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Low-wage jobs – stepping stones or just bad signals?

Alexander Mosthaf

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Alexander Mosthaf (IAB and University of Mainz)

Mit der Reihe „IAB-Discussion Paper“ will das Forschungsinstitut der Bundesagentur für Arbeit den Dialog mit der externen Wissenschaft intensivieren. Durch die rasche Verbreitung von Forschungsergebnissen über das Internet soll noch vor Drucklegung Kritik angeregt und Qualität gesichert werden.

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Abstract

This study investigates how the effects of low-wage employment and non-employment on wage prospects vary depending on qualification. We apply dynamic multinomial logit models with random effects and include interactions of the lagged labor market state with qualification to estimate heterogeneity in state dependence. We find that low-wage jobs are stepping stones to high-paid jobs for low qualified workers. In contrast, the chances of workers with a university degree to obtain a high-paid job are the same when being low-paid or non-employed (whereas their risk of non-employment is lower when having a low-paid job). Furthermore, our results suggest that for workers with university degree low-wage jobs are associated with negative signals.

Zusammenfassung

Dieses Papier untersucht, inwiefern sich Effekte von Niedriglohnbeschäftigung und Nichtbeschäftigung auf zukünftige Lohnaussichten hinsichtlich der Qualifikation von Individuen unterscheiden. Es verwendet dynamische multinomiale Logit Modelle mit zufälligen Effekten und berücksichtigt Interaktionsterme der vorhergehenden Erwerbszustände mit Qualifikation, um Heterogenität von Pfadabhängigkeit zu messen. Den Ergebnissen nach sind Niedriglohnbeschäftigungen für Geringqualifizierte Sprungbretter in Hochlohnbeschäftigungen. Im Gegensatz hierzu sind die Chancen von Arbeitnehmern mit Universitätsabschluss, eine Hochlohnbeschäftigung zu finden, gleich gross wenn sie niedriglohnbeschäftigt bzw. nicht beschäftigt sind (wobei das Risiko, in Zukunft nicht beschäftigt zu sein, bei Niedriglohnbeschäftigungen geringer ist). Außerdem deuten die Ergebnisse dieses Papiers darauf hin, dass Niedriglohnbeschäftigungen mit negativen Signaleffekten für Arbeitnehmer mit Universitätsabschluss einhergehen.

JEL classification: J30, J60, C33

Keywords: low-pay dynamics, state dependence, dynamic multinomial logit model, partial effect, nonlinear models, interaction term, unobserved heterogeneity

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1 Introduction

Recent studies have investigated state dependence in non-employment and low-wage employment in order to assess whether taking up a low-paid interim job improves the labor market prospects of not employed individuals (Buddelmeyer/Lee/Wooden, 2009; Cappellari/Jenkins, 2008; Mosthaf/Schank/Schnabel, 2009; Stewart, 2007; Uhlendorff, 2006).[1] So far, the heterogeneity in these effects has been given scant attention although it is important to know if taking up a low-paid interim job is advisable for everyone or only for specific subgroups of the population. This paper investigates how the effects of low-wage employment and non-employment on future labor market outcomes vary depending on qualification.

The current economic crisis in several OECD-countries lends a special interest to the question whether it is beneficial to take up a low-paid interim job. Ljungqvist/Sargent (1998) argue that European labor markets are more vulnerable to recessions than the US because generous unemployment benefits reduce incentives for laid-off workers to quickly accept jobs with lower wages than those of their previous jobs. In times of economic crisis the number of "good jobs" with high wages is limited and high reservation wages of laid-off workers lead to long-term unemployment, a factor producing a significant loss of human capital. By taking up a low-paid job instead of waiting for a "good job", unemployed individuals could shorten unemployment duration and thereby averting scarring effects associated with unemployment. On the other hand Burdett (1979) and Marimon/Zilibotti (1999) point out that searching for the right job match during unemployment may have positive returns.

Since the German government reduced the generosity of the unemployment benefit system (Caliendo, 2009), there has been a lively political discussion about policy instruments such as unemployment benefits, minimum wages and employment subsidies. Given the growing low-wage sector there is the concern that individuals accepting "bad jobs" might become trapped in low-wage employment and in doing so might further increase their unemployment risk (so that that there is a low-pay-no-pay cycle).

There is convincing evidence for the existence of state dependence in both non-employment and low-wage employment. That is, the incidence of non-employment and low-wage employment leads to a higher probability to be not employed or low-paid in the future. Similarly, taking up a low-paid job increases the future risk of non-employment and low-wage employment. State dependence in no-pay and low-pay may stem from low human capital accumulation, transaction costs, changes in preferences and from signalling effects. While there are some studies which examine the distinct sources of state dependence in non-employment, we are not aware of studies which show the importance of the different origins of state dependence in low-wage work.

This study uses a rich German administrative dataset and applies dynamic multinomial logit models with random effects which control for the problem of initial conditions and include interaction terms of the lagged labor market state. Thereby, we measure heterogeneity in

[1] McCormick (1990: p. 300) focusses in his study on interim jobs and defines them as jobs which are "*acceptable by certain workers as an interim position while searching on-the-job for a preferred, but costly to locate, job type.*"

state dependence in low-wage employment and non-employment with respect to qualification. We find that low-wage jobs clearly incur weaker scarring effects than non-employment for low qualified workers. For high qualified workers, however, low-wage employment reduces the chances to get a high-paid job in the future as much as non-employment. Furthermore, we show that low-wage jobs are associated with negative signals for high qualified workers.

The rest of this paper is organized as follows: section 2 gives an overview of the literature and of the theoretical background. Section 3 introduces the empirical specification while section 4 describes the institutional background and the data. Section 5 shows descriptive statistics. The econometric results are presented in section 6 and section 7 concludes.

2 Literature and theoretical background

As mentioned above, non-employment may lead to a loss of human capital (Phelps, 1972) or to negative signalling effects (Lockwood, 1991) and therefore enhance the probability of facing unemployment or low-wage employment in the future. In addition, transaction costs (like costs of job search) reduce the likelihood that workers will take up a new job (Burdett, 1978; Hyslop, 1999). The incidence of non-employment may also alter preferences. Individuals who experience an episode of non-employment in presence may ascribe a higher utility to leisure and a lower utility to wages and consumption than in the past. As a consequence, individuals could reduce labor supply and raise reservation wages (Hotz/Kydland/Sedlacek, 1988). As stated for instance by Layard/Nickell/Jackman (1991), negative signalling effects may also be important for episodes of low-wage employment. It is a reasonable assumption that this is also true for low human capital accumulation and costs of job search.[2]

Thus, it appears that labor market history affects current labor market success, a phenomenon referred to as state dependence in the literature. Due to the effect of time-constant unobserved variables on labor market outcomes and by virtue of the fact that the individuals labor market history is often not observed from its beginning, difficulties in measuring state dependence arise from the separation of genuine state dependence from spurious state dependence as well as from the problem of initial conditions. These issues have been addressed in a number of papers (see e. g. Heckman (1981a); Heckman (1981b); Honoré/Kyriazidou (2000); Wooldridge (2005)).

To our knowledge, genuine state dependence in low-wage work and non-employment only has been analyzed jointly before in studies for the UK, Australia and Germany. Cappellari/Jenkins (2008) investigate yearly transitions between low-wage employment, high-wage employment and unemployment in the UK. The study finds strong evidence for a low-pay-no-pay cycle. That is, being low-paid instead of being high-paid in period $t-1$ increases the probability to be unemployed in period t and vice versa. Stewart (2007) comes

[2] The existence of low human capital accumulation in low-wage employment is consistent with theories of labor market segmentation (Taubman/Wachter, 1986).

to similar conclusions. His results suggest that a low-paid job has the same negative effect on the probability to be employed in the future as an episode of unemployment. Stewart reasons that low-wage jobs are a conduit to repeat unemployment in the UK.

In a study for Australia, Buddelmeyer/Lee/Wooden (2009) find considerable differences in the effects between men and women. For men they show that the negative effect of a low-paid job on the employment probability is rather small. Low-wage work only leads to a higher unemployment risk when the preceding spell is an episode of unemployment. Women having a low-paid job, however, have a much larger probability of experiencing unemployment in future than women having a high-paid job.

Uhlendorff (2006) shows for German men that low-wage jobs reduce the probability to get a high-wage job and increase the risk of non-employment in the future but that employment prospects of low-wage earners are still better than the prospects of not employed individuals. He concludes that low-wage jobs are stepping stones to better jobs. Mosthaf/Schank/Schnabel (2009) investigate labor market dynamics of western German women and come to the result that future labor market success is better for low-paid women than for unemployed and inactive women, especially when having full-time jobs.

How does state dependence vary with qualification? Studies estimating the determinants of mobility out of low-wage employment rather than state dependence point to a positive impact of qualification on the probability to get high-paid. Schank/Schnabel/Stephani (2009), Mosthaf/Schnabel/Stephani (2011), and Grün/Mahringer/Rhein (2011) show with German administrative datasets which stem from the same sources as our dataset that transitions from low-pay to high-pay are more likely for well qualified individuals. Cappellari (2007) investigates low-pay dynamics of Italian workers and finds a positive but insignificant effect of qualification on upward mobility.[3] Pavlopoulus/Fourarge (2010) use the British BHPS and the German SOEP and come to the result that in Germany qualification has positive effects on the probability to get high-paid while in Great Britain qualification has positive effects only for those with unfavorable unobserved characteristics.

Studies which examine the determinants of transitions from non-employment to employment usually find a positive impact of qualification on future employment prospects: Fitzenberger/Wilke (2010) use the German IABS and reveal that individuals with vocational training or university degree have shorter durations of non-employment and higher post-unemployment earnings than low-qualified individuals. Korkeamäki/Kyyrä (2008) focus on workers who were displaced during mass layoffs and plant closures. By analyzing a Finnish administrative dataset, they find that earnings losses after displacement are largest for those with lower wages in the jobs before non-employment (who on average have lower qualifications). These findings support the hypothesis that state dependence in low-wage employment and non-employment is lower for high qualified individuals because they have a higher job offer arrival rate and therefore lower costs of job search.

[3] Another result of Cappellari (2007) is that high qualification has a negative impact on the risk to enter low-wage employment. He additionally simulates the degree of state dependence and finds that the experience of an episode of low-pay enhances the probability to be low-paid again in the future.

Nevertheless, while upward mobility seems to be larger for high qualified workers, the penalty of entering low-wage employment or non-employment concerning future employment prospects may be stronger for individuals with good qualifications than for low qualified workers. There are two reasons why state dependence could be higher for individuals with better qualifications. First, low human capital accumulation may matter more for well qualified workers as technological change is more important in occupations which are associated with complex tasks.

The second argument stems from theories on signalling effects. McCormick (1990) introduces the idea that taking up an interim job is associated with negative signalling effects, as employers may interpret the job search behavior of workers as a signal for their future productivity. In his model high-productive individuals are able to move faster from job to job and it is only profitable for low-productive individuals to take up an interim job and hence taking up such a job incurs negative signals. Workers anticipate the behavior of employers and are reluctant to take up interim jobs.

Cunningham/Vilasuso (1999) provide another argument why high productive workers will not be matched with low qualified jobs. Here, employers anticipate that high skilled workers who accept low skilled jobs will search on-the-job for better matches. As a consequence, expected tenure is short and fixed hiring costs exceed the returns of hiring.

McCormick (1990) and Cunningham/Vilasuso (1999) reveal that good workers will not be matched with bad jobs, i. e. that there is positive assortative matching. The growing empirical literature concerning this issue (which builds on Abowd/Kramarz/Margolis (1999)) faces methodological problems associated with fixed effects wage regressions (Andrews/Gill/Schank/Upward, 2008) and is still inconclusive. However, studies investigating firm productivity and the skill composition of the firms workforce point to the existence of positive assortative matching (Mendes/van den Berg/Lindeboom, 2010). Besides, von Wachter/Bender (2006) examine wage losses after job mobility of young workers and find some evidence for positive assortative matching with German administrative data.

We hypothesize, that negative signals of low-paid jobs are stronger for individuals with good certificates of qualification. While accepting low-paid interim jobs may be typical for low qualified workers, employers might assume that high qualified workers accepting bad jobs are an adverse selection with respect to unobserved productivity and will not hire these workers for good jobs.

Evidence for negative signalling effects of non-employment is found for instance by Gibbons/Katz (1991), Oberholzer-Gee (2008), Omori (1997) and Biewen/Steffes (2010). We are not aware, however, of evidence for the importance of signals for low-wage work. This study adds to the literature by showing that the incidence of low-wage employment provides negative signals for high qualified workers. Moreover, we find that low-wage jobs clearly incur weaker scarring effects than non-employment for individuals with low qualifications. Yet, for high qualified workers state dependence in low-wage employment with respect to the transition probability to high-wage employment has about the same size like state dependence of non-employment.

3 Empirical specification

We are interested in a model for the propensity of individual i to be in state j (high-wage employment, low-wage employment, non-employment, and an absorbing state explained below) in time period $t = s, \ldots, T$ (2001-2006). We therefore specify the following conditional density of y_{ijt}:

$$\prod_{t=s}^{T} f(\mathbf{y}_{it}|\mathbf{y}_{it-1}, \mathbf{q}_i, \mathbf{x}_{it}, \alpha_{ij}), \tag{1}$$

where $i = 1, \ldots, N$; $j = 1, \ldots, 4$. $\mathbf{y}_{it-1}$ is a vector of dummy variables representing the lagged employment state. $\mathbf{q}_i$ is time-constant and indicates the individuals qualification level. $\mathbf{x}_{it}$ is a vector of observed explanatory variables and α_{ij} are person specific random effects. The exclusion of $\mathbf{q}_i$, $\mathbf{x}_{it}$ or α_{ij} in this model would lead to the measurement of spurious state dependence. We include them, so that the coefficients belonging to $\mathbf{y}_{it-1}$ measure genuine state dependence.

We explicitly take into account transitions into the absorbing state to account for the possible endogeneity of panel retention. In our sample we cannot identify whether individuals who after leaving employment do not register as unemployed or do not return to employment covered by social security are actually searching for a job, inactive or working as civil servants or as self-employed. Van den Berg/Lindeboom/Ridder (1994) and Van den Berg/Lindeboom (1998) show that ignoring transitions to panel retention may lead to inconsistent estimates if these transitions are driven by the same unobserved characteristics as the transitions of interest.[4]

The estimation of dynamic models with lagged dependent variables goes along with the initial conditions problem (Heckman, 1981a). Typically, the initial state is not random, but determined by the individuals prior labor market history and his observed and unobserved characteristics.

$$f(\mathbf{y}_{is-1}|\mathbf{y}_{i1} \ldots \mathbf{y}_{is-2}, \mathbf{q}_i, \mathbf{x}_{i1} \ldots \mathbf{x}_{is-1}, \alpha_{ij}) \tag{2}$$

The latter violates the standard assumption of random effects models, namely the assumption that there is no correlation between the random effects ($\boldsymbol{\alpha}_i$) and the observed variables on the right side of the equation ($\mathbf{y}_{it-1}$, $\mathbf{q}_i$, $\mathbf{x}_i$). Wooldridge (2005) proposes to account for possible correlation of $\boldsymbol{\alpha}_i$ with $\mathbf{y}_{is-1}$, $\mathbf{q}_i$ and $\mathbf{x}_i$ by explicitly modeling the following distribution:

$$f(\alpha_{ij}|\mathbf{y}_{is-1}, \mathbf{q}_i, \bar{\mathbf{x}}_i, \eta_{ij}), \tag{3}$$

where $\bar{\mathbf{x}}_i$ are individual specific means of $\mathbf{x}$ over time. η_{ij} are random effects which are orthogonal to other explanatory variables of the model.

Equation 2 shows the dependence of the initial period from the individuals pre-sample

[4] Van den Berg/Lindeboom/Ridder (1994) and Van den Berg/Lindeboom (1998) apply multivariate duration models with random effects but their point also holds for dynamic multinomial logit models.

labor market history. We therefore specify the density of y_{ijs-1} conditional on $\mathbf{h}_i$ - a vector of variables representing the individuals prior labor market history.[5] By including $\mathbf{h}_i$ we intend to control more precisely for the impact of the prior labor market history than it would be done by the Wooldridge-approach in equation 3. In our model we take into account that workers could have a higher probability to be in the state of low-wage employment or non-employment because of the occurrence of events of low-wage employment or non-employment in the period between 1995 and 2000 (Heckman/Borjas, 1980). In addition, workers who are in one of both states in our analyzed period could be an adverse selection with respect to time-invariant variables not observed in the data. In this case $\mathbf{h}_i$ could catch up these unobserved characteristics.[6]

In this study we want to measure how state dependence varies with respect to qualification. For this purpose, we include interaction terms of $\mathbf{y}_{it-1}$ and $\mathbf{q}_i$. As suggested by Wooldridge (2005), possible correlation of $\mathbf{y}_{is-1} * \mathbf{q}_i$ with $\boldsymbol{\alpha}_i$ is accounted for by an additional term $\mathbf{y}_{is-1} * \mathbf{q}_i$.

$$\prod_{t=s}^{T} f(\mathbf{y}_{it}|\mathbf{y}_{it-1}, \mathbf{y}_{it-1} * \mathbf{q}_i, \mathbf{q}_i, \mathbf{x}_{it}, \mathbf{y}_{is-1}, \mathbf{h}_i, \bar{\mathbf{x}}_i, \mathbf{y}_{is-1} * \mathbf{q}_i, \eta_{ij}) \tag{4}$$

We assume that the function in 4 has a Type I extreme value distribution and obtain a multinomial logit model with random effects for the probability to be high-wage employed, low-wage employed, not employed or in the absorbing state. High-wage employment serves as reference category. Concerning the random effects we have to make assumptions about their distribution. Therefore, we compare models with the assumption of normal distributed random effects and models assuming a discrete distribution with an a priori unknown number of mass points. For the model of the normal random effects specification we estimate the parameters of the variance-covariance-matrix and integrate the distribution by applying adaptive quadrature.

$$L_i = \int_{-\infty}^{\infty} \prod_{t=s}^{T} \prod_{j=2}^{4} \left\{ \frac{exp(\mathbf{y}_{it-1}\boldsymbol{\gamma}_j + \mathbf{y}_{it-1} * \mathbf{q}_i\boldsymbol{\tau}_j + \mathbf{q}_i\boldsymbol{\kappa}_j + \mathbf{z}_{it}\boldsymbol{\zeta}_j + \eta_{ij})}{1 + \sum_{k=2}^{4} exp(\mathbf{y}_{it-1}\boldsymbol{\gamma}_k + \mathbf{y}_{it-1} * \mathbf{q}_i\boldsymbol{\tau}_k + \mathbf{q}_i\boldsymbol{\kappa}_k + \mathbf{z}_{it}\boldsymbol{\zeta}_k + \eta_{ik})} \right\}^{d_{ijt}} f(\boldsymbol{\eta}) d(\boldsymbol{\eta}), \tag{5}$$

where $\mathbf{x}_{it}, \mathbf{y}_{is-1}, \mathbf{h}_i, \bar{\mathbf{x}}_i$ and $\mathbf{y}_{is-1} * \mathbf{q}_i$ are summarized to $\mathbf{z}_{it}$. d_{ijt} is one if individual i is in state j at period t and zero otherwise. For the model with the discrete distribution of the random effects, we begin with estimating a model with one mass point and raise the number of mass points until the Akaike Information Criterion (AIC) does not improve. This model is referred to as nonparametric maximum likelihood estimator (Heckman/Singer, 1984).[7]

[5] $\mathbf{h}_i$ is a vector of variables representing the number of spells of non-employment and low-wage employment in the period between 1995 and 2000 broken down by the duration of these episodes. Additionally, it contains the cumulated duration of episodes of non-employment and episodes of low-wage employment in the period between 1998 and 2000. See Table 2 for an overview of these variables.

[6] An alternative way of including the effect of the labor market history in the period between 1995 and 2000 would be to run our estimations for all the periods between 1995 and 2006. However, our definition of non-employment relies on information about job-search and participation in active labor market programs which is only available since 1999 (see chapter 4 for details of the definitions of non-employment).

[7] All models in this paper are estimated using the Stata-ado-file GLLAMM by Rabe-Hesketh/Skrondal (2005).

$$L_i = \sum_{m=1}^{M} p_m \prod_{t=s}^{T} \prod_{j=2}^{4} \left\{ \frac{exp(\mathbf{y}_{it-1}\gamma_j + \mathbf{y}_{it-1} * \mathbf{q}_i\tau_j + \mathbf{q}_i\kappa_j + \mathbf{z}_{it}\zeta_j + v_{mj})}{1 + \sum_{k=2}^{4} exp(\mathbf{y}_{it-1}\gamma_k + \mathbf{y}_{it-1} * \mathbf{q}_i\tau_k + \mathbf{q}_i\kappa_k + \mathbf{z}_{it}\zeta_k + v_{mk})} \right\}^{d_{ijt}} \quad (6)$$

p_m is the probability of the mass point $\mathbf{v}_m$. Both are parameters to be estimated.

The main variable of interest in our paper is the interaction term of the lagged employment state with qualification $\mathbf{y}_{it-1} * \mathbf{q}_i$ which measures the heterogeneity in state dependence with respect to qualification. The coefficients in multinomial logit models cannot be interpreted with respect to economic significance. Ai/Norton (2003) and Greene (2010) point out that the calculation of partial effects of interaction terms in nonlinear models is not as straightforward as in linear models. In our context, the partial effect of $\mathbf{y}_{it-1} * \mathbf{q}_i$ of the multinomial model in equation 5 would be (Greene, 2010):[8]

$$\begin{aligned} &\frac{\Delta^2 E[\mathbf{y}_{ijt}|\mathbf{y}_{it-1}, \mathbf{y}_{it-1} * \mathbf{q}_i, \mathbf{q}_i, \mathbf{z}_{it}, \eta_{ij}]}{\Delta y_{lt-1} \Delta q_e} = \\ &[f(\gamma_{lj} + \tau_{lej} + \kappa_{ej} + \mathbf{z}_{it}\zeta_j + \eta_{ij}) - f(\kappa_{ej} + \mathbf{z}_{it}\zeta_j + \eta_{ij})] - \\ &[f(\gamma_{lj} + \mathbf{z}_{it}\zeta_j + \eta_{ij}) - f(\mathbf{z}_{it}\zeta_j + \eta_{ij})], \end{aligned} \quad (7)$$

with $l = 2, 3$ and $e = 2, 3, 4$. For identification γ_1, τ_{l1} and κ_1 are set to zero.[9]

However, this partial effect is not interesting if one wants to draw conclusions about genuine state dependence. The cross difference in 7 consists of subtrahends with and without the coefficient of qualification κ. As described earlier, κ represents spurious state dependence and hence the partial effect of the interaction term mixes up genuine state dependence and spurious state dependence. To determine genuine state dependence κ should be fix.

Rather than calculating the partial effect of the interaction term, we calculate transition matrices separated for each group of qualification to draw conclusions about heterogeneity in genuine state dependence. Therefore, we calculate individual predictions of y_{ijt} for each individual i at period t conditional on the lagged labor market state and qualification:

$$\begin{aligned} &P_i(y_{ijt} = 1|y_{ilt-1} = 1, q_e = 1) = \\ &f(\gamma_{lj} + \tau_{lej} + \kappa_{ej} + \mathbf{x}_{it}\beta_j + \mathbf{y}_{is-1}\varphi_j + \mathbf{h}_i\omega_j + \bar{\mathbf{x}}_i\varepsilon_j + \mathbf{y}_{is-1} * \mathbf{q}_i\xi_j + \eta_{ij}) \end{aligned} \quad (8)$$

Other explanatory variables than the lagged labor market state and qualification are fixed at the true sample values. After obtaining predictions and confidence intervals for each individual i in period t, average transition probabilities of the sample are calculated. State dependence in low-wage employment with respect to the probability to be high-paid for a

[8] For simplicity we ignore $\mathbf{y}_{is-1}$ and $\mathbf{y}_{is-1} * \mathbf{q}_i$ from equation 4 when derivating the function. Our point, however, also applies when we consider these terms in the derivation.

[9] γ_{1j} is the effect of high-pay, $t-1$ on the probability to be in state j. γ_{2j} the effect of low-pay, $t-1$ and γ_{3j} the effect of non-employment, $t-1$. Individuals who entered the absorbing state ($j = 4$) leave the dataset. κ_{1j} represents the effect of low qualification, κ_{2j} of lower middle qualification, κ_{3j} the effect of middle qualification and κ_{4j} the effect of high qualification.

high qualified individual averaged over the sample is then:

$$\frac{1}{N}\sum_{n=1}^{N} P_i(y_{i1t}=1|y_{i2t-1}=1,q_{i4}=1) - \frac{1}{N}\sum_{n=1}^{N} P_i(y_{i1t}=1|y_{i1t-1}=1,q_{i4}=1) \qquad (9)$$

State dependence is equivalent to the partial effect of $\mathbf{y}_{it-1}$. Due to the nonlinear functional form of multinomial logit models, state dependence varies by individual and moreover varies systematically with predicted probability.[10] Since our paper is focussed on the question whether low-wage jobs can be stepping stones out of non-employment, we estimate transition matrices for the group of workers who were not employed in period $s-1$.

4 Institutional background and data

The German educational system differs from those of Anglo-Saxon and most European countries. Therefore, we briefly give an overview of the German educational system before describing our sample. At the age of ten pupils leave the elementary school and are allocated into three school tracks: basic school, middle school and advanced school. While the basi9c school and the middle school qualify pupils for vocational training, the advanced school is meant to educate pupils for studies in universities and provides the school leaving certificate which enables absolvents to enter university (*Abitur*). Apart from theory-orientated universities, there are polytechnical universities (technical colleges), which rather prepare students for practice. See Riphahn/Schieferdecker (2010) for further details. Besides universities, Germany has an apprenticeship system where apprentices obtain on-the-job training in establishments and formal education by the state (von Wachter/Bender, 2006). For simplicity, we will use in the following the terminology presented in Table 1.

We use data from the German Integrated Employment Biographies Sample (IEBS). The administrative dataset includes information on employment, unemployment benefits, job search, and participation in active labor market programs on a daily basis. It is available at the Research Data Center of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB) (see Jacobebbinghaus/Seth (2007)).

We restrict our analysis to western Germany, because labor market conditions still vary considerably between western and eastern Germany. As women are much more often inactive on the labor market than men, one should apply different definitions of non-employment for both sexes. Unfortunately, we do not directly observe the search intensity in our dataset. This is why we exclude women from our analysis.

For our study, we build a panel dataset with yearly observations at the reference day June 30 for the period between 2000 and 2006. We analyze yearly transitions between three mutually exclusive states: high-wage employment, low-wage employment and non-employment. An individual is in the state of non-employment, if he is not employed in a job liable to social security and (a) is registered as unemployed, (b) participates in a program

[10] Ai/Norton (2003) illustrate the variance of partial effects of interaction terms.

of active labor market policy or (c) if he is in a period between two employment periods and is registered as unemployed or participating in a program of active labor market policy for at least one day in this period. Since information on employment stems from notifications to social security bodies, we cannot rule out that individuals defined as not employed are working as civil servants or are self-employed. Earlier studies did not have access to information on job search and participation in labor market programs and used information on unemployment benefit receipt for the definition of non-employment. For the analysis of employment dynamics of low-wage workers our definition is more appropiate since only individuals who have been employed for at least twelve months qualify for the receipt of unemployment benefits. If we used unemployment benefit receipt for the definition of non-employment instead of job search, we would loose those low-wage workers with unstable working careers who are of special interest in our analysis.

We follow a large part of the literature on low-wage employment and define an individual as low-paid if he earns less than two thirds of the median gross wage of all full-time employed individuals in western Germany liable to social security. Individuals with wages above these thresholds are called high-paid in our analysis (as it is usually done in the literature), although this category includes workers with wages which are lower than the average.

Although part-time jobs could be an important alternative for individuals searching for an interim job we only consider full-time jobs here. First, working hours are only crudely measured in our dataset and it would be impossible to assess if part-time workers are low-paid or high-paid. Second, including part-time work would force us to define more employment states which would require a huge computational effort.

The econometric models applied in this study are computationally very intensive. Therefore we run our estimations on a random sample of 15 000 individuals of the IEBS who are full-time employed or in the non-employment state in the year 2000. We define an absorbing state for individuals leaving the panel. Individuals enter the absorbing state, when they are working part-time at the reference day, when they cannot be classified as low-paid, high-paid or not employed or when there is a missing value in one of the variables needed in the econometric analysis.[11] Afterwards, they are not considered anymore.

When there is a gap between two episodes of employment at the same establishment that is equal or shorter than 32 days, we combine both job spells. Thereby, we want to reduce problems associated with recalls. Job spells shorter than two weeks are not considered in our analysis. This is because we want to avoid to include single payments. In our econometric analysis we will use information of the prior labor market history between 1995 until 2000. For this period, information about job search and participation in active labor market programs is not available. Therefore, episodes of non-employment simply are defined as gaps between two spells of part-time or full-time employment liable to social security. We suppose that individuals who had no full-time job between 1995 and 2000 have been out of the labor force and do not consider them in our analysis. In order to omit transitions from education to work and from work to retirement, we focus on individuals

[11] Missing values are rare in our administrative dataset. One exception is the variable on education. For this variable, we applied the IPI imputation rule by Fitzenberger/Osikominu/Völter (2006).

older than 29 in 2000 and younger than 59 in 2006. Moreover, we exclude individuals, who during the observation period work as trainees, interns, working students, are in partial retirement, live outside western Germany and individuals who are handicapped.

5 Descriptive statistics

Table 2 shows some descriptive statistics of our pooled sample broken down by labor market state. 85 percent of the observations in the pooled sample are high-paid, 4 percent are low-paid and 9 percent are in the state of non-employment. 2 percent (about 11 percent of all individuals) enter the absorbing state in one of the years between 2001 and 2006 and fall out of the panel.

There is a very low share of individuals with low qualification in the high-wage sector, whereas their share under the low-paid is high. In contrast, the share of individuals with high qualification is extremely small under the low-paid. Moreover, they have a relatively low probability to be not employed. We do not observe that the probability to enter the absorbing state follows a strong systematic pattern with respect to qualification. Germans are less often low-paid or not employed than foreigners and the mean local unemployment rate is lower for high-paid individuals than for the low-paid or not employed.

We now turn to the variables describing the prior labor market history of the individuals in our sample. Sample means of these variables indicate that individuals who have experienced episodes of low-wage employment or non-employment in the past are more likely to be in one of these employment states in the observation period. For instance, the mean cumulated duration of episodes of non-employment between 1998 and 2000 is highest among the non-working individuals (228 days) and lowest among the high-paid individuals. Similarly, the mean cumulated duration of episodes of low-wage employment is highest among the low-paid and smallest among the high-paid. What is more, individuals who enter the absorbing-state on average have a higher number of episodes of non-employment and episodes of low-wage employment between 1995 and 2000.[12]

The relationship between past labor market experience and current labor market outcomes is also highlighted in Table 3. Only 13.77 percent of the individuals who were low-paid in period $t-1$ in our sample got a high-paid job in the following period. 64.19 percent of them remained low-paid. 16.81 percent lost their job, while 5.23 entered the absorbing-state. In contrast, almost all individuals who where high-paid in $t-1$ also were high-paid in t (95.46 percent). Like low-wage workers, individuals who were not working in period $t-1$ were more likely to be not employed or low-paid than previously high-paid individuals. This pattern is in line with results by Uhlendorff (2006) based on data of the GSOEP. The probability of entering the absorbing state is largest for low-paid individuals and smallest for the high-paid.

[12] Note that some individuals enter more than one state in the pooled dataset and therefore one has to be cautious when interpreting this table. However, the pattern described here is also valid when we only consider the variable means calculated for the year 2006.

Note that aggregate transition probabilities vary by qualification. Transition rates to high-wage employment typically are larger for individuals with better qualifications, although the difference between preciously low-paid individuals with lower middle qualification, middle qualification and high qualification is only marginal. 15.57 percent of the low-paid individuals with university or technical college degree obtained a high-paid job in the following period, while only 9.05 percent of the low-wage workers with low qualification moved up the job ladder. The variation of upward mobility from non-employment to high-wage employment varies more dramatically. 23.50 percent of the best qualified workers reach the high-wage sector and only 4.94 percent of the individuals with the lowest qualification get a high-paid job in the next year.

With respect to the average values of our descriptive transition matrix, low-paid workers seem to be better off than those without a job. While the average transition rate to high-wage employment is around 14 percent for both employment states, the transition rate to non-employment is clearly lower for low-wage workers (16.81 percent) than for the non-employed (74.59 percent). Breaking down the transition rates by qualification we get a more differentiated picture. For low-wage workers with low qualification, the transition rate to better jobs is higher, when being low-paid instead of not being employed and hence, low-wage jobs seem to be stepping stones out of non-employment. For the best qualified, however, the transition rate from non-employment to high-wage employment is higher than the transition rate from low-pay to high-pay. This suggests that for individuals with university or technical college degree, low-wage jobs are rather dead-ends regarding future wage prospects.

The statistics presented in this chapter are descriptive and do not allow us to draw conclusions about genuine state dependence in low-pay-no-pay dynamics. Therefore, we apply the econometric model presented in chapter 3.

6 Econometric results

In our empirical analysis, we test alternative specifications of the dynamic multinomial logit models with random effects described in section 3. Some statistics of the estimated models are presented in table 4.[13] We first discuss models without interactions of the lagged labor market states and qualification. Model 1 is a dynamic multinomial logit model with normally distributed random effects which estimates the probabilities to be in one of the four states: high-wage employment, low-wage employment, non-employment, and the absorbing state. All parameters of the variance-covariance matrix are highly significant, that is there are some time-constant unobserved characteristics which affect the probabilities of all states. Ignoring one of the four states could theoretically lead to biased estimates. As the estimation of models with multivariate random effects is computationally very intensive, however, we also tested a model which does not consider the absorbing state. Although panel retention is endogenous the coefficients of both models are very similar. This is consistent with the findings of Van den Berg/Lindeboom (1998) who jointly estimate labor

[13] The regression tables including all coefficients of the models in Table 4 are available on request.

market dynamics and attrition with the Dutch OSA Labour Supply Panel Survey. In the following, we will ignore panel retention.

Model 3 assumes a discrete distribution of the random effects with six mass points. The coefficients are similar to the ones of model 2. However, the AIC of model 2 is slightly lower than that of model 3. We therefore rely on the model with the normal random effects specification in the following. In model 4, interaction terms of the lagged labor market states with qualification are added. This model provides the lowest AIC.

Table 5 shows the estimated coefficients of model 4. High-wage employment in period t serves as the reference category of the dependent variable. The parameters of the variance-covariance matrix (η_2 and η_3 and η_{23}) are clearly significant at the one percent level. The positive sign of the covariance η_{23} shows that there are time-constant unobserved characteristics which enhance the probability to be low-paid or not employed but reduce the probability to be high-paid.

The coefficients of the labor market states in period $s-1$ (year 2000) are highly significant with respect to the probabilities to be low-paid or not employed, respectively, versus the probability of having a high-paid job. This indicates that initial conditions are endogenous and controlling for the initial conditions problem is indispensable. The labor market experience before the year 2000 is correlated with the propensity of being in one of the three labor market states in the years between 2001 and 2006. The higher the number of episodes of non-employment between 1995 and 2000 and the cumulated durations of low-wage employment between 1998 and 2000, the higher is the propensity to be low-paid or not employed in the period between 2001 and 2006. Yet, our model does not allow us to infer whether these correlations stem from true occurrence or duration dependence or whether these variables rather serve as proxies for unobserved heterogeneity.

The coefficients representing the qualification of the individuals in our sample indicate that better qualification leads to a lower probability of being low-paid in comparison with the probability of being high-paid, This is in line with the results of studies estimating the upward mobility of low-wage earners.[14] It has to be noted, however, that these coefficients are likely to be correlated with unobserved heterogeneity and hence cannot be interpreted as causal effects.[15] The coefficients of lower middle and middle qualification on the probability to be in the state of non-employment are positive in sign but insignificant. As expected, individuals with high qualifications have a smaller probability to be not employed than individuals with low qualifications.

We do not detect large statistical effects of age with our model. Only the coefficients of the dummy variables Age: 35-39 and Age: 55-59 are statistically different from the reference category Age: 31-34. Though, there is a high multicolinearity with the individual specific means over time of the age variables. While Turkish nationality does not seem to be

[14] e. g. Schank/Schnabel/Stephani (2009), Mosthaf/Schnabel/Stephani (2011), Grün/Mahringer/Rhein (2011), Pavlopoulus/Fourarge (2010).

[15] The Wooldridge-method is only able to measure causal effects of time-varying variables. This is a minor problem as the time-invariant variables representing qualification are not central in our analysis.

associated with a higher probability of being low-paid or not-employed, individuals with nationalities other than German or Turkish are both more often low-paid or not-employed in our sample. Furthermore, the higher the local unemployment rate, the higher is the probability of not being employed in comparison with the probability of being high-paid.

We now turn to the coefficients of the lagged labor market states and its interactions with qualification. High-wage in period $t-1$ serves as the reference category for the variables low-pay, $t-1$ and non-employment, $t-1$. These variables in turn serve as reference category for the corresponding interactions with qualification and hence have to be interpreted with respect to individuals with low qualification.

That is, the significant parameter of low-pay, $t-1$ on the probability of being low-paid indicates that the low educated who experienced an episode of low-pay in the preceding period have a higher probability of being low-paid again rather than being high-paid in period t. For formerly low-paid individuals with lower middle qualification, the probability of being low-paid is lower than for those with low qualification. The coefficient of the interaction of the lagged labor market state with middle qualification is not statistically different from zero at the 10 percent level. However, individuals who experienced an episode of low-pay in $t-1$ and who have a high qualification have a higher probability of being repeatedly low-paid rather than high-paid than those with low qualification.

Non-employment in $t-1$ also leads to a higher probability of low-pay in period t in comparison with the probability of high-pay in period t. This effect, however, is strongest for individuals with low qualification. All interaction terms of non-employment, $t-1$ are negative in sign, although the coefficient of non-employment,$t-1*$high qualification is not statistically different from zero.

With respect to the probability of non-employment in t the coefficients of the lagged endogenous variables without interactions show, that both the experience of low-wage employment and non-employment lead to a higher probability to be not employed in presence. While not statistically different from zero in every case, the results indicate that low qualified individuals have the lowest probability of being high-paid as compared to not being employed. This pattern is most pronounced regarding the transitions out of non-employment.

To sum up, both the experience of low-wage employment and non-employment in the past enhances the probability of being low-paid or not-paid in presence. While state dependence in non-employment is highest for individuals with low qualification the same is only true for low-wage employment regarding the probability of not being employed in comparison with the probability of being high-paid. Regarding the probability of being low-paid rather than high-paid, workers with lower middle qualification and (although the effect is not statistically different from zero) workers with middle qualification have a lower probability of being low-paid again than those with low qualification. Formerly low-paid workers with high qualification face higher state dependence than those with low qualification and especially than those with lower middle qualification. In section 2, we discussed the different sources of state dependence in low-wage employment. In the following we will argue that the described pattern points to the importance of negative signalling effects for low-wage

workers with high qualification.

In section 2, we argue that low human capital accumulation and negative signalling effects may explain higher state dependence in low-wage employment and non-employment for high qualified individuals. As high qualified workers only face stronger state dependence in low-wage employment and scarring effects of non-employment are highest for workers with low qualifications, we do not believe that low human capital accumulation can explain our results. There is no reason why low human capital accumulation should be more important for high qualified individuals when being low-paid but not when being in the state of non-employment. Episodes of non-employment are more common events in the labor market history of high qualified workers than episodes of low-wage employment (see also Table 2 the argument of McCormick (1990) in section 2). Hence, it is plausible to argue that negative signalling effects are stronger for high qualified individuals when being low-paid but not (to that degree) when being non-employed.

As coefficients of multinomial logit models are difficult to interpret with respect to the size of the effect, we calculated average transition probabilities using the parameters of model 4. Table 6 shows average transition probabilities for those individuals who were not employed in the year 2000 broken down by qualification. Transition matrices calculated for other subgroups in our sample are available on request. The conclusion by Uhlendorff (2006) for western German men that low-wage employment goes along with a higher probability of changing to high-wage employment and a lower probability of getting not employed than non-employment is clearly confirmed for those with low qualifications. The probability of being high-paid is 0.137 for those who were low-paid in $t-1$. This estimate is not in the 5 percent confidence interval of the probability of being high-paid for those who were not employed in $t-1$ (0.037 and 0.092 respectively). The risk of not being employed in t is also lower when being low-paid. The point estimates of the probability of not being employed in t are 0.537 for those who were low-paid and 0.851 for those not employed in $t-1$. The confidence intervals do not overlap.

The same pattern applies for those who have a lower middle qualification level. However, looking at the probabilities of those with middle qualification the picture becomes unclear. The point estimates of the probability of being high-paid for those who were low-paid in $t-1$ lies in the confidence interval of the probability for those who were not employed in the preceding period. Yet, their risk of not being employed is still lower.

We now turn to the transition probabilities of individuals with high qualification. Those with the best qualification have the highest probability of being high-paid and the lowest probability of not being employed. However, with respect to the probability of being high-paid, the probability for those who were low-paid is almost the same in comparison with those who were not paid in $t-1$. State dependence in low-wage work regarding the probability of being high-paid is 34.7 percent points (0.637-0.290) while state dependence for those with low qualification is 31.5 and state dependence for those with lower middle qualification is 23.6. Again, concerning the risk of non-employment low-wage workers are still better off than those not employed.

In sum, our results suggest that low-wage work incurs negative signals for workers with technical college or university degree. While those with low qualification have better labor market prospects when being low-paid instead of not being employed, for individuals with high qualification, this is only true when one considers the risk of non-employment. Regarding the chances to get a high-paid job, low-wage jobs go along with the same transition probabilities as non-employment.

7 Conclusions

In this paper, we examined transitions between high-wage employment, low-wage employment and non-employment using dynamic multinomial logit models which control for unobserved heterogeneity and the problem of initial conditions. Using a rich German administrative dataset, we focussed on heterogeneity in state dependence in both low-wage employment and non-employment with respect to qualification by including interaction terms of the lagged labor market states.

We showed that results of earlier studies that low-wage jobs serve as stepping stones to better-paid jobs still hold for individuals without vocational training and for individuals with apprenticeship and without *Abitur*. However, for individuals with technical college or university degree state dependence in low-wage employment with respect to the probability of getting a high-paid job has about the same size like state dependence in non-employment. Looking at the risk of non-employment, low-wage workers are better off than those not employed regardless of the qualification level.

State dependence in low-wage employment regarding the transition to high-wage employment is strongest for those with the highest qualification level. We conclude that low-wage jobs indeed go along with negative signals for high qualified workers. This result is important for labor market policy. If low human capital accumulation was the most important source of state dependence in low-wage work, high qualified low-wage workers could prevent scarring effects by participating in further training measures. This, however, would not lead to lower state dependence if signalling effects were the main origin of state dependence. In this case, policy makers could weaken employment protection in order to reduce the employers costs of screening workers.

References

Abowd, John M.; Kramarz, Francis; Margolis, David N. (1999): High wage workers and high wage firms. In: Econometrica, Vol. 67, p. 251–333.

Ai, C.; Norton, E. C. (2003): Interaction terms in logit and probit models. In: Economics Letters, Vol. 80, p. 123–129.

Andrews, Martin J.; Gill, Len; Schank, Thorsten; Upward, Richard (2008): High wage workers and low wage firms: negative assortative matching or limited mobility bias? In: Journal of the Royal Statistical Society Series A, Vol. 171, p. 673–697.

Biewen, Martin; Steffes, Susanne (2010): Unemployment persistence: Is there evidence for stigma effects? In: Econmics Letters, Vol. 106, No. 3, p. 188–190.

Buddelmeyer, Hielke; Lee, Wang-Sheng; Wooden, Mark (2009): Low-Paid Employment and Unemployment Dynamics in Australia. Melbourne Institute Working Paper Series, Working Paper No. 06/09, University of Melbourne, Melbourne.

Burdett, Kenneth (1979): Unemployment insurance payments as a search subsidy: A theoritical analysis. In: Economic Inquiry, Vol. 17, No. 3, p. 333–343.

Burdett, Kenneth (1978): A Theory of Employee Job Search and Quit Rates. In: The American Economic Review, Vol. 68, No. 1, p. 212–220.

Caliendo, Marco (2009): Income support systems, labor market policies and labor supply: The German experience. IZA Discussion Paper No. 4665, Institute for the Study of Labor, Bonn.

Cappellari, Lorenzo (2007): Earnings mobility among Italian low-paid workers. In: Journal of Population Economics, Vol. 20, No. 3, p. 465–482.

Cappellari, Lorenzo; Jenkins, P. (2008): Transistions between unemployment and low pay. In: Research in Labor Economics, Solomon W. Polachek and Konstantinos Tatsiramos, p. 57–79.

Cunningham, Stephen; Vilasuso, Jon (1999): The problem with interim employment. In: Journal of Institutional and Theoretical Economics, Vol. 155, p. 321–341.

Fitzenberger, Bernd; Osikominu, Aderonke; Völter, Rober (2006): Imputation rules to improve the education variable in the IAB employment subsample. In: Journal of Applied Social Science Studies, Vol. 126, No. 3, p. 405–436.

Fitzenberger, Bernd; Wilke, Ralf (2010): New insights into unemployment duration and post unemployment earnings in Germany. In: Oxford Bulletin of Economics and Statistics, Vol. 72, No. 6, p. 794–826.

Gibbons, Robert; Katz, Lawrence F. (1991): Layoffs and lemons. In: Journal of Labor Economics, Vol. 9, No. 4, p. 351–380.

Greene, William (2010): Testing hypothesis about interaction terms in nonlinear models. In: Economics Letters, Vol. 107, p. 291–296.

Grün, Carola; Mahringer, Helmut; Rhein, Thomas (2011): Low-wage jobs: A means for employment integration for the unemployed? IAB Discussion Paper No. 1/2011, Institute for Employment Research, Nuremberg.

Heckman, James J. (1981a): The incidental parameters problem and the problem of initial conditions in estimating a discrete time-discrete data stochastic process. In: Manski, Charles F.; McFadden, Daniel (Eds.) Structural analysis of discrete data with econometric applictions, Cambridge: The MIT Press, p. 179–195.

Heckman, James J. (1981b): Statistical models for discrete panel data. In: Manski, Charles F.; McFadden, Daniel (Eds.) Structural analysis of discrete data with econometric applications, Cambridge: The MIT Press, p. 114–178.

Heckman, James J.; Borjas, George J. (1980): Does unemployment cause future employment? Definitions, questions and answers from a continuous time model of heterogeneity and state dependence. In: Economica, Vol. 47, p. 247–283.

Heckman, James J.; Singer, B. (1984): A method for minimizing the impact of distributional assumptions in econometric models for duration data. In: Econometrica, Vol. 52, No. 2, p. 271–320.

Honoré, Bo E.; Kyriazidou, Ekaterini (2000): Panel data discrete choice models with lagged dependent variables. In: Econometrica, Vol. 68, No. 4, p. 839–874.

Hotz, V. Joseph; Kydland, Finn E.; Sedlacek, Guilherme L. (1988): Intertemporal preferences and labor supply. In: Econometrica, Vol. 56, No. 2, p. 335–360.

Hyslop, Dean R. (1999): State Dependence, serial correlation and heterogeneity in intertemporal labor force participation of married women. In: Econometrica, Vol. 67, p. 1255–1294.

Jacobebbinghaus, Peter; Seth, Stefan (2007): The German Integrated Employment Biographies Sample. In: Journal of Applied Social Sciences Studies, Vol. 127, No. 2, p. 335–342.

Korkeamäki, Ossi; Kyyrä, Tomi (2008): A distributional analysis of displacement costs in an economic depression and recovery. VATT Discussion Papers No. 465, Government Institute for Economic Research, Helsinki.

Layard, Richard; Nickell, Stephen; Jackman, Richard (1991): Unemployment. Macroeconomic performance and the labour market. Oxford: Oxford University Press.

Ljungqvist, Lars; Sargent, Thomas J. (1998): The European unemployment dilemma. In: The Journal of Political Economy, Vol. 106, p. 514–550.

Lockwood, Ben (1991): Information externalities in the labour market and the duration of unemployment. In: Review of Economic Studies, Vol. 58, p. 733–753.

Marimon, Ramon; Zilibotti, Fabrizio (1999): Unemployment vs. mismatch of talents: reconsidering unemployment benefits. In: The Economic Journal, Vol. 109, No. 455, p. 266–291.

McCormick, Barry (1990): A theory of signalling during job search, employment efficiency and “stigmatised” jobs. In: Review of Economic Studies, Vol. 57, No. 2, p. 299–313.

Mendes, Rute; van den Berg, Gerard J.; Lindeboom, Maarten (2010): An empirical assessment of assortative matching in the labor market. In: Labour Economics, Vol. 17, p. 919–929.

Mosthaf, Alexander; Schank, Thorsten; Schnabel, Claus (2009): Low-wage employment versus unemployment: Which one provides better prospects for women? Discussion Paper No. 65, Friedrich-Alexander-University Erlangen-Nuremberg, Chair of Labour and Regional Economics, Nuremberg.

Mosthaf, Alexander; Schnabel, Claus; Stephani, Jens (2011): Low-wage Careers: Are there dead-end firms and dead-end jobs? In: Zeitschrift für Arbeitsmarktforschung, Vol. 43, No. 3, p. 231–249.

Oberholzer-Gee, Felix (2008): Nonemployment stigma as rational herding: A field experiment. In: Journal of Economic Behavior & Organisation, Vol. 65, No. 30-40.

Omori, Yoshiaki (1997): Stigma effects of nonemployment. In: Economic Inquiry, Vol. 35, p. 394–416.

Pavlopoulus, Dimitris; Fourarge, Didier (2010): Escaping low pay: do male labour market entrants stand a chance? In: International Journal of Human Manpower, Vol. 31, No. 8, p. 908–927.

Phelps, Edmund S. (1972): Inflation policy and unemployment theory. The cost-benefit approach to monetary planning. London (u. a.): MacMillan.

Rabe-Hesketh, Sophia; Skrondal, Anders (2005): Multilevel and longitudinal modeling using Stata. College Station, Texas: Stata Press, 1 ed..

Riphahn, Regina T.; Schieferdecker, Florian (2010): The transition to tertiary education and parental background over time. forthcoming in Journal of Population Economics, University of Erlangen-Nuremberg, Nuremberg.

Schank, Thorsten; Schnabel, Claus; Stephani, Jens (2009): Geringverdiener. Wem und wie gelingt der Aufstieg? In: Jahrbücher für Nationalökonomie und Statistik, Vol. 229, No. 5, p. 584–614.

Stewart, Mark B. (2007): The interrelated dynamics of unemployment and low-wage employment. In: Journal of Applied Econometrics, Vol. 22, No. 3, p. 511–531.

Taubman, Paul; Wachter, Michael L. (1986): Segmented labor markets. In: Ashenfelter, Orley C.; Layard, Richard (Eds.) Handbook of Labor Economics, Vol. 2, chap. 21, Amsterdam: Elsevier, p. 1183–1217.

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

Van den Berg, Gerhard J.; Lindeboom, Maarten (1998): Attrition in Panel Survey Data and the Estimation of Multi-State Labor Market Models. In: The Journal of Human Resources, Vol. 33, No. 2, p. 458–478.

Van den Berg, Gerhard J.; Lindeboom, Maarten; Ridder, Geert (1994): Attrition in longitudinal panel data and the empirical analysis of dynamic labour market behaviour. In: Journal of Applied Econometrics, Vol. 9, No. 4, p. 421–435.

von Wachter, Till; Bender, Stefan (2006): In the right place at the wrong time: The role of firms and luck in young workers careers. In: American Economic Review, Vol. 96, No. 5, p. 1679–1705.

Wooldridge, Jeffrey M. (2005): Simple Solutions to the initial conditions problem in dynamic, nonlinear panel data models with unobserved heterogenity. In: Journal of Applied Econometrics, Vol. 20, No. 1, p. 39–54.

Table 1: Terminology

no vocational training	low qualification
vocational training, no *Abitur*	lower middle qualification
vocational training, *Abitur*	middle qualification
technical college or university degree	high qualification

Table 2: Variable means by labor market state

	High-pay	Low-pay	Non-employment	Absorbing-state
Low qualification (dummy)	0.09	0.18	0.15	0.12
Lower middle qualification (dummy)	0.68	0.74	0.71	0.66
Middle qualification (dummy)	0.06	0.05	0.06	0.07
High qualification (dummy)	0.17	0.04	0.08	0.16
Age: 30-34 (dummy)	0.08	0.10	0.09	0.10
Age: 35-39 (dummy)	0.25	0.28	0.25	0.27
Age: 40-44 (dummy)	0.26	0.23	0.23	0.25
Age: 45-49 (dummy)	0.21	0.19	0.21	0.20
Age: 50-54 (dummy)	0.15	0.15	0.15	0.14
Age: 55-59 (dummy)	0.05	0.06	0.07	0.04
Nationality: German (dummy)	0.93	0.81	0.84	0.87
Nationality: Turkish (dummy)	0.02	0.05	0.06	0.04
Nationality: other (dummy)	0.04	0.13	0.10	0.10
Local unemployment rate	8.23	8.94	9.24	7.90
Number of low-pay episodes with tenure > 0 / <= 180 days	0.07	0.61	0.53	0.29
Number of low-pay episodes with tenure > 180 / <= 365 days	0.03	0.31	0.19	0.11
Number of low-pay episodes with tenure > 365 / <= 545 days	0.01	0.11	0.06	0.04
Number of low-pay episodes with tenure > 545 / <= 730 days	0.01	0.10	0.03	0.03
Number of low-pay episodes with tenure > 730	0.02	0.31	0.06	0.06
Number of non-employment episodes with duration > 0 / <= 180 days	0.34	0.94	0.87	0.56
Number of non-employment episodes with duration > 180 / <= 365 days	0.09	0.29	0.30	0.17
Number of non-employment episodes with duration > 365 / <= 545 days	0.02	0.13	0.13	0.05
Number of non-employment episodes with duration > 545 / <= 730 days	0.01	0.07	0.10	0.04
Number of non-employment episodes with duration > 730	0.03	0.11	0.19	0.08
Cumulated duration of low-wage employment between 1998 and 2000	18.58	304.48	82.98	71.20
Cumulated duration of non-employment between 1998 and 2000	34.44	161.56	228.05	101.95
Share of observations	0.85	0.04	0.09	0.02
Number of observations	71962	3367	7862	1666
Number of individuals	15140	2926	4539	1666

Source: IEBS (1995-2006); pooled unbalanced sample; 15 000 individuals

Table 3: Descriptive transition matrix by qualification

	High-pay, t	Low-pay, t	Non-employment, t	Absorbing-state, t	Total
High-pay, $t-1$	95.46	0.67	2.24	1.63	100
Low-pay, $t-1$ * low qualification	9.05	68.49	17.32	5.15	100
Low-pay, $t-1$ * lower middle qualification	14.77	63.58	16.87	4.78	100
Low-pay, $t-1$ * middle qualification	14.86	59.43	16.57	9.14	100
Low-pay, $t-1$ * high qualification	15.75	61.42	13.39	9.45	100
Low-pay, $t-1$	13.77	64.19	16.81	5.23	100
Non-employment, $t-1$ * low qualification	4.94	8.11	83.69	3.26	100
Non-employment, $t-1$ * lower middle qualification	13.66	8.82	74.15	3.36	100
Non-employment, $t-1$ * middle qualification	18.39	6.13	69.98	5.50	100
Non-employment, $t-1$ * high qualification	23.50	3.79	66.40	6.31	100
Non-employment, $t-1$	13.55	8.13	74.59	3.73	100

Source: IEBS (1995-2006); pooled unbalanced sample; 15 000 individuals; Transitions between periods t - 1 and t; figures indicate row percentages

Table 4: Model specifications

Model No.	1	2	3	4
Control for panel retention	yes	no	no	no
Distribution of random effects[a]	normal	normal (-)	discrete (6)	normal (-)
Significance of parameters of the variance-covariance matrix	yes	yes	yes	yes
Interactions	no	no	no	yes
Log likelihood	-23423.373	-17013.3	-16983.6	-16960.1
Number of parameters	120	79	91	103
AIC	47086.7	34184.5	34211.5	34126.1

a Number of mass points in parantheses

Table 5: Model 4, multinomial logit model with random effects (normal distribution), model without absorbing-state, with interactions

	Low-pay, t b/se	Non-employment, t b/se
High-pay, $t-1$ (reference group)	-	-
Low-pay, $t-1$ (dummy)	3.664***	2.483***
	(0.322)	(0.311)
Low-pay, $t-1$ * lower middle qualification	-0.567*	-0.904***
	(0.334)	(0.330)
Low-pay, $t-1$ * middle qualification	-0.661	-0.722
	(0.541)	(0.541)
Low-pay, $t-1$ * high qualification	1.010*	-0.286
	(0.612)	(0.608)
Non-employment, $t-1$ (dummy)	3.269***	4.405***
	(0.306)	(0.244)
Non-employment, $t-1$ * lower middle qualification	-0.798**	-1.533***
	(0.324)	(0.252)
Non-employment, $t-1$ * middle qualification	-1.430***	-1.811***
	(0.501)	(0.334)
Non-employment, $t-1$ * high qualification	-0.418	-1.626***
	(0.512)	(0.306)

Table is continued on the next page

Low qualification (reference group)	-	-
Lower middle qualification (dummy)	-0.378*	0.125
	(0.195)	(0.145)
Middle qualification (dummy)	-0.714**	0.326
	(0.310)	(0.204)
High qualification (dummy)	-2.340***	-0.393**
	(0.330)	(0.176)
Age: 31-34 (reference group)	-	-
Age: 35-39 (dummy)	0.060	-0.263**
	(0.154)	(0.116)
Age: 40-44 (dummy)	0.065	-0.286
	(0.243)	(0.181)
Age: 45-49 (dummy)	0.285	-0.149
	(0.332)	(0.244)
Age: 50-54 (dummy)	0.462	0.168
	(0.424)	(0.309)
Age: 55-59 (dummy)	0.920*	0.768**
	(0.524)	(0.378)
Nationality: German (reference group)	-	-
Nationality: Turkish (dummy)	0.218	0.264
	(0.231)	(0.196)
Nationality: other (dummy)	0.530***	0.441***
	(0.159)	(0.136)
Local unemployment rate	-0.007	0.064**
	(0.034)	(0.026)
Individual averages ($\overline{\mathbf{x}_i}$):		
Individual average of age: 35-39	-0.591	-0.147
	(0.365)	(0.297)
Individual average of age: 40-44	-0.578*	-0.061
	(0.330)	(0.259)
Individual average of age: 45-49	-0.656	0.110
	(0.444)	(0.341)
Individual average of age: 50-54	-0.798	-0.154
	(0.521)	(0.392)
Individual average of age: 55-59	-1.039	-0.523
	(0.705)	(0.522)
Individual average of local unemployment rate	0.047	0.002
	(0.037)	(0.028)
High-pay, $t = s - 1$ (reference group)	-	-
Low-pay, $t = s - 1$ (dummy)	3.693***	3.423***
	(0.442)	(0.411)
Low-pay, $t = s - 1$ * lower middle qualification	0.094	-0.267
	(0.432)	(0.414)
Low-pay, $t = s - 1$ * middle qualification	0.791	-0.518
	(0.717)	(0.680)
Low-pay, $t = s - 1$ * high qualification	0.104	-1.857**
	(0.844)	(0.942)
Non-employment, $t = s - 1$ (dummy)	3.158***	4.355***
	(0.441)	(0.386)
Non-employment, $t = s - 1$ * lower middle qualification	-0.208	-0.245
	(0.440)	(0.378)
Non-employment, $t = s - 1$ * middle qualification	-0.095	-0.943*
	(0.690)	(0.550)
Non-employment, $t = s - 1$ * high qualification	-0.386	-0.795*
	(0.642)	(0.478)

Table is continued on the next page

Number of low-pay episodes with tenure > 0 / <= 180 days	0.134*	0.262***
	(0.070)	(0.062)
Number of low-pay episodes with tenure > 180 / <= 365 days	0.018	-0.030
	(0.115)	(0.111)
Number of low-pay episodes with tenure > 365 / <= 545 days	0.160	0.211
	(0.222)	(0.205)
Number of low-pay episodes with tenure > 545 / <= 730 days	0.126	-0.368
	(0.275)	(0.261)
Number of low-pay episodes with tenure > 730	0.791***	0.062
	(0.244)	(0.238)
Number of non-employment episodes with duration > 0 / <= 180 days	0.371***	0.385***
	(0.041)	(0.033)
Number of non-employment episodes with duration > 180 / <= 365 days	0.419***	0.354***
	(0.106)	(0.091)
Number of non-employment episodes with duration > 365 / <= 545 days	0.892***	0.921***
	(0.163)	(0.142)
Number of non-employment episodes with duration > 545 / <= 730 days	0.859***	0.945***
	(0.216)	(0.187)
Number of non-employment episodes with duration > 730	1.046***	1.421***
	(0.220)	(0.182)
Cumulated duration of low-wage employment between 1998 and 2000	0.002***	0.001**
	(0.000)	(0.000)
Cumulated duration of non-employment between 1998 and 2000	0.001**	0.000
	(0.000)	(0.000)
Variance η_2	4.698	0.306***
Variance η_3	4.715	0.280***
Covariance: η_2, η_3	3.655	0.250***
Constant	-6.921***	-6.417***
	(0.339)	(0.267)
Observations	249573	
AIC	34126.1	
Log Likelihood	-1.7e+04	

Source: IEBS (1995-2006); 15 000 individuals; year dummies included
Reference group of the dependent variable is high-pay, $t-1$
Coefficients; Standard errors in parantheses; levels of significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table 6: Simulated transition matrices by group of qualification: initially non-employed

Low qualification									
	High-pay, t			Low-pay, t			Non-employment, t		
High-pay, $t-1$	0.452	(0.348)	(0.555)	0.106	(0.061)	(0.170)	0.443	(0.341)	(0.545)
Low-pay, $t-1$	0.137	(0.084)	(0.211)	0.326	(0.230)	(0.435)	0.537	(0.422)	(0.640)
Non-employment, $t-1$	0.060	(0.037)	(0.092)	0.089	(0.057)	(0.134)	0.851	(0.794)	(0.895)
Lower middle qualification									
	High-pay, t			Low-pay, t			Non-employment, t		
High-pay, $t-1$	0.447	(0.344)	(0.557)	0.076	(0.041)	(0.127)	0.477	(0.371)	(0.575)
Low-pay, $t-1$	0.211	(0.140)	(0.300)	0.275	(0.180)	(0.386)	0.514	(0.403)	(0.620)
Non-employment, $t-1$	0.138	(0.086)	(0.210)	0.095	(0.054)	(0.157)	0.768	(0.675)	(0.836)
Middle qualification									
	High-pay, t			Low-pay, t			Non-employment, t		
High-pay, $t-1$	0.430	(0.321)	(0.545)	0.053	(0.024)	(0.100)	0.518	(0.401)	(0.627)
Low-pay, $t-1$	0.198	(0.108)	(0.318)	0.182	(0.091)	(0.327)	0.621	(0.445)	(0.756)
Non-employment, $t-1$	0.150	(0.088)	(0.234)	0.047	(0.020)	(0.102)	0.803	(0.704)	(0.876)
High qualification									
	High-pay, t			Low-pay, t			Non-employment, t		
High-pay, $t-1$	0.637	(0.535)	(0.726)	0.020	(0.008)	(0.048)	0.343	(0.255)	(0.440)
Low-pay, $t-1$	0.290	(0.175)	(0.431)	0.238	(0.123)	(0.391)	0.472	(0.308)	(0.628)
Non-employment, $t-1$	0.277	(0.205)	(0.355)	0.050	(0.026)	(0.090)	0.674	(0.589)	(0.748)

Source: IEBS (1995-2006); transition matrices simulated with parameters of model 4 averaged over those individuals who were not employed in period $s-1$; five percent confidence intervals in parentheses

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Institute for Employment Research
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Regensburger Str. 104
D-90478 Nuremberg

Editorial staff
Regina Stoll, Jutta Palm-Nowak

Technical completion
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For further inquiries contact the author:

Alexander Mosthaf
Phone +49.911.179 8545
E-mail alexander.mosthaf@iab.de