.21 | 0.11 | 0.31 |
| Age | 43.09 | 8.57 | 42.52 | 9.17 | 44.25 | 8.39 | 43.57 | 8.74 |
| Female | 0.35 | 0.48 | 0.27 | 0.44 | 0.41 | 0.49 | 0.37 | 0.48 |
| Education in years | 12.59 | 2.74 | 11.00 | 2.41 | 12.75 | 2.75 | 11.31 | 2.52 |
| Married | 0.66 | 0.47 | 0.79 | 0.40 | 0.63 | 0.48 | 0.78 | 0.42 |
| Health status: good | 0.60 | 0.49 | 0.57 | 0.50 | 0.55 | 0.50 | 0.54 | 0.50 |
| School in Germany: no | 0.00 | 0.00 | 0.60 | 0.49 | 0.00 | 0.00 | 0.47 | 0.50 |
| Number of children LT6 | 0.23 | 0.52 | 0.33 | 0.60 | 0.17 | 0.45 | 0.24 | 0.52 |
| Number of children GE6 | 0.57 | 0.86 | 0.81 | 0.99 | 0.52 | 0.83 | 0.80 | 0.96 |
| Year 2001 | 0.29 | 0.45 | 0.30 | 0.46 | 0.00 | 0.00 | 0.00 | 0.00 |
| Year 2002 | 0.26 | 0.44 | 0.26 | 0.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| Year 2003 | 0.24 | 0.43 | 0.24 | 0.42 | 0.00 | 0.00 | 0.00 | 0.00 |
| Year 2004 | 0.22 | 0.41 | 0.21 | 0.41 | 0.00 | 0.00 | 0.00 | 0.00 |
| Year 2006 | 0.00 | 0.00 | 0.00 | 0.00 | 0.24 | 0.43 | 0.26 | 0.44 |
| Year 2007 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.41 | 0.23 | 0.42 |
| Year 2008 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.40 | 0.20 | 0.40 |
| Year 2009 | 0.00 | 0.00 | 0.00 | 0.00 | 0.18 | 0.38 | 0.17 | 0.38 |
| Year 2010 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.37 | 0.15 | 0.35 |
| Initial condition (in 2005) | | | | | | | | |
| Inactivity | 0.10 | 0.30 | 0.13 | 0.34 | 0.11 | 0.32 | 0.17 | 0.38 |
| Employment | 0.87 | 0.34 | 0.78 | 0.41 | 0.85 | 0.36 | 0.74 | 0.44 |
| Welfare receipt | 0.03 | 0.18 | 0.09 | 0.28 | 0.04 | 0.19 | 0.09 | 0.29 |
| Number of person-year observations | 13,781 | | 2,953 | | 12,977 | | 2,274 | |

Source: SOEP 2000-2010.

Table A2
Averages of selected variables by labor market state

| Variable | Pre reform | | | Post reform | | |
|-------------------------|------------|------------|---------|-------------|------------|---------|
| | Inactivity | Employment | Welfare | Inactivity | Employment | Welfare |
| A. Natives | | | | | | |
| Age | 43.91 | 43.01 | 42.61 | 44.00 | 44.30 | 43.87 |
| Female | 0.65 | 0.31 | 0.65 | 0.69 | 0.37 | 0.64 |
| Education in years | 12.07 | 12.74 | 10.63 | 12.45 | 12.87 | 11.08 |
| Married | 0.70 | 0.67 | 0.36 | 0.72 | 0.63 | 0.32 |
| Health status: good | 0.56 | 0.62 | 0.39 | 0.54 | 0.56 | 0.33 |
| School in Germany: no | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Number of children LT6 | 0.36 | 0.21 | 0.31 | 0.34 | 0.15 | 0.22 |
| Number of children GE6 | 0.49 | 0.57 | 0.68 | 0.50 | 0.52 | 0.61 |
| Household size | 2.92 | 2.82 | 2.70 | 2.98 | 2.72 | 2.48 |
| Single person | 0.16 | 0.19 | 0.22 | 0.13 | 0.20 | 0.28 |
| Single parent | 0.07 | 0.06 | 0.34 | 0.07 | 0.07 | 0.30 |
| Couple Without Children | 0.21 | 0.21 | 0.12 | 0.21 | 0.23 | 0.10 |
| Couple with children | 0.54 | 0.52 | 0.28 | 0.57 | 0.49 | 0.30 |
| Other household type | 0.02 | 0.02 | 0.03 | 0.02 | 0.01 | 0.02 |
| B. Immigrants | | | | | | |
| Age | 42.56 | 42.18 | 45.42 | 44.63 | 43.49 | 43.10 |
| Female | 0.53 | 0.22 | 0.29 | 0.66 | 0.31 | 0.55 |
| Education in years | 10.52 | 11.17 | 10.40 | 10.79 | 11.52 | 10.41 |
| Married | 0.81 | 0.79 | 0.78 | 0.82 | 0.79 | 0.62 |
| Health status: good | 0.51 | 0.61 | 0.37 | 0.47 | 0.57 | 0.39 |
| School in Germany: no | 0.55 | 0.59 | 0.73 | 0.48 | 0.47 | 0.50 |
| Number of children LT6 | 0.46 | 0.29 | 0.40 | 0.39 | 0.22 | 0.21 |
| Number of children GE6 | 0.68 | 0.82 | 0.92 | 0.72 | 0.78 | 1.00 |
| Household size | 3.44 | 3.37 | 3.66 | 3.40 | 3.30 | 3.23 |
| Single person | 0.07 | 0.10 | 0.09 | 0.07 | 0.08 | 0.17 |
| Single parent | 0.09 | 0.07 | 0.12 | 0.08 | 0.09 | 0.27 |
| Couple Without Children | 0.17 | 0.15 | 0.15 | 0.16 | 0.16 | 0.06 |
| Couple with children | 0.63 | 0.67 | 0.55 | 0.68 | 0.65 | 0.50 |
| Other household type | 0.04 | 0.02 | 0.09 | 0.02 | 0.02 | 0.01 |

Source: SOEP 2001-2004 and 2006-2010.

Table A3
Averages of selected variables by labor market transitions

| State in $t - 1$ | Variable | State at time t | | |
|----------------------|-----------|-------------------|------------|---------|
| | | Inactivity | Employment | Welfare |
| A. Natives | | | | |
| Inactivity | Age | 44.8 | 39.0 | 40.9 |
| | Female | 0.67 | 0.66 | 0.63 |
| | Education | 12.2 | 12.7 | 10.9 |
| Employment | Age | 41.4 | 42.7 | 43.1 |
| | Female | 0.56 | 0.34 | 0.53 |
| | Education | 12.4 | 12.8 | 11.5 |
| Welfare receipt | Age | 42.3 | 41.5 | 43.5 |
| | Female | 0.72 | 0.56 | 0.68 |
| | Education | 11.0 | 11.5 | 10.6 |
| B. Immigrants | | | | |
| Inactivity | Age | 40.4 | 36.9 | 44.4 |
| | Female | 0.69 | 0.66 | 0.36 |
| | Education | 10.9 | 11.6 | 10.0 |
| Employment | Age | 40.6 | 41.5 | 43.3 |
| | Female | 0.45 | 0.32 | 0.36 |
| | Education | 10.9 | 11.7 | 10.7 |
| Welfare receipt | Age | 42.1 | 41.6 | 41.5 |
| | Female | 0.49 | 0.37 | 0.55 |
| | Education | 10.3 | 11.0 | 10.6 |

Note: Weighted data using cross-sectional weights.

Source: SOEP 2000-2010.

Table A4
Estimation results: natives and immigrants (pre reform)

| Variable | Natives | | | | Immigrants | | | |
|------------------------------------|---------------------|---------|--------------------------|---------|---------------------|---------|--------------------------|---------|
| | Employment Coef. | S.E. | Welfare receipt Coef. | S.E. | Employment Coef. | S.E. | Welfare receipt Coef. | S.E. |
| Employed in t-1 | 2.218*** | (0.161) | 0.302 | (0.268) | 2.563*** | (0.299) | -0.238 | (0.390) |
| Welfare receipt in t-1 | 1.387*** | (0.307) | 2.332*** | (0.349) | 1.548*** | (0.399) | 1.662*** | (0.470) |
| Age | 0.524*** | (0.090) | 0.297* | (0.161) | 0.259** | (0.131) | -0.015 | (0.198) |
| Age squared | -0.649*** | (0.100) | -0.359** | (0.178) | -0.344** | (0.147) | 0.040 | (0.218) |
| Female | 2.151 | (2.467) | 4.574 | (4.261) | -3.645 | (3.966) | 0.805 | (6.039) |
| Age × Female | -0.193* | (0.115) | -0.226 | (0.197) | 0.073 | (0.188) | -0.051 | (0.284) |
| Age sq. × Female | 0.252* | (0.129) | 0.234 | (0.221) | -0.033 | (0.216) | 0.041 | (0.322) |
| Education | 0.117*** | (0.022) | -0.255*** | (0.048) | 0.106*** | (0.039) | 0.008 | (0.057) |
| School in Germany: no | — | | — | | -0.292 | (0.219) | 0.330 | (0.353) |
| Married | -0.251** | (0.127) | -1.214*** | (0.209) | -0.117 | (0.238) | -0.488 | (0.357) |
| Health status: good | 0.040 | (0.123) | -0.308 | (0.213) | -0.045 | (0.208) | -0.809*** | (0.302) |
| No. of kids LT 6 | 0.684*** | (0.157) | 0.720** | (0.308) | 0.141 | (0.260) | 0.709* | (0.375) |
| No. of kids GE 6 | 0.191 | (0.144) | 0.271 | (0.238) | 0.273 | (0.218) | 0.635** | (0.305) |
| Year 2002 | -0.245** | (0.113) | -0.062 | (0.212) | 0.168 | (0.199) | 0.273 | (0.290) |
| Year 2003 | -0.355*** | (0.117) | 0.183 | (0.213) | -0.249 | (0.199) | 0.068 | (0.299) |
| Year 2004 | -0.239* | (0.123) | 0.574*** | (0.218) | 0.175 | (0.215) | 0.662** | (0.311) |
| Employed in t=0 | 2.575*** | (0.269) | 0.108 | (0.373) | 1.313*** | (0.424) | 0.329 | (0.490) |
| Welfare receipt in t=0 | 0.028 | (0.378) | 2.232*** | (0.486) | -0.429 | (0.456) | 2.007*** | (0.648) |
| M: Health status: good | 0.509** | (0.206) | -0.711** | (0.357) | 0.521 | (0.348) | 0.402 | (0.517) |
| M: No. of kids LT 6 | -1.698*** | (0.240) | -1.279** | (0.504) | -0.529 | (0.373) | -0.312 | (0.549) |
| M: No. of kids GE 6 | -0.128 | (0.190) | -0.209 | (0.311) | -0.367 | (0.275) | -0.455 | (0.385) |
| Constant | -11.359*** | (1.971) | -4.315 | (3.561) | -5.808** | (2.826) | -2.375 | (4.317) |
| $Var(a_{ij})$ | 2.803 | (0.476) | 1.647 | (0.646) | 1.245 | (0.586) | 1.771 | (0.961) |
| $Cov(a_{i,empl}, a_{i,welf})$ | 0.204 | (0.509) | | | -0.276 | (0.592) | | |
| log likelihood | -3668.710 | | | | -1232.784 | | | |
| No. of household-year observations | 13,781 | | | | 2,953 | | | |
| No. of households | 4,172 | | | | 922 | | | |

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 2000-2004.

Table A5
Estimation results: post reform

| Variable | Natives | | | | Immigrants | | | |
|------------------------------------|---------------------|-----------|--------------------------|---------|---------------------|----------|--------------------------|---------|
| | Employment Coef. | S.E. | Welfare receipt Coef. | S.E. | Employment Coef. | S.E. | Welfare receipt Coef. | S.E. |
| Employed in t-1 | 2.221*** | (0.156) | 0.523** | (0.264) | 2.091*** | (0.354) | 0.695 | (0.431) |
| Welfare receipt in t-1 | 1.472*** | (0.286) | 1.941*** | (0.326) | 1.636*** | (0.443) | 1.877*** | (0.456) |
| Age | 0.736*** | (0.096) | 0.830*** | (0.184) | 0.726*** | (0.242) | -0.261 | (0.295) |
| Age squared | -0.875*** | (0.106) | -0.934*** | (0.203) | -0.913*** | (0.266) | 0.208 | (0.324) |
| Female | 7.876*** | (2.591) | 18.760*** | (4.910) | 7.965 | (5.953) | -3.037 | (7.365) |
| Age × Female | -0.485*** | (0.121) | -0.908*** | (0.226) | -0.508* | (0.276) | 0.092 | (0.343) |
| Age sq. × Female | 0.600*** | (0.137) | 1.014*** | (0.253) | 0.629** | (0.308) | -0.092 | (0.387) |
| Education | 0.047** | (0.023) | -0.177*** | (0.046) | 0.137** | (0.057) | -0.060 | (0.079) |
| School in Germany: no | — | | — | | 0.101 | (0.318) | -0.045 | (0.416) |
| Married | -0.685*** | (0.136) | -1.906*** | (0.237) | -0.675** | (0.332) | -1.051*** | (0.394) |
| Health status: good | -0.116 | (0.131) | -0.911*** | (0.226) | -0.359 | (0.265) | -0.088 | (0.337) |
| No. of kids LT 6 | 0.388** | (0.161) | 0.370 | (0.291) | 0.316 | (0.356) | -0.095 | (0.471) |
| No. of kids GE 6 | 0.124 | (0.146) | 0.306 | (0.248) | 0.341 | (0.308) | 0.189 | (0.373) |
| Year 2007 | 0.180 | (0.125) | -0.486** | (0.213) | 0.054 | (0.283) | -0.219 | (0.352) |
| Year 2008 | 0.330** | (0.133) | -0.332 | (0.225) | 0.469 | (0.306) | -0.525 | (0.394) |
| Year 2009 | 0.226 | (0.138) | -0.919*** | (0.254) | 0.276 | (0.322) | -0.090 | (0.400) |
| Year 2010 | 0.313** | (0.146) | -0.199 | (0.249) | 0.061 | (0.332) | 0.175 | (0.411) |
| Employed in t=0 | 2.562*** | (0.245) | -0.089 | (0.374) | 2.592*** | (0.558) | -0.992 | (0.607) |
| Welfare receipt in t=0 | 0.371 | (0.349) | 3.203*** | (0.507) | 0.391 | (0.523) | 1.901*** | (0.596) |
| M: Health status: good | 0.577** | (0.225) | -0.257 | (0.403) | 1.209** | (0.507) | -0.600 | (0.647) |
| M: No. of kids LT 6 | -1.068*** | (0.298) | 0.110 | (0.520) | -1.655*** | (0.603) | -0.775 | (0.719) |
| M: No. of kids GE 6 | 0.265 | (0.164) | -0.054 | (0.294) | -0.246 | (0.315) | 0.461 | (0.396) |
| Constant | -15.202*** | (2.086) | -16.502*** | (4.077) | -14.694*** | (5.345) | 7.980 | (6.519) |
| $Var(a_{ij})$ | 2.484 | (0.401) | 3.898 | (0.963) | 1.902 | (0.897) | 2.413 | (1.144) |
| $Cov(a_{i,empl}, a_{i,welf})$ | 0.022 | (0.497) | | | -0.475 | (0.717) | | |
| log likelihood | | -3456.030 | | | | -826.853 | | |
| No. of household-year observations | | 12,977 | | | | 2,274 | | |
| No. of households | | 3,266 | | | | 616 | | |

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 2005-2010.

Table A6
Predicted probabilities of labor market transitions
given observed characteristics

| State at time $t - 1$ | State at time t | | | | | | | | | |
|-----------------------------------|-------------------|--------|-------|------------|--------|-------|---------|--------|-------|--|
| | Inactive | | | Employment | | | Welfare | | | |
| | Mean | 95%-CI | | Mean | 95%-CI | | Mean | 95%-CI | | |
| A. Natives: pre reform | | | | | | | | | | |
| Inactive | 0.237 | 0.183 | 0.304 | 0.724 | 0.655 | 0.777 | 0.039 | 0.022 | 0.070 | |
| Employment | 0.078 | 0.057 | 0.103 | 0.902 | 0.873 | 0.925 | 0.020 | 0.011 | 0.035 | |
| Welfare | 0.100 | 0.061 | 0.152 | 0.802 | 0.718 | 0.855 | 0.098 | 0.059 | 0.173 | |
| B. Natives: post reform | | | | | | | | | | |
| Inactive | 0.218 | 0.164 | 0.283 | 0.730 | 0.662 | 0.784 | 0.053 | 0.032 | 0.086 | |
| Employment | 0.067 | 0.047 | 0.091 | 0.902 | 0.871 | 0.927 | 0.032 | 0.019 | 0.050 | |
| Welfare | 0.091 | 0.058 | 0.137 | 0.823 | 0.755 | 0.869 | 0.086 | 0.055 | 0.139 | |
| C. Immigrants: pre reform | | | | | | | | | | |
| Inactive | 0.351 | 0.216 | 0.525 | 0.518 | 0.345 | 0.649 | 0.131 | 0.063 | 0.265 | |
| Employment | 0.097 | 0.051 | 0.163 | 0.860 | 0.778 | 0.916 | 0.043 | 0.018 | 0.093 | |
| Welfare | 0.134 | 0.061 | 0.246 | 0.665 | 0.457 | 0.780 | 0.201 | 0.108 | 0.408 | |
| D. Immigrants: post reform | | | | | | | | | | |
| Inactive | 0.225 | 0.119 | 0.394 | 0.663 | 0.498 | 0.769 | 0.112 | 0.051 | 0.219 | |
| Employment | 0.081 | 0.035 | 0.152 | 0.831 | 0.740 | 0.901 | 0.088 | 0.039 | 0.164 | |
| Welfare | 0.080 | 0.029 | 0.175 | 0.752 | 0.612 | 0.841 | 0.168 | 0.090 | 0.295 | |

Note: Calculations are based on estimation results in Tables A4 and A5. Simulation-based 95% confidence intervals are calculated using 1000 replications.

Table A7
Estimation results: regional unemployment rate (pre reform)

| Variable | Natives | | | | Immigrants | | | |
|---------------------------------------|------------|-----------|-----------------|---------|------------|-----------|-----------------|---------|
| | Employment | | Welfare receipt | | Employment | | Welfare receipt | |
| | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. |
| Employed in t-1 | 1.995*** | (0.397) | 1.174* | (0.689) | 2.791*** | (0.707) | 0.797 | (1.039) |
| Welfare receipt in t-1 | 2.630*** | (0.868) | 4.047*** | (0.787) | -0.076 | (1.102) | 1.381 | (1.118) |
| Employed in t-1 × unempl. Rate | 0.025 | (0.041) | -0.088 | (0.067) | -0.030 | (0.071) | -0.107 | (0.104) |
| Welfare receipt in t-1 × unempl. Rate | -0.125 | (0.083) | -0.172** | (0.071) | 0.172 | (0.111) | 0.033 | (0.109) |
| Unemployment rate | -0.063* | (0.037) | 0.153*** | (0.048) | -0.097 | (0.062) | 0.106 | (0.073) |
| Age | 0.517*** | (0.090) | 0.339** | (0.163) | 0.249* | (0.132) | -0.054 | (0.198) |
| Age squared | -0.642*** | (0.100) | -0.403** | (0.180) | -0.337** | (0.148) | 0.082 | (0.218) |
| Female | 1.878 | (2.459) | 5.565 | (4.312) | -4.375 | (4.012) | 0.217 | (6.044) |
| Age × Female | -0.180 | (0.115) | -0.269 | (0.200) | 0.106 | (0.190) | -0.028 | (0.284) |
| Age sq. × Female | 0.239* | (0.129) | 0.279 | (0.223) | -0.071 | (0.218) | 0.020 | (0.322) |
| Education | 0.121*** | (0.023) | -0.265*** | (0.048) | 0.113*** | (0.039) | -0.000 | (0.057) |
| School in Germany: no | — | | — | | -0.240 | (0.220) | 0.280 | (0.352) |
| Married | -0.264** | (0.127) | -1.186*** | (0.211) | -0.128 | (0.240) | -0.463 | (0.357) |
| Health status: good | 0.040 | (0.123) | -0.313 | (0.214) | -0.063 | (0.209) | -0.805*** | (0.303) |
| No. of kids LT 6 | 0.690*** | (0.156) | 0.739** | (0.310) | 0.134 | (0.262) | 0.678* | (0.372) |
| No. of kids GE 6 | 0.196 | (0.144) | 0.267 | (0.239) | 0.296 | (0.221) | 0.644** | (0.305) |
| Year 2002 | -0.217* | (0.113) | -0.116 | (0.214) | 0.222 | (0.201) | 0.249 | (0.291) |
| Year 2003 | -0.287** | (0.120) | 0.052 | (0.218) | -0.129 | (0.205) | -0.019 | (0.307) |
| Year 2004 | -0.163 | (0.126) | 0.445** | (0.222) | 0.303 | (0.222) | 0.559* | (0.319) |
| Employed in t=0 | 2.553*** | (0.268) | 0.141 | (0.376) | 1.324*** | (0.419) | 0.297 | (0.492) |
| Welfare receipt in t=0 | 0.067 | (0.382) | 2.153*** | (0.480) | -0.373 | (0.459) | 1.951*** | (0.645) |
| M: Health status: good | 0.496** | (0.205) | -0.730** | (0.359) | 0.481 | (0.350) | 0.412 | (0.518) |
| M: No. of kids LT 6 | -1.710*** | (0.240) | -1.283** | (0.509) | -0.481 | (0.376) | -0.344 | (0.547) |
| M: No. of kids GE 6 | -0.149 | (0.189) | -0.190 | (0.313) | -0.382 | (0.278) | -0.475 | (0.386) |
| Constant | -10.693*** | (2.007) | -6.590* | (3.651) | -4.822* | (2.864) | -2.287 | (4.334) |
| $Var(a_{ij})$ | 2.737 | (0.268) | 1.680 | (0.693) | 1.279 | (0.770) | 1.713 | (0.746) |
| $Cov(a_{i,empl}, a_{i,welf})$ | 0.278 | (0.615) | | | -0.300 | (0.574) | | |
| log likelihood | | -3656.795 | | | | -1225.318 | | |
| No. of household-year observations | | 13,781 | | | | 2,953 | | |
| No. of households | | 4,172 | | | | 922 | | |

Note: Dynamic multinomial logit models with random effects. Robust standard errors clustered by region in parentheses. 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 2000-2004.

Table A8
Estimation results: regional unemployment rate (post reform)

| Variable | Natives | | | | Immigrants | | | |
|---------------------------------------|------------|-----------|-----------------|---------|------------|----------|-----------------|---------|
| | Employment | | Welfare receipt | | Employment | | Welfare receipt | |
| | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. |
| Employed in t-1 | 2.268*** | (0.373) | 0.849 | (0.648) | 3.521*** | (0.750) | 2.464** | (1.028) |
| Welfare receipt in t-1 | 2.584*** | (0.726) | 3.202*** | (0.781) | 4.264*** | (1.159) | 3.391*** | (1.157) |
| Employed in t-1 × unempl. Rate | -0.005 | (0.038) | -0.035 | (0.064) | -0.132* | (0.079) | -0.164 | (0.111) |
| Welfare receipt in t-1 × unempl. Rate | -0.118* | (0.071) | -0.131* | (0.074) | -0.260** | (0.123) | -0.136 | (0.113) |
| Unemployment rate | -0.006 | (0.035) | 0.092* | (0.053) | -0.042 | (0.070) | 0.138* | (0.080) |
| Age | 0.733*** | (0.096) | 0.823*** | (0.183) | 0.714*** | (0.234) | -0.418 | (0.295) |
| Age squared | -0.871*** | (0.106) | -0.926*** | (0.201) | -0.896*** | (0.259) | 0.388 | (0.322) |
| Female | 7.810*** | (2.592) | 18.635*** | (4.876) | 8.417 | (5.506) | -4.625 | (7.047) |
| Age × Female | -0.482*** | (0.121) | -0.902*** | (0.224) | -0.533** | (0.255) | 0.179 | (0.328) |
| Age sq. × Female | 0.597*** | (0.137) | 1.008*** | (0.251) | 0.663** | (0.285) | -0.194 | (0.369) |
| Education | 0.049** | (0.023) | -0.180*** | (0.046) | 0.128** | (0.050) | -0.056 | (0.069) |
| School in Germany: no | — | | — | | 0.167 | (0.292) | -0.214 | (0.425) |
| Married | -0.680*** | (0.136) | -1.864*** | (0.235) | -0.513* | (0.296) | -0.836** | (0.360) |
| Health status: good | -0.120 | (0.130) | -0.915*** | (0.225) | -0.371 | (0.253) | -0.059 | (0.325) |
| No. of kids LT 6 | 0.393** | (0.161) | 0.372 | (0.290) | 0.357 | (0.340) | -0.015 | (0.445) |
| No. of kids GE 6 | 0.127 | (0.146) | 0.308 | (0.247) | 0.393 | (0.288) | 0.275 | (0.352) |
| Year 2007 | 0.154 | (0.132) | -0.371* | (0.224) | -0.219 | (0.284) | -0.154 | (0.357) |
| Year 2008 | 0.286* | (0.150) | -0.155 | (0.251) | -0.018 | (0.316) | -0.426 | (0.414) |
| Year 2009 | 0.188 | (0.149) | -0.769*** | (0.270) | -0.119 | (0.323) | -0.001 | (0.412) |
| Year 2010 | 0.272* | (0.160) | -0.029 | (0.272) | -0.352 | (0.343) | 0.313 | (0.436) |
| Employed in t=0 | 2.558*** | (0.244) | -0.040 | (0.375) | 2.231*** | (0.482) | -1.488*** | (0.572) |
| Welfare receipt in t=0 | 0.408 | (0.352) | 3.145*** | (0.504) | 0.208 | (0.427) | 1.628*** | (0.522) |
| M: Health status: good | 0.591*** | (0.225) | -0.218 | (0.399) | 1.108** | (0.472) | -0.641 | (0.622) |
| M: No. of kids LT 6 | -1.078*** | (0.297) | 0.111 | (0.515) | -1.639*** | (0.564) | -0.944 | (0.675) |
| M: No. of kids GE 6 | 0.259 | (0.164) | -0.035 | (0.293) | -0.314 | (0.287) | 0.389 | (0.374) |
| Constant | -15.100*** | (2.106) | -17.313*** | (4.064) | -14.136*** | (5.059) | 9.539 | (6.459) |
| $Var(a_{ij})$ | 2.476 | (0.404) | 3.643 | (0.623) | 1.197 | (0.514) | 1.784 | (1.241) |
| $Cov(a_{i,empl}, a_{i,welf})$ | -0.012 | (0.467) | | | -1.462 | (0.431) | | |
| log likelihood | | -3452.143 | | | | -819.835 | | |
| No. of household-year observations | | 12,977 | | | | 2,274 | | |
| No. of households | | 3,266 | | | | 616 | | |

Note: Dynamic multinomial logit models with random effects. Robust standard errors clustered by region in parentheses. 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 2000-2004.

Table A9

Estimation results: natives and immigrants setting the initial condition to 2006

| Variable | Natives | | | | Immigrants | | | |
|------------------------------------|------------|---------|-----------------|---------|------------|---------|-----------------|---------|
| | Employment | | Welfare receipt | | Employment | | Welfare receipt | |
| | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. |
| Employed in t-1 | 2.156*** | (0.193) | 0.466 | (0.345) | 1.738*** | (0.467) | 0.413 | (0.542) |
| Welfare receipt in t-1 | 1.342*** | (0.353) | 1.807*** | (0.412) | 1.507*** | (0.546) | 1.773*** | (0.569) |
| Age | 0.676*** | (0.116) | 0.654*** | (0.228) | 0.830** | (0.333) | 0.193 | (0.386) |
| Age squared | -0.791*** | (0.127) | -0.729*** | (0.249) | -1.067*** | (0.362) | -0.273 | (0.419) |
| Female | 7.122** | (3.116) | 13.360** | (6.149) | 5.456 | (8.084) | 2.916 | (9.504) |
| Age × Female | -0.441*** | (0.144) | -0.658** | (0.279) | -0.448 | (0.364) | -0.181 | (0.429) |
| Age sq. × Female | 0.547*** | (0.161) | 0.739** | (0.309) | 0.604 | (0.398) | 0.214 | (0.472) |
| Education | 0.054** | (0.025) | -0.155*** | (0.052) | 0.116* | (0.066) | -0.079 | (0.086) |
| School in Germany: no | — | | — | | 0.105 | (0.371) | -0.226 | (0.440) |
| Married | -0.567*** | (0.152) | -1.580*** | (0.271) | -0.336 | (0.393) | -0.880** | (0.442) |
| Health status: good | -0.004 | (0.154) | -0.874*** | (0.279) | -0.738** | (0.337) | -0.647 | (0.413) |
| No. of kids LT 6 | 0.388** | (0.189) | 0.199 | (0.354) | 0.023 | (0.438) | -0.254 | (0.560) |
| No. of kids GE 6 | -0.048 | (0.174) | 0.118 | (0.296) | 0.159 | (0.383) | 0.042 | (0.448) |
| Year 2008 | 0.139 | (0.137) | 0.135 | (0.242) | 0.446 | (0.321) | -0.369 | (0.408) |
| Year 2009 | 0.018 | (0.142) | -0.471* | (0.272) | 0.213 | (0.336) | -0.000 | (0.421) |
| Year 2010 | 0.104 | (0.150) | 0.252 | (0.267) | -0.040 | (0.347) | 0.272 | (0.426) |
| Employed in t=0 (2006) | 2.750*** | (0.306) | 0.085 | (0.503) | 3.101*** | (0.742) | 0.178 | (0.732) |
| Welfare receipt in t=0 (2006) | 0.580 | (0.400) | 3.399*** | (0.598) | 0.183 | (0.639) | 2.681*** | (0.800) |
| M: Health status: good | 0.419 | (0.255) | 0.218 | (0.462) | 1.866*** | (0.632) | 0.734 | (0.729) |
| M: No. of kids LT 6 | -0.942*** | (0.351) | -0.134 | (0.628) | -0.766 | (0.743) | -0.824 | (0.884) |
| M: No. of kids GE 6 | 0.429** | (0.184) | 0.208 | (0.325) | -0.286 | (0.372) | 0.410 | (0.439) |
| Constant | -14.384*** | (2.540) | -14.019*** | (5.089) | -16.163** | (7.519) | -3.086 | (8.693) |
| $Var(a_{ij})$ | 2.174 | (0.462) | 3.206 | (1.029) | 1.844 | (0.955) | 1.053 | (0.891) |
| $Cov(a_{i,empl}, a_{i,welf})$ | 0.223 | (0.637) | | | -1.041 | (0.512) | | |
| log likelihood | -2446.1304 | | | | -573.07076 | | | |
| No. of household-year observations | 9,749 | | | | 1,668 | | | |
| No. of households | 2,941 | | | | 540 | | | |

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 2006-2010.

Table A10
Predicted probabilities of labor market transitions
given subsample-specific average characteristics setting the initial condition to 2006

| State at time $t - 1$ | State at time t | | | | | | | | | |
|----------------------------|-------------------|--------|-------|------------|--------|-------|---------|--------|-------|--|
| | Inactive | | | Employment | | | Welfare | | | |
| | Mean | 95%-CI | | Mean | 95%-CI | | Mean | 95%-CI | | |
| A. Natives, post reform | | | | | | | | | | |
| Inactive | 0.184 | 0.143 | 0.244 | 0.790 | 0.727 | 0.829 | 0.026 | 0.016 | 0.050 | |
| Employment | 0.038 | 0.032 | 0.044 | 0.953 | 0.945 | 0.959 | 0.009 | 0.007 | 0.014 | |
| Welfare | 0.068 | 0.038 | 0.113 | 0.885 | 0.820 | 0.923 | 0.047 | 0.027 | 0.088 | |
| B. Immigrants, post reform | | | | | | | | | | |
| Inactive | 0.149 | 0.085 | 0.281 | 0.779 | 0.633 | 0.855 | 0.073 | 0.039 | 0.156 | |
| Employment | 0.042 | 0.028 | 0.064 | 0.921 | 0.885 | 0.940 | 0.037 | 0.025 | 0.065 | |
| Welfare | 0.041 | 0.018 | 0.101 | 0.850 | 0.717 | 0.902 | 0.109 | 0.066 | 0.226 | |

Note: Calculations are based on estimation results in Table A9. Simulation-based 95% confidence intervals are calculated using 1000 replications.

Table A11
Estimation results: alternative definition of states

| Variable | Natives | | | |
|------------------------------------|------------|------------|-----------------|---------|
| | Employment | | Welfare receipt | |
| | Coef. | S.E. | Coef. | S.E. |
| Employed in t-1 | 2.196*** | (0.139) | 0.516** | (0.237) |
| Welfare receipt in t-1 | 0.991*** | (0.258) | 1.767*** | (0.285) |
| Age | 0.724*** | (0.087) | 0.668*** | (0.161) |
| Age squared | -0.866*** | (0.096) | -0.777*** | (0.178) |
| Female | 8.237*** | (2.316) | 15.247*** | (4.253) |
| Age × Female | -0.498*** | (0.108) | -0.770*** | (0.197) |
| Age sq. × Female | 0.610*** | (0.122) | 0.873*** | (0.221) |
| Education | 0.046** | (0.020) | -0.181*** | (0.043) |
| School in Germany: no | -0.021 | (0.196) | 0.832*** | (0.301) |
| Married | -0.707*** | (0.122) | -1.778*** | (0.215) |
| Health status: good | -0.183 | (0.116) | -0.571*** | (0.205) |
| No. of kids LT 6 | 0.395*** | (0.145) | 0.169 | (0.263) |
| No. of kids GE 6 | 0.186 | (0.130) | 0.270 | (0.215) |
| Year 2007 | 0.111 | (0.113) | -0.186 | (0.197) |
| Year 2008 | 0.304** | (0.121) | -0.252 | (0.214) |
| Year 2009 | 0.152 | (0.125) | -0.375 | (0.229) |
| Year 2010 | 0.216 | (0.132) | 0.183 | (0.228) |
| Employed in t=0 (2006) | 2.386*** | (0.215) | -0.586* | (0.356) |
| Welfare receipt in t=0 (2006) | 1.133*** | (0.275) | 2.375*** | (0.354) |
| M: Health status: good | 0.612*** | (0.202) | -0.217 | (0.366) |
| M: No. of kids LT 6 | -1.133*** | (0.261) | 0.035 | (0.448) |
| M: No. of kids GE 6 | 0.181 | (0.142) | 0.040 | (0.246) |
| Constant | -14.574*** | (1.892) | -12.341*** | (3.546) |
| $Var(a_{ij})$ | 2.247 | (0.344) | 3.438 | (0.727) |
| $Cov(a_{i,empl}, a_{i,welf})$ | 0.691 | (0.461) | | |
| log likelihood | | -4039.3653 | | |
| No. of household-year observations | | 15,251 | | |
| No. of households | | 3,882 | | |

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

Source: SOEP 2005-2010.

Table A12

Estimation results: alternative definition of states (natives and immigrants)

| Variable | Natives | | | | Immigrants | | | |
|------------------------------------|------------|---------|-----------------|---------|------------|---------|-----------------|---------|
| | Employment | | Welfare receipt | | Employment | | Welfare receipt | |
| | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. |
| Employed in t-1 | 2.213*** | (0.153) | 0.706** | (0.293) | 2.185*** | (0.336) | 0.304 | (0.412) |
| Welfare receipt in t-1 | 0.967*** | (0.315) | 1.884*** | (0.346) | 1.312*** | (0.441) | 1.761*** | (0.469) |
| Age | 0.732*** | (0.095) | 1.006*** | (0.219) | 0.634*** | (0.233) | -0.041 | (0.281) |
| Age squared | -0.868*** | (0.105) | -1.126*** | (0.240) | -0.805*** | (0.255) | -0.037 | (0.306) |
| Female | 8.240*** | (2.550) | 22.617*** | (5.793) | 6.844 | (5.852) | -1.615 | (7.097) |
| Age × Female | -0.495*** | (0.119) | -1.101*** | (0.264) | -0.447* | (0.270) | 0.018 | (0.329) |
| Age sq. × Female | 0.606*** | (0.134) | 1.239*** | (0.293) | 0.555* | (0.302) | -0.012 | (0.369) |
| Education | 0.040* | (0.022) | -0.185*** | (0.054) | 0.126** | (0.055) | -0.061 | (0.071) |
| School in Germany: no | — | | — | | 0.007 | (0.306) | 0.005 | (0.371) |
| Married | -0.734*** | (0.133) | -2.166*** | (0.276) | -0.772** | (0.320) | -1.112*** | (0.364) |
| Health status: good | -0.146 | (0.130) | -0.934*** | (0.260) | -0.346 | (0.262) | -0.095 | (0.338) |
| No. of kids LT 6 | 0.428*** | (0.159) | 0.198 | (0.329) | 0.294 | (0.353) | -0.016 | (0.459) |
| No. of kids GE 6 | 0.148 | (0.144) | 0.448 | (0.281) | 0.389 | (0.304) | 0.130 | (0.364) |
| Year 2007 | 0.122 | (0.124) | -0.232 | (0.245) | 0.029 | (0.280) | -0.141 | (0.351) |
| Year 2008 | 0.272** | (0.132) | -0.092 | (0.257) | 0.424 | (0.302) | -0.510 | (0.403) |
| Year 2009 | 0.146 | (0.137) | -0.532* | (0.283) | 0.221 | (0.317) | -0.024 | (0.409) |
| Year 2010 | 0.254* | (0.145) | 0.102 | (0.281) | 0.047 | (0.326) | 0.249 | (0.410) |
| Employed in t=0 | 2.452*** | (0.240) | -0.940* | (0.480) | 2.177*** | (0.503) | -0.257 | (0.556) |
| Welfare receipt in t=0 | 1.129*** | (0.328) | 2.625*** | (0.452) | 0.923* | (0.481) | 1.698*** | (0.512) |
| M: Health status: good | 0.510** | (0.222) | 0.009 | (0.460) | 1.030** | (0.491) | -0.388 | (0.605) |
| M: No. of kids LT 6 | -1.075*** | (0.293) | 0.404 | (0.601) | -1.553*** | (0.588) | -0.995 | (0.694) |
| M: No. of kids GE 6 | 0.264 | (0.161) | -0.459 | (0.344) | -0.232 | (0.311) | 0.394 | (0.374) |
| Constant | -14.878*** | (2.060) | -20.454*** | (4.893) | -12.269** | (5.177) | 3.647 | (6.260) |
| $Var(a_{ij})$ | 2.313 | (0.382) | 3.866 | (0.960) | 1.707 | (0.794) | 1.326 | (0.823) |
| $Cov(a_{i,empl}, a_{i,welf})$ | 0.158 | (0.590) | | | 0.555 | (0.619) | | |
| log likelihood | -3196.7524 | | | | -801.9247 | | | |
| No. of household-year observations | 12,977 | | | | 2,274 | | | |
| No. of households | 3,266 | | | | 616 | | | |

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

Source: SOEP 2005-2010.