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Dütsch, Matthias; Struck, Olaf

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## Employment trajectories in Germany: Do firm characteristics and regional disparities matter?

Matthias Duetsch, Olaf Struck



**Otto-Friedrich-University of Bamberg**  
Feldkirchenstraße 21  
96045 Bamberg  
Phone ++49 (0)951 2692  
Fax ++49 (0)951 5637  
Email: [claudia.bauersachs@uni-bamberg.de](mailto:claudia.bauersachs@uni-bamberg.de)  
<http://www.uni-bamberg.de/arbeitswiss/>

## **Abstract**

The employment period is of central importance in the life course and therefore ensuring job stability, whether internally or between firms, is essential for workers. In considering this, it is worthwhile to note from the outset that employees act within a particular framework. Employment trajectories are affected by firm-specific opportunity structures and diverse regional heterogeneities. Furthermore, the role of the business cycle is also an important factor to be addressed. This article is to contribute to existing research on employment trajectories and particularly towards addressing more fully structural factors that frame action, which remain under investigated.

In order to gain a fuller picture of structural and cyclical determinants, a German linked employer-employee dataset as well as data on regional economic characteristics using the 'Spatial Planning Regions' (German statistical units) were merged. The hierarchically clustered data was explored through multilevel models of analysis. Firstly, the key factors of influence on employment stability were identified, followed by the determinants of upward, lateral and downward inter-firm mobility as well as those transitions that lead to unemployment.

This article shows that during an economic upswing inter-firm promotions are more frequently achieved, whereas in an economic downswing the risks of unemployment increase. Moreover, it was found that investment in further training and internal infrastructure has a positive effect on employment trajectories. In addition, work councils increase employment stability, especially during periods of economic growth. In contrast to this, employment trajectories are destabilised through a disadvantageous firm demography as well as the intensive use of fixed-term employment. Densely populated areas offer better employment opportunities, whereas unemployment risks dominate in rural areas during an economic downswing. Furthermore, differences in levels of productivity as well as the particular labour market environment accentuate unequal employment opportunities. Regardless of qualification level, all employees within a region during an economic upswing benefit from the accumulation of a higher level of human capital, whereas during an economic downturn, skill segregation prevails, where it is only the highly qualified that benefit.

*Keywords: Job duration, employment career, structural effects, linked employer-employee data*

# 1 Introduction

The employment period is a decisive phase of the life course. It strongly influences future opportunities in life, especially with regard to wage levels and welfare state entitlements (Heinz 2006; Vobruba 2000). For this reason, from the worker's perspective, job stability has a high value. It shelters the worker from the risk of unemployment and allows for the development of firm-specific human capital (Blossfeld et al. 2006; Boockmann and Steffes 2010; Winkelmann and Zimmermann 1998). Moreover, recent studies conclude that the German labour market is characterised by a significant and growing proportion of mobile workers, while, at the same time, job stability declines for younger cohorts in the labour market (Blossfeld et al. 2006; Giesecke and Heisig 2011). In this context, modern approaches to understanding employment systems show that job stability can also be assured in open employment systems through adequate opportunities for inter-firm mobility (Alewell and Hansen 2012; Lepak et al. 2006; Struck and Dütsch 2012). This allows workers to both preserve and further develop their occupational skills throughout their employment careers. However, downward mobility or transitions to unemployment causes a loss of qualifications and leads to unfavourable labour market chances in the future (ebd.).

To date most research has focused on factors influencing employment trajectories. It is widely documented that individual factors such as gender, nationality, educational level and the particular age cohort play an important role in explaining employment (dis-)continuities (Bergemann and Mertens 2004; Giesecke and Heisig 2011; Hillmert et al. 2004). Furthermore, it has been assumed that changing labour market structures caused by processes of economic change, have affected entry-level employees' career paths (Blossfeld 1986; Hillmert et al. 2004). According to cohort analyses, a poor start to the employment career seems to negatively affect the future development of the life course (ibid.). Moves towards flexible labour markets have increased the practice of atypical employment and altered mobility patterns owing to an increase in periods of unemployment and non-employment (Giesecke and Heisig 2011; Grotheer et al. 2004; Struck 2006).

Although Coleman (1990) has pointed out the importance of the wider social context for individual behaviour, less attention has been paid to the structural effects within life course research. Thus, the impact of firm-specific factors and regional disparities on employment trajectories has been largely unexplored; "new structuralism" stresses the significance of accounting for firm characteristics (Baron and Bielby 1980) and thus it seems pertinent to

consider these factors further. Furthermore, spatial economics, especially the seminal theory on “new economic geography” (Krugman 1991), has stimulated the emergence of a wave of empirical work regards spatial analysis. In using this theoretical approach several economists have exposed the relevance of regional factors on the development of both employment and wages in Germany (Blien 2001; Blien et al. 2002; Möller and Tassinopoulos 2000).

In moving beyond what has been outlined above, this article seeks to contribute more fully to life course research through focussing on structural framework conditions in greater detail. It will consider if and to what extent job stability and a diversity of employment trajectories are influenced by both firm-specific and regional characteristics. In addition, different economic conditions will be taken into account for comparative purposes. To achieve this, a German linked employer-employee dataset was combined with data on regional characteristics from the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR). Based on this new and hierarchically structured data set, a multilevel framework was deployed to evaluate employment trajectories. The article is structured as follows: Firstly theoretical considerations are presented in section 2 followed by the state of current research in section 3. Data and the estimation strategy will be described in section 4. Section 5 contains the empirical results on employment careers in Germany. Finally, section 6 summarises the findings.

## **2 Theoretical background**

### **2.1 Firm-specific factors and the career path**

More recent life course research has accounted for the effect of firms’ internal processes and structures on individual career opportunities, wages and socio-economic status (Ahrne 1994; Baron and Bielby 1980; Struck 2006). Employment careers and mobility processes are perceived as the result of interaction between employers and employees. The dynamics of this interaction stem from labour market segmentation, which is practiced by firms and framed by the institutional setting (Doeringer and Piore 1971; Sengenberger 1987). With this in mind, recent approaches in human resource management systems (HRMS) as well as employment systems derive segmentation processes from the internal labour and employment organisation (Hendry 2003; Lepak et al. 2006; Struck and Dütsch 2012). Looking at transaction cost theory it is argued that firms consist of and apply different employment systems, which is dependent upon the internal labour organisation, the technical equipment and the demand for

professionally accredited qualifications, as well as the availability of workers within both internal and external labour markets. Diverse employment systems differ in the average duration of the employment relationship as well as regards the extent of openness to external markets (ibid.). Especially relevant for workers are the opportunities and constraints of the employment relationship for stability and mobility.

Openness towards external markets can be attributed to particular firm characteristics and human resource structures. Vacancy chain models explain internal employment trajectories by supposing that employment systems are characterised by positioning systems, which can either be more open or closed (Sørensen 1977). In the case where the employment system is relatively closed due to institutional arrangements such as collective agreements, vacancies normally arise through voluntary departures from the firm. In this situation, the worker occupying the next lower position in the hierarchy is promoted to the vacant position (ibid.). Furthermore, approaches in organisational demography are extensions of the vacancy chain model in that they account for the impact of the firm's demographic structures on internal career options (Pfeffer 1985; Mittmann 1992). *Thus, the age distribution of the workforce can cause blocked promotion opportunities for employees positioned ahead of a large age cohort. This creates an employment environment which can lead to voluntary inter-firm mobility.*

Regarding firm size it is often thought that smaller firms show a higher rate of staff turnover than larger companies owing to their more limited capacity for adaption to changing market conditions. Larger companies are able to manage, for example, sudden fluctuations in sales revenue more easily, as they can balance out lost sales in one product area through gains in another (Struck 2006). Furthermore, they can offer more employment opportunities and promotion prospects. This is to say that larger companies are characterised as being able to offer more possibilities for changing jobs, both laterally and vertically, as well as being able to retain more staff than smaller firms (Baron and Bielby 1980; Carroll and Mayer 1986). *Accordingly, inter-firm job changes following employment in a larger company should mostly occur voluntarily and therefore lead more frequently to lateral mobility processes and even upward mobility.*

Owing to processes of economic transnationalism (Blossfeld et al. 2006; Giesecke and Heisig 2011), the shifting of socio-structural frameworks as well as the legal reshaping of what constitutes basic employment conditions (Struck 2006), firms are increasingly taking

advantage of instable and fixed-term employment relationships in order to exploit the potential of flexibility so as to remain competitive. In view of the rising importance of atypical types of employment, it has been frequently observed that the number of non-core employees in firms as well as the rate of mobility in these non-core areas has grown. Regarding this, it is assumed that firm-specific or job-specific human capital cannot be embedded or maintained within the non-core workforce (Blossfeld et al. 2005; Struck and Dütsch 2012). Parallel to these processes, the core staff profit from higher employment stability. *It is thus highly relevant to analyse whether and, when yes, how the application of atypical employment relationships impacts job mobility patterns.*

In addition, individual qualifications and competencies are vitally important for labour market mobility. The education system has sought for decades to support trends towards the acquisition of higher level qualifications. Regarding “skill-biased technological change” (Acemoglu 2002), this has resulted in the restructuring of jobs and their requirements (Bresnahan et al. 2002). In the context of heightened structural and demographic change, an extensive discussion on the past and future role of education as well as the acquisition of competencies has been taking place (Büchel and Pannenberg 2004; Dieckhoff 2007). The completion of further training programmes is considered highly relevant for maintaining or improving social status as well as for staying competitive in the labour market. In this regard, lifelong learning has grown considerably in importance as part of ensuring knowledge is up-to-date, which requires, for example, constant adaption to modern technologies and work processes (ibid.). This is in keeping with human capital theory, which emphasises the place of education and training in raising the productivity and efficiency of workers through increasing both their level of cognitive ability and therewith their individual capability (Becker 1962). *It is necessary to consider empirically whether those firms that provide further training opportunities correspond to more stable jobs and higher wages as well as improved labour productivity.*

It can be assumed that it is important to distinguish between good and poor opportunity structures as regards the breadth of investment in a firm’s infrastructure. Modern technologies should increase internal job stability and employment opportunities, as it takes a comparatively long time to train an employee on effective use. That is, employers have an invested interest in avoiding “sunk costs” (Neubäumer 2006). Following the acquisition of job specific training, employees should benefit through being able to quickly move from one

employer to another owing to the ‘positive signalling effect’ (Spence 1973). *Therefore, high job stability, whether within the firm or between firms, is linked to a firm’s level of technological development.*

Employee representation should lead to the closure of internal employment systems. Employees will aim for personal flexibility above lay-offs (Weber 1968). Based on institutionally framed conditions –the law against dismissal; a right to information as well as the work councils right to be heard – a system of employee representation can organise internal opposition according to, for instance, the exit-voice-approach of Hirschman (1970) and could thus cause higher transaction costs for the employer. *For this reason, work councils and employee representatives should ensure the closure of internal employment systems and thereby increase employment stability.*

## **2.2 Region-specific factors and the career path**

Several established labour market theories share a common avoidance to addressing and explaining the role of macro-structural factors on the labour market (Fujita et al. 2001). In contrast, research on regional economies, whose significance within economic science has increased in recent years (ibid.), stimulated in particular by Krugmans contribution on “new economic geography” (Krugman 1991, 1998), focuses on explaining regional heterogeneities and their impacts on regional growth. In considering this, Krugman (1991) developed a core-periphery model, which according to Hirschman (1958) is based on divergent centripetal and centrifugal forces. It looks at the impact of positive external effects and points to the mutual relationship between economies of scale, transportation costs and migration. Thus, centripetal forces lead to urbanisation effects since they provoke the concentration of economic activities within a certain geographical area. Industrial centres are being strengthened because firms and employees capitalise agglomeration advantages. In the case of high economies of scale, a company tries to limit production to one single facility and to serve the market from there. In order to prevent transportation costs, the company will set up in a location with a high population density and therefore, higher demand. Both the workforce and firms are attracted to a regional economy as part of realising agglomeration advantages, made possible through a larger potential sales market and employee pool (Krugman 1991). Hence, lower transportation costs and higher economies of scale, increase the likelihood of development for economic centres and peripheries alike.



According to Fassmann and Meusburger (1997), a primary segment of the labour market, characterised by stable jobs, good wages, promotion prospects as well as predominantly more highly qualified employees, will be found in central or core economic locations. This is dependent on stable levels of demand and higher economies of scale. In contrast to this, secondary, or peripheral segments of the labour market, characterised by instable and badly paid jobs, lower qualifications, marginal promotion prospects and high unemployment, will take root owing to instable levels of demand and poor market efficiency. *Recent regional economic research can provide evidence for heightened worker demand in densely populated areas (Blien et al. 2006; Farhauer and Granato 2006); however, the question arises if, and when yes, to what extent do agglomeration effects play out on individual trajectories.*

A further approach to regional research, the endogenous growth theory, has established a link between the qualification structures of the regional workforce and economic development. It contests the assumption of neoclassical labour market theory that economic growth is determined exogenously in the long term (Lucas 1988) and rather emphasises the dependence of regional economic growth potential on the level of skills and knowledge available in the region. Due to the fact that employees' productivity increases alongside the acquisition of human capital, the strength of locally embedded human capital is considered to be the "engine of growth" (Lucas 1988), over and above any technological progress. Within this theory, all groups of workers and firms in a region might benefit from productivity gains by increasing wages, as a result of the positive external effects. This is particularly caused by productivity gains within certain groups of workers (e.g. the highly skilled). These spillover effects may occur, for example, due to signalling effects and / or the supply chain. Blien and Wolf (2002) as well as Farhauer and Granato (2006) state that regional growth in employment is positively influenced, when a higher share of the local workforce possess vocational and higher level qualifications. Contrary to this, other studies have shown a divergent development in terms of employment and wages due to increased skill segregation (Gerlach et al. 2002; Schlitte et al. 2010; Stephan 2001). *This paper seeks to further explore if the local level of human capital affects employment trajectories and whether these follow different patterns depending on qualifications.*

### **2.3 Career paths and the business cycle**

The significance of cyclical fluctuations on employee mobility in the labour market can be shown through reference to the sorting model. This explains labour market fluctuations and

the efficient reallocation of employees to workplaces (Hinz and Abraham 2008; Struck 2006). According to this model, seeking new employment while in work only results in a change of job if it holds the promise of higher wages or other non-monetary benefits as well as compensation for extra expenses incurred as a result of job seeking. Therefore, this model provides an economic indicator of employee behaviour as regards the decision to terminate the employment contract. Assuming that a period of economic growth leads to the generation of better paid jobs, then inter-firm mobility will rise due to voluntary job transitions and, parallel to this, average job stability will decline. On the other hand, during a recession only a few attractive jobs will be generated and there is hardly any margin for wage increases. Thus, the incentive for voluntary mobility declines while involuntary layoffs rise (ebd.). *This leads to an interest in considering such cyclical effects on the life course in order to explain specific paths of mobility.*

### **3 State of current research**

Recent empirical studies demonstrate the various effects of firm characteristics on employment careers, through using linked-employer-employee data from the 'Institute for Employment Research'. Grotheer et al. (2004) looked at the job stability of employees, who had just joined a firm. They found work councils to have a stabilising effect on employment as well as a strong correlation between the prevalence of part-time or fixed-term employment and employees leaving the firm. A lack of opportunities for promotion owing to a firm's age demographic was shown to only have a slightly positive effect on the probability of leaving a firm. The manufacturing industry is particularly characterised by stable employment, in contrast to the construction and service sectors. However, the service industry does offer better opportunities for changing employment as well as a reduced risk of unemployment. Boockmann and Steffes (2005, 2010) applied a similar approach for analysing male employees. A positive effect was also evident here from those firms who provided opportunities for further education as well as the presence of a work council. Utilising the German Socio-Economic Panel (GSOEP), Bergemann and Mertens (2004) found a higher risk of dismissals in smaller firms as well as lower rates of layoffs and voluntary departures in larger firms. Giesecke and Heisig (2011), using the same data set, show that men working in larger firms are much more likely to change employer.

Only a few studies assess the effect of regional indicators on job stability or employment trajectories. According to Grotheer et al. (2004), fluctuations in production and demand as

well as high regional unemployment rates provoke a change of employer in west Germany, while mobility between firms and exits into unemployment are lower in the former east Germany. Boockmann and Steffes (2005) have established similar results with regard to unemployment rates within each German state. Whereas in western Germany they could not observe a definite link between higher rates of unemployment and job stability, it was shown to have a stabilising effect in eastern Germany. Furthermore, as well as the unemployment rate, the risk of being made redundant after completing a tenure of employment is higher in western Germany. Regards the former eastern Germany, inter-firm changes are less probable for women. In a further study on male employees, Boockmann and Steffes (2010), however, do not find higher unemployment rates to have a significant impact on employment stability, but rather note a decrease in mobility between west German firms.

Some current research shows the effect of the economic cycle on employment careers. Erlinghagen (2005) investigated its influence on involuntary dismissals in West Germany between 1985 and 2001, based on data from the socio-economic panel and used unemployment rates and the gross domestic product as indicators. According to his results, the probability of dismissal increases during a period of declining economic growth alongside declining employment. In their analysis Giesecke and Heisig (2011) include the gross domestic product and the unemployment rate. Hence, the probability of changing job increases during periods of economic growth. Furthermore, they indicate that the service sector experiences cyclical fluctuations more heavily than does industry. Using the gross domestic product as a cyclical indicator, Struck et al. (2007) found more voluntary fluctuation in periods of growth and higher levels of stability amongst long-term employees. Hübler and Walter (2009), also using data from the socio-economic panel, identified a contra-cyclical risk for dismissal as well as a pro-cyclical risk for terminating employment. Macro-level studies cannot fully explain the reasons for these employment dynamics, however they do support the assertion that job changes occur in a pro-cyclical environment (Fitzenberger and Garloff 2007; Schaffner 2011). According to international studies, wages are also subject to pro-cyclical fluctuations. Thus, wages fall in periods of economic decline for both current staff as well as, and to a higher degree, for new entrants (Hart 2006; Devereux and Hart 2006).

*In general, empirical studies to this point have focused on firm characteristics and cyclical parameters and their impact on employment stability, whereas those more vertical processes concerning mobility – with the exception of transitions into unemployment – have been under-*

*researched. This is despite structural approaches and studies on cyclical effects suggesting the significance of firm-specific determinants as well as particular economic conditions on opportunities for vertical inter-firm mobility. Regional heterogeneities are mostly neglected in research on employment trajectories, or, when used, mostly for an East-West comparison; however, macro-level research points out the employment effects of regional disparities. Keeping this in mind, the following analysis on employment trajectories aims to close these identified research gaps.*

## **4 Data and Method**

### **4.1 Data and Sample Definition**

The database for the following empirical analysis is the German LIAB, a linked employer-employee dataset from the ‘Institute for Employment Research’ (Jacobebbinghaus 2008). It combines data on employees with the ‘IAB Establishment Panel’, which is a representative annual survey of 16,000 business establishments (Fischer et al. 2008). We have made use of the ‘LIAB longitudinal version 2’, which includes approximately 9,700 firms which continuously took part in the survey between 1999 and 2001 or between 2000 and 2002. The employment and welfare recipient histories for the period from 1993 to 2006 are drawn from those persons that were employed in any of the LIAB firms for at least one day between 1997 and 2003.

Data on employees is taken from two different sources. Firstly, the ‘Employee-History’ contains data on individual employment history records submitted by employers to the German public pension insurance system. The reliability of this data is high, as failing to supply accurate information is considered a legal misdemeanour and can even result in a summary offence. One exception concerns individual information on the education variable, which has been adjusted using imputation (Fitzenberger et al. 2005). The Employment Statistics Register covers about 80 percent of total employment. Moreover, ‘Benefit Recipient History’ concerns data on the receipt of unemployment benefits, unemployment assistance or maintenance allowance. Basic personal data on individual employment histories is left-censored and can thus be tracked from 1.1.1993 onwards. The generated data enables us to identify the three labour market states, namely, ‘unemployment’, ‘new employment’ and the ‘employment gap’. However, it is not easy to identify all periods of unemployment as only information for the occasions a person received unemployment benefits from the German

Federal Employment Agency are recorded. Owing to this, the data does not account for those unemployed people who were not officially registered as such. Thus, a cleansing procedure has been used to generate the three labour market states, as detailed above. A job change between firms has been defined as a period of frictional unemployment, which does not exceed 90 days. An unemployment period has been defined, moreover, as a period when the job-seeker receives unemployment benefits for at least one day over 90 days. Finally, the state 'out of the labour force' is activated when no change of employment within the 90 day period has occurred, nor have unemployment benefits been received. Thus, this data allows us to construct complete employment biographies for those employees covered by the LIAB.

In addition, the LIAB dataset and data on regional characteristics derived from the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) have been merged. This contains information on rates of unemployment, GDP per capita, regional typologies with regard to population density and their place as core or peripheral regions, as well as the share of students. This data is based on annual averages. The identified indicators exist for the 97 German Spatial Planning Regions, which is considered adequate for competently analysing regional labour markets (Schwarze 1995; Rendtel and Schwarze 1996). Thus, this generated dataset permits simultaneous analyses of both the employer and the employee, as well as the regional context. As noted in chapter 2.3, it is necessary to consider cyclical effects on employment trajectories. For this reason, terminations of employment, which took place in 1999 and 2002, were examined. As figure 1 shows, using the output gap<sup>1</sup> as well as the unemployment rate, 1999 was characterised by economic growth, whereas 2002 as one of decline (cf. also Sachverständigenrat 2008, 2009).

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<sup>1</sup> For dating distinct cyclical up- and downswing phases the definition of the expert advisory board is reverted to. The concept of the expert advisory board (Sachverständigenrat 2008: 78ff.) reflects the so-called output gap, i.e. the relative deviance of the GDP from the production potential as percentage.

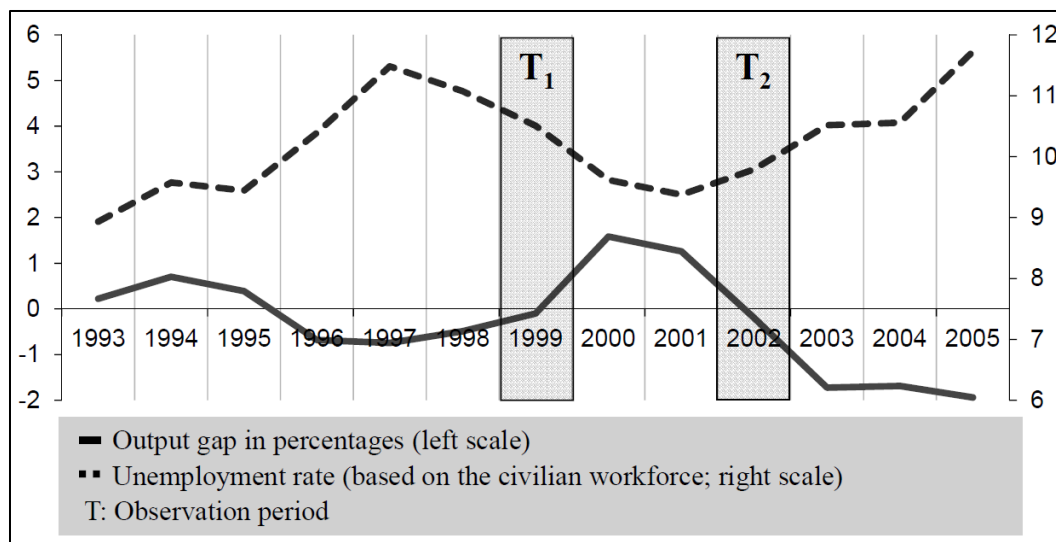


Figure 1: Observation periods and the economic cycle

The period reflected in  $T_1$  examines persons who were already employed on 1.1.1999 or were employed between 1.1.1999 and 31.12.1999.  $T_2$ , on the other hand, considers those employees, who were part of the workforce as of 1.1.2002 or were employed between 1.1.2002 and 31.12.2002.

The used data is restricted to persons aged between 25 and 52, who are in full-time employment and excludes individuals in vocational training or in work during the university break. This is moreover useful to avoid any confusion between those exiting employment and those taking early retirement. When a subject appears in the sample twice, the employment period with the higher income will be used. Furthermore, those employees whose income is above the income assessment ceiling are excluded, as this information is censored. These conditions provide a sample of 370,779 persons, 1,836 firms and 97 regions during 1999 as well as 363,339 workers, 2,140 firms and 97 regions during 2002.

## 4.2 Econometric Method

In what follows, multivariate analyses are performed using data that comprises workers, firms and regions. Structuring the data from the level of the region to the worker is an important detail when choosing an estimation procedure. Moulton (1986, 1990) noted that the inclusion of meso- and macro-level variables in a standard regression analysis leads to an inefficient estimation of the coefficients and to biased standard errors. To counteract this problem, three-level models with random effects have been used (Rabe-Hesketh and Skrondal 2008; Skrondal and Rabe-Hesketh 2003). Based on this three-level approach, employment

trajectories are assessed using a two-stage procedure: Firstly, the risk of job exit is calculated through a generalized linear mixed model for a binomial response with a logit link (ibid.):

$$\text{logit}\{\Pr(y_{ijk} = 1|x_{ijk}, C_{jk}^{(2)}, C_k^{(3)})\} = \beta_0 + \beta_1 x_{ijk} + C_{jk}^{(2)}, C_k^{(3)}$$

In the above,  $\beta_0$  represents the regression constant.  $\beta_1$  refers to the fixed effects and  $x_{ijk}$  is a vector with explanatory variables at the individual, firm and regional levels. Finally,  $C_{jk}^{(2)}$  and  $C_k^{(3)}$  represent random intercepts for both firms and regions. Secondly, a competing risk model is used to explore the career paths of four possible destination states, including, ‘*upward job-to-job mobility*’, which is defined as an increase in wages of at least 10%, ‘*lateral job-to-job mobility*’, ‘*downward job-to-job mobility*’, defined as a decrease in wages of more than 5% and ‘*unemployment*’. This will follow the use of linear mixed models to separate each state or career path. This analysis is carried out using a large set of 50 explanatory variables, which can be divided into those concerning individual, firm-specific and region-specific factors. Looking at individual factors, information includes details on gender, age, level of education, nationality, job position, as well as on the corresponding firm entrance cohorts and on previous periods of employment. Firm-specific characteristics include firm size, age distribution, details on contracts and investments, the presence or absence of work councils in the governance of the business organisation, and the employment sector. Region-specific factors concern the differentiated types of regions, the level of human capital, productivity and the unemployment rate.<sup>2</sup>

## 5 Results

### 5.1 Transition patterns after leaving employment

Firstly, descriptive transition rates of the full-time employed are examined for the years 1999 and 2002 in order to obtain a first indication of mobility patterns during different economic and business cycles. These are illustrated in table 1.

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<sup>2</sup> Descriptive statistics of individual, firm-specific and region-specific characteristics are reported in tables 4 to 6 in the appendix.

Table 1: Status after leaving employment (%)

	Year 1999	Year 2002	p-value <sup>1</sup>
<b>Exit from job</b>	9.16	8.34	0.371
<b>Exit states<sup>2</sup></b>			0.000
<b>Inter-firm upward mobility</b>	20.04	13.73	
<b>Inter-firm lateral mobility</b>	15.12	14.07	
<b>Inter-firm downward mobility</b>	9.88	9.61	
<b>Unemployment</b>	25.98	29.88	
<b>Employment gap</b>	29.04	32.70	

<sup>1</sup> t-tests and chi<sup>2</sup>-tests were performed to explore the differences between the two years.

<sup>2</sup> Percentages do not add up to exactly 100 due to imprecise rounding.

Source: Linked Employer-Employee Data (LIAB); own calculations

The results show that in the majority of cases, irrespective of the economic environment, and in both years, almost 10 % of employees left the firm owing to layoffs. Approximately 20 % of workers attained a higher position through inter-firm mobility in 1999, a period of economic growth, whereas 55 % were not in employment. During the periods of economic decline only 14 % of employees improved their employment status through inter-firm mobility. In contrast, 63 % moved into non-employment. On the whole the results indicate varying patterns of mobility. In the identified periods of economic growth, voluntary changes between firms are more likely to be accompanied by an improved income, whereas during periods of decline, fewer transitions between firms and more personnel layoffs are observed. This is in line with research that looked at pro-cyclical fluctuations in employment mobility (Fitzenberger and Garloff 2007; Hübler and Walter 2009; Schaffner 2011) as well as on wages (Hart 2006; Devereux and Hart 2006).

With this in mind, the question of which firm and regional factors influence the opportunities and risks in employment careers, considering here in particular different cyclical phases, needs to be addressed. In addition, individual characteristics will also be briefly reported since they are of considerable importance according to existing research on employment trajectories (Bender et al. 2000; Giesecke and Heisig 2011; Hillmert et al. 2004). The results of the analysis are illustrated in table 2.

## 5.2 Individual determinants

In line with Giesecke and Heisig (2011), the detailed coefficients demonstrate that job exit rates for female employees are higher than for their male colleagues and, moreover that they are at greater risk of unemployment. Foreign nationals suffer from greater employment instability. A foreign national is unlikely to manage a direct change of firm after leaving employment and thus more likely to move into unemployment. Regarding the age cohort,



older workers benefit from more stable employment conditions than those between 25 and 34 years of age (see also Grotheer and Stuck, 2004). It is worth noting, however that older employees change employment rarely, but are instead more likely to move into periods of unemployment, particularly during an economic upswing. This is to say that younger employees – supporting the job shopping theory (Johnson1978) – display greater inter-firm mobility.

Furthermore, mobility patterns differ vastly depending on qualification level. The lower the qualification of employees, the more likely they are to find themselves in instable employment as well as an increased likelihood of transitions into unemployment. However, they also benefit from an improved economic environment, using it to achieve higher wages and thereby avoiding downward mobility. In contrast to this, highly qualified workers make a voluntarily decision in favour of inter-firm mobility. They are able to prevent unemployment and downward mobility more successfully, particularly in periods of economic contraction. These results on the decisive role of the qualification level are broadly in agreement with those of Giesecke and Heisig (2011). However, contrary to this, it has been further uncovered that more lowly qualified personnel also profit from an economic upswing, using this environment to avoid downward mobility and even to achieve higher wages, through strategically changing employer. Compared to the skilled blue collar worker, the unskilled blue collar worker is more likely to leave the firm and is at greater risk of unemployment. In comparison to this, white collar workers are employed more stably and are at a lower risk of unemployment. Though both these groups of employees have lower career opportunities during periods of economic growth than skilled blue collar employees, during an economic downturn, the opposite is the case.

In line with the results of Boockmann and Steffes (2010), higher employment exit rates can be found for entry-level employees. Employees who have entered the firm within the last year have higher inter-firm promotion prospects. Furthermore, previous employment periods consistently show a positive effect as it leads to greater external career opportunities. The longer workers with previous unemployment or non-employment periods are employed, the more likely they will be able to reduce scarring effects and thus stabilise their future careers. To summarise this, the length of the current employment period diminishes the negative effect of past unemployment or non-employment in the biography. Therefore, it can be seen, and in

keeping with Heckman and Borjas (1980), it is necessary to distinguish between different state dependences in the research on employment trajectories.

### 5.3 Firm-specific determinants

Firm-specific effects that structure the life course will now be explored. It has been said that internal career progression is influenced by the firm demography (Pfeffer 1985; Mittmann 1992; Sørensen 1977). Therefore, when this is not conducive to good promotional prospects, employees can be expected to seek alternative employment. Accordingly, it is observed that it is actually those workers positioned ahead of a large age cohort who are most likely to leave the firm.<sup>3</sup> Parallel to this, if a change of firm occurs, they are at greater risk of finding themselves unemployed or having their promotional prospects restricted. This runs contrary to the results of Grotheer et al. (2004) for the former west and east Germany. Since these authors only examined new entrants, they conclude that the higher probability of entry and exit exceeds the effect of firm demography, which is indeed valid for medium age cohorts. This bias, however, does not appear in the present analysis that includes all full-time labour market participants. Due to the demographical structure we conclude that blocked promotion opportunities raise the probability of exiting a firm and, furthermore, destabilise employment trajectories.

Moreover, it has been argued that career progression prospects and employment options vary according to the size of the firm. The results indicate that the larger the firm, the lower the rate of exits; which strengthens the closure of employment systems with regard to the external job market. This was especially apparent during the cyclical decline in 2002 by way of comparatively low unemployment risks.<sup>4</sup> Regarding exits or changes from large firms during the period of economic upswing in 1999, it is particularly lateral transitions between firms that are prominent. However, those employees who change employment seem restricted in

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<sup>3</sup> The dummy variable 'blocked promotion opportunities' is coded with 1 if a person's position was ahead of the median of the age distribution within a firm. This is especially the case if an older age cohort is strongly represented within a firm and the own age cohort is ahead. Then, promotion opportunities for the succeeding younger cohorts should be blocked by the older cohorts. It is to be considered that this modeling is aimed at left skewed or normally distributed age patterns, since bimodal or multimodal age distributions are captured insufficiently.

<sup>4</sup> For that purpose, the indicated coefficients have been transformed in Odds-Ratios ( $Exp(\beta)$ ), which represent the delogarithmized logit-coefficients. They can be expressed as probabilities  $((Exp(\beta) - 1) * 100)$ .

their ability to increase their income. This confirms that larger firms show a lower turnover rate due to their greater scope for flexibility (Struck 2006) and diverse types of employment (Baron and Bielby 1980; Carroll and Mayer 1986).

Concerning the changing nature of employment contracts and in particular the growing importance of atypical employment, the consequential destabilising effects on career trajectories has been pointed in recent years (Struck and Köhler 2004; Struck 2006). In this study, fixed-term employment has been examined, as one type of atypical employment.<sup>5</sup> This found that job stability declines according to the level of fixed-term employment within the firm, and independent of the economic environment. In addition, unemployment risks increase after exiting a firm. Only during the cyclical periods of growth is the employment risk reduced, since, in this situation, employees can avail of lateral inter-firm changes. To summarise, firms using atypical, fixed-term employment arrangements offer disadvantageous opportunity structures, as they increase the level of individual risk in the employment trajectory (see also Grotheer et al. 2004).

Human capital theory (Becker 1962) states that further training increases employment stability and reduces the risk of unemployment. It can be assumed that especially those firms that have invested in their employees' human capital have an interest in reducing voluntary exits so as to avoid "sunk costs" (Neubäumer 2006). The results indeed support that during cyclical decline employment stability is higher in firms, which invest in further training. Employees who quit a firm with relevant further education or training, profit from a comparatively low risk of unemployment and are affected less by lateral mobility or decline. Furthermore, investment in the firm's infrastructure has been taken into account. Firms with state-of-the-art technology and equipment provide for a stabilising effect on employment trajectories during periods of growth. They increase the stability of employment and thereby protect workers from downward inter-firm mobility as well as from unemployment. Moreover, while those firms that have state-of-the-art technology and equipment cannot retain their employees during an economic slowdown, their employees are relatively well protected from unemployment after leaving. In the case of transitions between firms they manage to maintain or even improve their income. This demonstrates that due to their structure, firms offer different opportunities for employee development, which determines to a large extent

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<sup>5</sup> The intensity of use by the firms is pictured, based on the share of fixed-term employees in the entire workforce.

the changes and risks within employment trajectories. This also refers to inter-firm mobility processes, because in these cases the opportunity structures of firms have a signalling effect for future employers (Spence 1973).

The presence of work councils and employee representation should increase employment stability owing to their powers of negotiation (Hirschman 1970; Weber 1976). According to this analysis, however, the stabilising effect of work councils and employee representation can only be observed in a period of economic growth. During decline, personnel layoffs will still be implemented even if these institutions for representation are present. These results add to the findings of recent studies on mobility (Boockmann and Steffes 2005, 2010; Grotheer et al. 2004), which identify the stabilising effect of work councils and employee representation. If the cyclical economic phases are explicitly modelled, it becomes clear that during a cyclical downturn, internal closure is, apparently, impossible. Furthermore, it has been noted that dismissed employees realise promotions or lateral changes less frequently, even if a work council or employee representation are established in the firm.

With regard to the economic sectors, during economic growth, agriculture, forestry and mining are characterised by lower exit rates in comparison to the manufacturing industry. With regard to changing the employer, employees who quit the firm are more likely to move into periods of unemployment and are rarely able to achieve a promotion or a lateral change. During decline, however, exits as well as direct firm changes are more likely. The construction sector, largely independent of the economic environment, is characterised by low employment stability and increased unemployment risks. In line with the results of Giesecke and Heisig (2011), it can be seen that in industry and other services, pro-cyclical voluntary mobility dominates. For firms, independent of economic conditions, employment stability is quite similar in the services sector and in the manufacturing industry.

Table 2: Generalized linear mixed models for a binomial response on individual, firm-specific and region-specific factors influencing employment trajectories

Independent variables	Year 1999					Year 2002				
	Exit from Job	Inter-firm career path			Unemployment	Exit from Job	Inter-firm career path			Unemployment
		Upward mobility	Lateral mobility	Downward mobility			Upward mobility	Lateral mobility	Downward mobility	
<b>Individual factors</b>										
Sex (1 = female)	0.432 ***	-0.408 ***	-0.264 ***	-0.139 **	0.245 ***	0.568 ***	-0.253 ***	-0.158 ***	0.228	0.184 ***
Nationality (1 = Foreign)	0.023	-0.105 *	-0.502 ***	-0.125 *	0.358 ***	0.001	-0.221 ***	-0.639 ***	-0.181	0.291 ***
Age: Reference.: 25 to 34 years of age										
35 to 44 years of age (1=yes)	-0.354 ***	-0.601 ***	-0.253 ***	-0.274 ***	0.106 ***	-0.346 ***	-0.572 ***	0.008	-1.154 ***	0.021
45 to 52 years of age (1=yes)	-0.326 ***	-0.858 ***	-0.341 ***	-0.484 ***	0.297 ***	-0.263 ***	-0.898 ***	0.346 ***	-1.320	0.121 ***
<b>Highest Degree of Education: Ref.:</b>										
Secondary school and vocational training										
No vocational training (1=yes)	0.111 ***	0.326 ***	-0.141 **	-0.388 ***	0.085 **	0.169 ***	0.043	-0.116 *	-0.277	0.062 *
A-Level and vocational training (1=yes)	0.021	0.379 ***	-0.012	0.055	-0.207 ***	0.042	0.289 ***	0.013	-0.423	-0.223 ***
University degree (1=yes)	-0.303 ***	0.136 **	0.007	-0.343 ***	-0.367 ***	-0.520 ***	-0.362 ***	-0.461 ***	-1.895 ***	-0.320 ***
<b>Job Position: Ref.: Skilled blue collar</b>										
Unskilled blue collar (1=yes)	0.318 ***	-0.133 **	0.088 *	0.279 ***	0.665 ***	0.309 ***	0.082	0.092 *	0.473 **	0.574 ***
Master craftsman (1=yes)	-0.274 ***	-0.499 ***	0.331 ***	-0.503 ***	-0.321 **	-0.387 ***	0.442 ***	-0.142	-1.497 *	-0.595 ***
White collar (1=yes)	-0.225 ***	-0.149 ***	-0.001	-0.483 ***	-0.314 ***	-0.139 ***	0.271 ***	0.341 ***	-0.880 ***	-0.365 ***
<b>Cohorts and previous employment state:</b>										
Ref.: Permanently employed										
First employment (1=yes)	0.968 ***	1.794 ***	0.173	0.456	1.318 ***	0.803 ***	0.813 ***	-0.152	3.067 ***	1.181 ***
Entrance at most one year ago * Share of employment (1=yes)	2.211 ***	3.966 ***	1.733 ***	3.324 ***	2.181 ***	2.168 ***	3.727 ***	1.379 ***	3.184 ***	2.110 ***
Entrance at most one year ago * Share of unemployment (1=yes)	3.516 ***	4.151 ***	1.378 ***	3.740 ***	4.779 ***	3.244 ***	3.607 ***	1.055 ***	3.058 ***	4.330 ***
Entrance at most one year ago * Share of non-employment (1=yes)	2.742 ***	3.638 ***	1.030 ***	3.197 ***	2.752 ***	3.068 ***	3.784 ***	0.520 ***	3.279 ***	2.483 ***
Entrance 1 to 5 years ago * Share of employment (1=yes)	1.646 ***	3.925 ***	1.710 ***	2.800 ***	1.107 ***	1.533 ***	3.564 ***	1.488 ***	2.748 ***	1.016 ***
Entrance 1 to 5 years ago * Share of unemployment (1=yes)	1.461 ***	2.275 ***	0.737 ***	1.554 ***	2.691 ***	1.477 ***	1.626 ***	-0.542 **	1.365 ***	2.476 ***

Entrance 1 to 5 years ago * Share of non-employment (1=yes)	1.097 ***	2.420 ***	0.504 ***	1.165 ***	1.585 ***	1.103 ***	1.944 ***	-0.407 **	1.388 ***	1.449 ***
Entrance more than 5 years ago * Share of employment (1=yes)	3.851 ***	6.100 ***	2.832 ***	4.274 ***	1.094 ***	3.837 ***	5.523 ***	2.908 ***	4.879 ***	0.968 ***
Entrance more than 5 years ago * Share of unemployment (1=yes)	0.139	-0.548	-0.256	-0.538	1.095 ***	-0.078	-6.138 *	-2.968 ***	-2.000	1.013 ***
Entrance more than 5 years ago * Share of non-employment (1=yes)	0.509 ***	-4.672 ***	-1.159 *	-5.993 **	0.004	0.242 **	-5.702 ***	-1.421 **	-6.997 ***	0.400 **
<b>Firm-specific factors</b>										
<b>Age distribution</b> (Blocked promotion-opportunities: 1=yes) <sup>1</sup>	0.159 ***	0.025	-0.199 *	0.095 *	0.135 ***	0.105 ***	-0.035	0.409 ***	0.481	0.080 **
<b>Firm size:</b> Ref.: Small firm										
Small medium-sized firm (1=yes)	-0.165 **	-0.188	0.377 *	0.173	-0.408 ***	-0.381 ***	-0.104	-0.008	0.759	-0.511 ***
Medium-sized firm (1=yes)	-0.274 ***	-0.296 **	0.430 *	0.184	-0.633 ***	-0.425 ***	-0.166	0.138	1.229	-0.828 ***
Larger firm (1=yes)	-0.268 ***	-0.137	0.326 *	0.195	-0.758 ***	-0.557 ***	-0.530 ***	-0.191	-0.168	-1.110 ***
<b>Atypical employment</b> (Share of fixed-term employees)	0.989 ***	0.307	1.035 ***	0.383	1.362 ***	0.962 ***	0.049	-0.033	1.303	1.561 ***
<b>Investments</b>										
Investments in further training (1=yes)	-0.212 ***	-0.007	-0.325 ***	-0.241 *	-0.178 **	-0.316 ***	0.132	-0.486 ***	-0.946 *	-0.314 ***
Technological state of machinery and equipment (1= state-of-the-art equipment)	-0.145 ***	0.037	-0.225 **	-0.327 ***	-0.368 ***	-0.006	0.260 ***	0.086 *	-0.683	-0.201 ***
<b>Co-determination</b> (Works council: 1=yes)	-0.212 ***	-0.526 ***	-0.627 ***	-0.126	0.030	-0.070	-0.253 ***	-0.227 ***	0.274	-0.030
<b>Sector:</b> Ref.: Manufacturing industry										
Agriculture, forestry and mining (1=yes)	-0.347 ***	-1.361 ***	-0.536 **	-0.201	0.674 ***	0.621 ***	1.401 ***	0.675 ***	1.631 *	0.039
Construction (1=yes)	0.548 ***	-0.200 **	-0.029	0.260 **	0.938 ***	0.739 ***	0.171	0.095	1.045	0.792 ***
Trade (1=yes)	0.213 ***	0.149 *	0.115	0.514 ***	0.113	0.123	0.102	0.039	0.956	0.135
Services for firms (1=yes)	0.117	0.330 ***	-0.279	0.011	0.133	0.186	0.120	0.649 ***	0.894	-0.027
Other services (1=yes)	0.134 ***	-0.037	0.232 **	-0.037	-0.106	-0.025	-0.105	-0.169 ***	0.388	-0.219 ***
<b>Region-specific factors</b>										
<b>Types of region:</b> Ref.: Densely populated agglomerations										

Agglomerations with outstanding centres (1=yes)	0.293 ***	0.708 ***	0.637 ***	-0.017	0.126	0.209 **	0.758 ***	0.457 ***	1.102 **	0.156
Urbanised areas of higher density (1=yes)	0.397 ***	0.773 ***	0.748 ***	0.130	-0.055	-0.001	0.114	0.454 ***	-0.397	-0.162
Urbanised areas of medium density and large regional centres (1=yes)	0.176 ***	0.062	0.277 *	0.009	0.141	0.113	0.558 ***	0.362 ***	-0.446	-0.085
Urbanised areas of medium density without large regional centres (1=yes)	0.086	-0.057	0.513 **	0.186	-0.040	0.084	0.873 ***	0.054	-1.235	-0.313 *
Rural areas of higher-density (1=yes)	0.138 *	-0.330 **	0.321 *	0.242	0.218	0.032	0.219	0.128	0.616	-0.000
Rural areas of lower-density (1=yes)	0.110	0.043	0.0103	0.068	0.167	0.208 *	0.203	0.213 *	-0.951	0.224 *
<b>Productivity (GDP per capita)</b>	0.040 ***	0.021 **	0.027 ***	0.017 *	-0.035 ***	-0.013 *	-0.012	-0.015 ***	-0.294 **	-0.007
<b>Unemployment rate</b>	-0.017 ***	-0.014	-0.021 *	-0.019	0.014	-0.008 *	-0.036 ***	-0.020 ***	-0.748 ***	0.030 ***
<b>Accumulation of human capital (Share of students)</b>	-0.002	-0.003	0.008 **	0.005	0.004	0.001	0.009 ***	0.010 ***	0.154 ***	-0.003
Constant	-3.357 ***	-6.706 ***	-6.002 ***	-6.987 ***	-4.643 ***	-2.998 ***	-7.077 ***	-4.783 ***	-6.297 ***	-4.189 ***
Episodes (persons)	370779	370779	370779	370779	370779	363339	363339	363339	363339	363339
Episodes (firms)	1836	1836	1836	1836	1836	2140	2140	2140	2140	2140
Episodes (regions)	97	97	97	97	97	97	97	97	97	97
Residual variance (firms)	0.208	0.109	0.775	0.591	0.531	0.183	0.274	0.024	1.248	0.738
Residual variance (regions)	0.075	0.067	0.054	0.048	0.009	0.044	0.054	0.010	0.090	0.052
log likelihood (final values)	-80269	-20597	-19151	-15144	-30915	-74991	-14466	-18377	-12833	-31670

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

<sup>1</sup>“1” indicates that an employee is positioned ahead of the median age in the internal age distribution

Source: Linked Employer-Employee Data (LIAB); own calculations

## 5.4 Region-specific determinants

According to Krugman (1991) there are divergent centripetal and centrifugal forces that tend to promote, or even oppose, geographical concentration. This leads to the development of urban economic centres and more rural peripheries, which offer different opportunity structures for employment (Fassmann and Meusburger 1997). The results in table 2 show the following with regard to periods of economic growth: In agglomerations with outstanding centres as well as in areas with well-developed, urbanised centres and higher population densities, internal employment stability is less than in densely populated agglomerations; however, inter-firm promotions as well as lateral changes will be realised more regularly. In urbanised areas with an average population density and large regional centres, more frequent and predominantly lateral transitions between firms can be observed, whereas in rural areas of higher population density upward mobility becomes less likely. During an economic downturn, high inter-firm mobility is only observed in those economic regions with well-developed, urbanised centres. Furthermore, in urbanised areas, it would seem that the limited number of employees who change employment are doing so voluntarily, as this provides improved opportunities for upward or lateral employment transitions. Contrary to this, leaving employment in rural, lower-density areas is often accompanied by a higher risk of unemployment. Our findings indicate – as stated by Fassmann and Meusburger (1997) – that urbanised areas offer more and better options for employment. In contrast to this, increased unemployment risks exist in rural areas, especially during the cyclical periods of economic decline.

The economic productivity of each defined region has been determined using gross domestic product (GDP). This measure supports that during improvements in the economic cycle, higher job mobility, as well as more transitions between firms, and lower unemployment risks corresponds to a higher level of regional productivity. Moreover, comparatively high regional productivity also protects employees during an economic downturn from dismissals and downward inter-firm mobility. Furthermore, a fuller picture of regional heterogeneities is seen with reference to local unemployment rates. Independent of the economic environment, employment exits are observed less frequently, the higher the regional rate of unemployment is. This indicates that lower voluntary mobility takes place in those regions, which are characterised by a struggling labour market. If employees leave the firm in regions with high unemployment rates and during a period of economic decline, the chances of a transition



between firms is comparatively marginal, while the risks of unemployment increase. Thus, such unequal career prospects indicate regional segmentation in the labour market.

The local accumulation of human capital is highly significant for the development of economic growth and employment prospects (Lucas 1988). In order to determine the effect of the accumulation of human capital on employment trajectories, we have used data on the share of students within the regional demographic. The results show that regional disparities during periods of growth only have a marginal impact on employment trajectories, whereas in periods of decline the probability of changes between firms rises in accordance with the accumulation of human capital. However, recent studies (Gerlach et al. 2002; Schlitte et al. 2010; Stephan 2001) refer to the increased prominence of skill segregation, and that especially highly qualified employees are seen to profit from an improvement in the regional skill-level structure. We analyse this thesis through devising a cross-level comparison between each of the identified qualification groups.<sup>6</sup> As shown in table 3, the less qualified benefit from the acquisition of a higher level of human capital through realising upward or lateral inter-firm mobility during an economic upturn. This also applies to those employees who have successfully completed their upper-level high school leaving certificate and further vocational training. In contrast, those employees who have completed a secondary school certificate and vocational training are employed in more stable employment, the higher the local level of human capital is. This finding also transfers to more highly qualified employees; they are more likely to avail of the external job market for upward mobility and are in little danger of downward mobility or unemployment. In comparison, during a downturn, employees with no vocational training are employed comparatively insecurely despite the higher local level of human capital and are also at a higher risk of downward mobility. In an economic decline only those employees with a secondary school and vocational training certificate profit from the higher stock of human capital to achieve inter-firm promotions. This also applies to highly qualified workers who are in stable employment. Thus, the results on the local level of human capital differ depending on the economic context. During an upturn in the economy, all qualification groups benefit from a higher regional level of human capital – as found by Blien and Wolf (2002) as well as Farhauer and Granato (2006); however, and in accordance with the results of Gerlach et al. (2002), Schlitte et al. (2010) and

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<sup>6</sup> Results are taken from separate estimations which are otherwise identical to those displayed in Table 2.

According to likelihood ratio tests, all interaction effects are highly significant.

Stephan (2001), during a downturn, skill segregation exerts an unfavourable effect on low skilled employees.

Table 3: Generalized linear mixed models for a binomial response with cross-level effects

Independent variables	Year 1999					Year 2002				
	Exit from Job	Inter-firm career path			Unemployment	Exit from Job	Inter-firm career path			Unemployment
		Upward mobility	Lateral mobility	Downward mobility			Upward mobility	Lateral mobility	Downward mobility	
<i>Cross-level-Effects Highest degree of education * Local accumulation of human capital</i>										
No vocational training (1=yes) * Share of students	0.006 ***	0.013 ***	0.009 **	0.006	0.001	0.005 ***	0.007	0.013 ***	0.014 ***	-0.000
Secondary school and vocational training (1=yes) * Share of students	-0.004 **	-0.003	0.005	0.001	-0.002	0.001	0.010 ***	0.005	0.002	-0.002
A-Level and vocational training (1=yes) * Share of students	0.007 ***	0.024 ***	0.013 **	0.004	-0.007	-0.001	0.008	-0.003	0.009	-0.004
University degree (1=yes) * Share of students	-0.004 **	0.008 **	0.009 **	-0.015 ***	-0.011 **	-0.006 ***	-0.006	-0.013 ***	-0.006	-0.000

## 6 Conclusions

This article has added to current research on employment trajectories through focusing in greater detail on structural effects. This was necessary as previous research has mainly considered individual characteristics. However, according to Coleman (1990), it should be remembered that employees act within specific contexts. They work in organisations, which in turn, offer different opportunity structures and thereby influence employment trajectories (Ahrne 1994; Baron and Bielby 1980). Therefore, and supporting the thoughts of Baron and Bielby (1980: 760) that labour market research would benefit immeasurably by “bringing the firms back in”, this study has paid particular attention to firm characteristics. Furthermore, employees and employers act within different regionally structured contexts. Regional economics refer here to the significant impact of regional heterogeneities on wages and employment (Krugman 1991; Blien et al. 2002; Möller and Tassinopoulos 2000). For this reason, and for the first time, regional indicators have been systematically included in this study so as to explore the nature of their role on employment trajectories. This seems fitting as recent research shows that employment mobility patterns are affected by economic cycles (Fitzenberger and Garloff 2007; Giesecke and Heisig 2011; Hübler and Walter 2009). Thus, we have taken periods of both economic growth and decline into account.

In order to gain a fuller picture of multiple structural and cyclical determinants, a German linked employer-employee dataset provided by the IAB (Jacobebbinghaus 2008) and data on regional characteristics as taken from the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) were merged. The regional indicators have been investigated in each of the 97 used Spatial Planning Regions. The data analysis has been carried out in three steps. Firstly, the frequency of exits from a firm and the consequences of these exits were explored descriptively during both a period of economic growth and decline in the years 1999 and 2002, respectively. Secondly, those decisive factors on employment stability were identified and analysed through use of multi-level models, which allowed for the hierarchical clustering of data. Thirdly, the determinants of inter-firm upward, downward and lateral mobility, as well as transitions into unemployment were considered.

At first, it could be shown descriptively that whether in a period of growth or decline, almost 10 % of the employees who left the firm had been dismissed. Moreover, the identified exit states suggested, corresponding to previous research studies (Fitzenberger and Garloff 2007;

Hübler and Walter 2009; Schaffner 2011), pro-cyclical mobility of employment as well as pro-cyclical development of wages (Hart 2006; Devereux and Hart 2006). Thus, during periods of economic growth approximately 20 % of employees achieved an inter-firm promotion, whereas approximately 55 % moved into a period of non-employment. During an economic downturn approximately 14 % of workers were able to achieve a promotion; however 63 % moved into non-employment. With this as the context, the significance of firm characteristics as well as region-specific factors were taken into account and related to the economic environment.

Looking at *firm-specific determinants*, it was shown that the firm demography both causes and moderates processes of mobility (Pfeffer 1985; Mittmann 1992; Sørensen 1977). Closed promotion opportunities increase the probability of leaving employment as well as serving to increase the risk of unemployment. Thus, a disadvantageous firm demography can destabilise employment trajectories for a part of the labour force. Due to multiple and diverse employment opportunities for career progression in larger firms (Baron and Bielby 1980; Carroll and Mayer 1986; Struck 2006), more of a closed employment system is evident here. Especially during an economic downturn, the rate of employee exit declines. Parallel to this, the low risk of unemployment indicates that the termination of employment is voluntary. Furthermore, firms that use atypical forms of employment strongly correspond to unfavourable opportunity structures. In addition, and wholly independent of the economic conditions, such forms of employment increase instability and stimulate the risk of unemployment. Therefore, employment trajectories are destabilised the more employers apply atypical forms of employment (Struck and Köhler 2004; Struck 2006). If employees work in firms that provide further training opportunities, they benefit from greater employment stability, which is particularly true during a period of economic decline. Those workers who have received further on-the-job training also benefit from comparatively lower unemployment risks and are less affected by lateral or downward inter-firm mobility. Firms with state-of-the-art technology and equipment provide a stabilising effect for staff during an economic upturn. Moreover, in a downturn, those employees leaving the firm are relatively well protected from unemployment. Thus, firms that invest in further training, or in their infrastructure, improve employment opportunities and create the conditions for inter-firm mobility processes, due to the positive signalling effect for future employers (Spence 1973). Especially in a positive economic environment, work councils and employee representation increases employment stability. However, during a turn for the worse in the economy,

dismissals will be carried out whether or not channels for employee representation exist. In this case, an internally closed workforce is, apparently, not possible.

Concerning *region-specific characteristics*, the effect of different settlement structures and the associated diverse levels of demand for labour has been analysed with respect to its impact on employment trajectories. Especially in periods of economic growth, workers in densely populated areas benefit from greater inter-firm mobility, often accompanied by upward mobility, than their colleagues in sparsely populated areas. In accordance with Fassmann and Meusburger (1997), more densely populated areas offer more and better employment opportunities. Contrary to this, during economic decline, job mobility generally decreases, whereas employees in rural areas are at greater risk of unemployment. Furthermore, high productivity in a region offers, especially during an upturn in the economic cycle, various employment opportunities; frequent inter-firm mobility processes and low risks of unemployment were observed to support this claim. During economic decline, high productivity at the regional level increases job stability. Moreover, in regions with comparatively high rates of unemployment, less voluntary job mobility occurs, regardless of the economic situation. In the case of economic decline, employment risks rise in regions, which are already characterised as having troubled labour markets, verified through limited opportunities for mobility, and the greater likelihood of transitions into unemployment. For this reason, the unequal employment opportunities in differently structured regions suggest the regional segmentation of the job market (Fassmann and Meusburger 1997).

Concerning the local accumulation of human capital, only a marginal influence on employment trajectories was found. It was only during an economic downturn that employees profited from higher regional levels of human capital, as transitions between firms are more frequent. Through differentiating the effect of the local level of human capital between qualification groups, a two-sided story emerges. During a period of economic growth, lowly qualified workers are employed in more instable conditions, the higher the local level of human capital is, however, they frequently achieve lateral or even upward inter-firm mobility. Employees with a university degree show higher levels of employment stability in regions with a high level of human capital as well as favourable inter-firm mobility processes and lower risks of unemployment. During an economic slowdown, the lower job stability of more lowly qualified employees more frequently leads to downward inter-firm mobility in a region with a higher stock of human capital. Highly qualified employees, in contrast, profit from

greater employment stability. Thus, the results differ depending on the state of the economic cycle; while during an upturn the results of Blien and Wolf (2002) as well as of Farhauer and Granato (2006) are supported in that all skill groups profit from a higher level of human capital, during a downturn, skill segregation is more apparent, which has also been found by Gerlach et al. (2002), Schlitte et al. (2010) and Stephan (2001).

In summary, it could be shown that firm characteristics and region-specific factors as well as economic conditions play an important role on career mobility patterns. This is an important finding, particularly when looked at in comparison to the following three developments: Firstly, in recent years market volatility has increased due to processes of economic globalisation and transnationalisation, which causes ever shortening economic cycles. Secondly, and related to this, human resource policy has changed in recent years, particularly with regard to an increase in the usage of atypical employment contracts. Thirdly, several political initiatives, such as the European initiative for regional development and the promotion of metropolitan regions, as well as the German initiative to shift decision-making powers from the central government to local and regional units, have raised the importance of regional structures for growth and employment (Blien et al. 2002). In this regard, it is necessary to account for both structural and cyclical effects in more detail as future research on employment careers continues to develop.

## References

- Acemoglu, D.: Technical change, inequality, and the labor market. *Journal of Economic Literature* 40, 7-72 (2002)
- Ahrne, G.: *Social Organizations. Interaction inside, outside and between organizations*. Sage, London (1994)
- Alewell, D., Hansen, N.K.: Human resource management systems – A structured review of research contributions and open questions. *Industrielle Beziehungen* 19, 90-123 (2012)
- Baron, J., Bielby, W.: Bringing the firms back in: Stratification, segmentation, and the organization of work. *American Sociological Review* 45, 737-765 (1980)
- Becker, G.: Investment in Human Capital: A theoretical Analysis. *Journal of Political Economy* 70, 9-42 (1962)
- Dieckhoff, M.: Does it Work? The Effect of Continuing Training on Labour Market Outcomes: A Comparative Study of Germany, Denmark, and the United Kingdom. *European Sociological Review* 23, 295-308 (2007).
- Bender, S., Konietzka, D., Sopp, P.: Diskontinuität im Erwerbsverlauf und betrieblicher Kontext. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 52, 475-499 (2000)

- Bergemann, A., Mertens, A.: Job Stability Trends, Layoffs, and Transitions to Unemployment: An Empirical Analysis for West Germany. IZA Discussion Paper 1368 (2004)
- Blien, U., Haas, A., Hirschenauer, F., Maierhofer, E., Tassinopoulos, A., Vollkommer, D., Wolf, K.: Regionale Arbeitsmarktforschung im IAB. Mitteilungen aus der Arbeitsmarkt- und Berufsforschung 34, 45-73 (2001)
- Blien, U., Kirchhof, K., Ludewig, O.: Agglomeration effects on labour demand. IAB Discussion Paper 28 (2006)
- Blien, U., Wolf, K.: Regional development of employment in eastern Germany: an analysis with an econometric analogue to shift-share techniques. Papers in Regional Science 81, 391-414 (2002)
- Blien, U.: Arbeitslosigkeit und Entlohnung auf regionalen Arbeitsmärkten. Theoretische Analyse, ökonometrische Methode, empirische Evidenz und wirtschaftspolitische Schlussfolgerungen für die Bundesrepublik Deutschland. Physica, Heidelberg (2001)
- Blossfeld, H.-P., Klijzing, E., Mills, M., Kurz, K.: Globalization, Uncertainty and Youth in Society. Routledge, London (2005)
- Blossfeld, H.-P., Mills, M., Bernardi, F.: Globalization, Uncertainty And Men's Careers: An International Comparison. Elgar, Cheltenham (2006)
- Blossfeld, H.-P.: Career opportunities in the Federal Republic of Germany: a dynamic approach to the study of life-course, cohort, and period effects. European Sociological Review 3, 208-225 (1986)
- Boockmann, B., Steffes, S.: Individual and Plant-level Determinants of Job Durations in Germany. ZEW-Discussion Paper 89 (2005)
- Boockmann, B., Steffes, S.: Workers, Firms or Institutions: What Determines Job Duration for Male Employees in Germany? Industrial and Labor Relations Review 64, 109-127 (2010)
- Bresnahan, T. F., Brynjolfsson, E., Hitt, L. M.: Information Technology, Workplace Organization and the Demand for Skilled Labor: Firm-level Evidence. The Quarterly Journal of Economics 117, 339-376 (2002)
- Büchel, F., Pannenberg, M.: Berufliche Weiterbildung in West- und Ostdeutschland – Teilnehmer, Struktur und individueller Ertrag. Zeitschrift für Arbeitsmarktforschung 2, 73-126 (2004)
- Carroll, G.R., Mayer, K.U.: Job-Shift Patterns in the Federal Republic of Germany: The Effects of Social Class, Industrial Sector, and Organizational Size. American Sociological Review 51 (3), 323-341 (1986)
- Coleman, J. S.: Foundations of social theory. Belknap Press of Harvard University Press, Cambridge (1990)
- Devereux, P., Hart, R.: Real Wage Cyclicity of Job Stayers, Within-Company Job Movers, and Between-Company Job Movers. Industrial and Labor Relations Review 60, 105-119 (2006)
- Doeringer, P., Piore, M.: Internal labor markets and manpower analysis. D.C. Heath, Lexington (1971)
- Erlinghagen, M.: Entlassungen und Beschäftigungssicherheit im Zeitverlauf. Zur Entwicklung unfreiwilliger Arbeitsmarktmobilität in Deutschland. Zeitschrift für Soziologie 34, 147-168 (2005)
- Farhauer, O., Granato, N.: Regionale Arbeitsmärkte in Westdeutschland: Standortfaktoren und Branchenmix entscheidend für Beschäftigung. IAB-Kurzbericht 4 (2006)



- Fassmann, H., Meusburger, P.: Arbeitsmarktgeographie. Erwerbstätigkeit und Arbeitslosigkeit im räumlichen Kontext. Teubner, Stuttgart (1997)
- Fischer, G., Janik, F., Müller, D., Schmucker, A.: Das IABBetriebspanel - von der Stichprobe über die Erhebung bis zur Hochrechnung. FDZ-Methodenreport 1 (2008)
- Fitzenberger, B., Garloff, A.: Labor market transitions and the wage structure in Germany. *Jahrbücher für Nationalökonomie und Statistik* 227 (2), 115-152 (2007)
- Fitzenberger, B., Osikominu, A., Völter R.: Imputation Rules to Improve the Education Variable in the IAB Employment Subsample. FDZ-Methodenreport 3 (2005)
- Fujita, M., Krugman, P., Venables, A.: The spatial economy. cities, regions and international trade. MIT Press, Cambridge (2001)
- Gerlach, K., Meyer, W., Tsertsvadze, G.: Entwicklung der qualifikatorischen Segregation im Verarbeitenden Gewerbe. In: Bellmann, L., Kölling, A. (eds.) *Betrieblicher Wandel und Fachkräftebedarf*, pp. 51-84. Institut für Arbeitsmarkt- und Berufsforschung, Nürnberg (2002)
- Giesecke, J., Heisig, J.P.: Destabilization and Destandardization: For Whom? The Development of West German Job Mobility since 1984. *Zeitschrift für Wirtschafts- und Sozialwissenschaften* 131(2), 301-314 (2011)
- Grotheer, M., Struck, O., Bellmann, L., Gewiese, T.: Determinanten der Beschäftigungsstabilität. Chancen und Risiken von „Entrants“ im Ost-West-Vergleich. In: Struck, O., Köhler, C. (eds) *Beschäftigungsstabilität im Wandel? Empirische Befunde und theoretische Erklärungen für Ost- und Westdeutschland*, pp. 181-198. Rainer Hampp Verlag, Mering (2004)
- Hart, R.: Worker-Job Matches, Job Mobility and Real Wage Cyclicity. *Economica* 73, 287-298 (2006)
- Heckman, J.J., Borjas, G.J.: Does Unemployment Cause Future Unemployment? Definitions, Questions and Answers from a Continuous Time Model of Heterogeneity and State Dependence. *Economica* 47 (187), 247-283 (1980)
- Heinz, W.: From Work Trajectories to Negotiated Careers: The Contingent Work Life Course. In: Mortimer, J.T., Shanahan, M.J. (eds) *Handbook of the life course*, pp. 185-204. Springer, New York (2006)
- Hendry, C.: Applying employment systems theory to the analysis of national models of HRM. *The International Journal of Human Resource Management* 14, 1430-1442 (2003)
- Hillmert, S., Kurz, K., Grunow, D.: Beschäftigungsstabilität in der ersten Hälfte des Erwerbslebens. Ein Kohortenvergleich. In: Struck, O., Köhler, C. (eds) *Beschäftigungsstabilität im Wandel?*, pp. 63–86. Rainer Hampp Verlag, Mering (2004)
- Hinz, T., Abraham, M.: Theorien des Arbeitsmarktes: Ein Überblick. In: Abraham, M., Hinz, T. (eds) *Arbeitsmarktsoziologie. Probleme, Theorien, empirische Befunde*, pp. 17-68. VS-Verlag, Wiesbaden (2008)
- Hirschman, A.: *Exit, Voice and Loyalty. Responses to Decline in Firms, Organizations and States*. Harvard University Press, Cambridge (1970)
- Hirschman, A.: *The Strategy of Economic Development*. Yale University Press, New Haven (1958)

- Hübler, O., Walter, T.: Beschäftigungsstabilität im Konjunkturzyklus – Eine empirische Analyse mit Individualdaten für Westdeutschland 1984-2005. *Zeitschrift für Wirtschafts- und Sozialwissenschaften* 129, 1-35 (2009)
- Jacobebbinghaus, P.: LIAB-Datenhandbuch. Version 3.0. FDZ-Datenreport 3 (2008)
- Johnson, W.R.: A Theory of Job Shopping. *The Quarterly Journal of Economics* 92 (2), 261-278 (1978)
- Krugman, P.: *Geography and trade*. MIT Press, Cambridge (1991)
- Krugman, P.: What's new about the new economic geography? *Oxford Review of Economic Policy* 14, 7-17 (1998)
- Lepak, D.P., Liao, H., Chung, Y., Harden, E. E.: A conceptual review of human resource management systems in strategic human resource management research. *Research in personnel and human resources management* 25, 217-271 (2006)
- Lucas, R.: On the mechanics of economic development. *Journal of Monetary Economics* 22, 3-42 (1988)
- Mittman, B.: Theoretical and Methodological Issues in the Study of Organizational Demography and Demographic Change. In: Tolbert, P., Bacharach, S.B. (eds.) *Research in the Sociology of Organizations* 10, pp. 3-53. Greenwich, London (1992)
- Möller, J., Tassinopoulos, A.: Zunehmende Spezialisierung oder Strukturkonvergenz? Eine Analyse der sektoralen Beschäftigungsentwicklung auf regionaler Ebene. *Jahrbuch für Regionalwissenschaft* 20, 1-38 (2000)
- Moulton, B.: An illustration of a pitfall in estimating the effects of aggregate variables on micro units. *Review of Economics and Statistics* 72, 334-338 (1990)
- Moulton, B.: Random group effects and the precision of regression estimates. *Journal of Econometrics* 32, 385-397 (1986)
- Neubäumer, R.: Warum bilden Betriebe ihre Mitarbeiter weiter – oder auch nicht? Ein theoretischer Ansatz zur Erklärung unterschiedlicher Weiterbildungsaktivitäten von Betrieben. In: Weiß, M. (eds.) *Evidenzbasierte Bildungspolitik: Beiträge der Bildungsökonomie*, pp. 93-113. Duncker & Humblot, Berlin (2006)
- Pfeffer, J.: Organizational Demography: Implications for Management. *California Management Review* 28, 67-81 (1985)
- Rabe-Hesketh, S., Skrondal, A.: *Multilevel and Longitudinal Modeling Using Stata*. Stata Press, College Station (2008)
- Rendtel, U., Schwarze, J.: Schätzungen von Lohnkurven für Westdeutschland mit einem verallgemeinerten Varianz-Komponenten-Modell. *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung* 3, 491-493 (1996)
- Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung: Jahresgutachten 2008/09: „Finanzkrise meistern –Wachstumskräfte stärken“. Statistisches Bundesamt, Wiesbaden (2008)
- Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung: Jahresgutachten 2009/10: „Die Zukunft nicht aufs Spiel setzen“. Statistisches Bundesamt, Wiesbaden (2009)

- Schaffner, S.: Heterogeneity in the cyclical sensitivity of job-to-job flows. *Zeitschrift für ArbeitsmarktForschung* 43, 263-275 (2011)
- Schlitte, F., Böttcher, F., Niebuhr, A., Diez, J.: The determinants of regional disparities in skill segregation – Evidence from a cross section of German regions. *HWWI Research Paper* 1-36 (2010)
- Schwarze, J.: Neue Befunde zur “Lohnkurve” in Deutschland: Eine Analyse mit Paneldaten für Raumordnungsregionen 1985 und 1989. *DIW Diskussionspapier* 119 (1995)
- Sengenberger, W.: Struktur und Funktionsweise von Arbeitsmärkten. Die Bundesrepublik Deutschland im internationalen Vergleich. Campus, Frankfurt a.M. (1987)
- Skrondal, A., Rabe-Hesketh, S.: Multilevel logistic regression for polytomous data and rankings. *Psychometrika* 68, 267-287 (2003)
- Sørensen, A.: The structure of inequality and the process of attainment. *American Journal of Sociology* 101, 965-978 (1977)
- Spence, M.: Job market signaling. *Quarterly Journal of Economics* 3, 355-374 (1973)
- Stephan, G.: Firmenlohndifferenziale. Eine Analyse für die Bundesrepublik Deutschland. Campus, Frankfurt a.M. (2001)
- Struck, O., Dütsch, M.: Gesicherte Mobilität am Arbeitsmarkt. Zur Bedeutung berufsfachlicher Qualifikationen in geschlossenen und offenen Beschäftigungssystemen. *Industrielle Beziehungen* 19 (2), 124-153 (2012)
- Struck, O., Grotheer, M., Schröder, T., Köhler, C.: Instabile Beschäftigung. Neue Ergebnisse zu einer alten Kontroverse. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 59, 294-317 (2007)
- Struck, O., Köhler, C.: Beschäftigungsstabilität im Wandel? Rainer Hampp Verlag, Mering (2004)
- Struck, O.: Flexibilität und Sicherheit. Empirische Befunde, theoretische Konzepte und institutionelle Gestaltung von Beschäftigungsstabilität. VS-Verlag, Wiesbaden (2006)
- Vobruba, G.: Alternativen zur Vollbeschäftigung. Suhrkamp, Frankfurt a.M. (2000)
- Weber, M.: *Economy and Society: An Outline of Interpretive Sociology*. Bedminster Press, New York (1968)
- Winkelmann, R., Zimmermann, K.: Is job stability declining in Germany? Evidence from count data models. *Applied Economics* 30, 1413-1420 (1998)

## Appendices

Table 4: Description of individual characteristics (Indication of means and/or shares in percentages)

Characteristics	1999	2002
<b>Males</b>	71.12	72.99
<b>German(s)</b>	92.61	92.08
<b>Age<sup>1</sup></b>		
25 to 34 years of age	32.05	27.53
35 to 44 years of age	41.06	43.45
45 to 52 years of age	26.89	29.01
<b>Highest Degree of Education<sup>1</sup></b>		

No vocational training	12.24	11.91
Secondary school and vocational training	71.03	68.99
A-Level and vocational training	4.01	5.46
University degree	12.71	13.63
<b>Job position<sup>1</sup></b>		
Unskilled blue collar	25.68	24.20
Skilled blue collar	29.19	29.87
Master craftsman	1.71	1.65
White collar	43.42	44.29
<b>Previous employment-state<sup>1</sup></b>		
Share of employment	0.32	0.33
Share of unemployment	0.05	0.04
Share of non-employment	0.07	0.08
First employment	0.03	0.02
Permanently employed	0.53	0.53
<b>Cohorts<sup>1</sup></b>		
Entrance at most one year ago	16.99	16.07
Entrance 1 to 5 years ago	25.00	27.10
Entrance more than 5 years ago	58.01	56.82
<b>Number of observations</b>	370779	363339

<sup>1</sup> Percentages don't add up to exactly 100 due to imprecise rounding.  
Source: Linked Employer-Employee Data (LIAB); own calculations

Table 5: Description of firm-specific characteristics (Indication of means and/or shares in percentages)

Characteristics	1999	2002
<b>Firm size<sup>1</sup></b>		
Small firm	25.05	26.17
Small medium-sized firm	45.21	46.31
Medium-sized firm	14.22	14.39
Larger firm	15.52	13.13
<b>Qualification structure<sup>1</sup></b>		
Simple tasks	0.18	0.19
Qualified tasks	0.83	0.81
<b>Contractual relationships<sup>1</sup></b>		
Share of fixed-term employees	0.05	0.04
Share of apprentices	0.10	0.10
Share of part-time employees	0.12	0.14
<b>Investments</b>		
Investments in further training	76.85	76.64
Technological state of machinery and equipment <sup>2</sup>	2.92	2.84
<b>Co-determination</b>		
Works council (1=yes)	50.11	49.91
<b>Sector<sup>1</sup></b>		
Agriculture, forestry and mining	4.74	4.11
Construction	15.41	12.06
Manufacturing industry	33.71	39.44
Trade	12.53	12.29
Services for firms	6.48	7.24
Other services	21.79	19.95

<sup>1</sup> Percentages don't add up to exactly 100 due to imprecise rounding.

<sup>2</sup> "1" indicates that the establishment has state-of-the-art equipment; "5" indicates that the equipment is obsolete.

Source: Linked Employer-Employee Data (LIAB); own calculations

Table 6: Description of the regional distribution of employment-relevant factors (Indication of means and/or shares in percentages)

Characteristics	1999			2002		
	Mean	Minimum	Maximum	Mean	Minimum	Maximum
<b>Types of region<sup>1</sup></b>						
Densely populated agglomerations	24.36	-/-	-/-	24.36	-/-	-/-
Agglomerations with outstanding centres	23.55	-/-	-/-	23.55	-/-	-/-
Urbanised areas of higher density	14.58	-/-	-/-	14.58	-/-	-/-
Urbanised areas of medium density and large regional centres	17.96	-/-	-/-	17.96	-/-	-/-
Urbanised areas of medium density without large regional centres	2.84	-/-	-/-	2.84	-/-	-/-
Rural areas of higher-density	12.18	-/-	-/-	12.18	-/-	-/-
Rural areas of lower-density	4.53	-/-	-/-	4.53	-/-	-/-
<b>Accumulation of human capital</b>						
Share of students	47.57	34.80	63.80	19,69	0,00	59,80
<b>Productivity</b>						
Unemployment rate	11.77	5.50	22.90	11.08	4.90	24.10
GDP (per capita)	22.63	14.50	41.90	24.00	14.80	45.10

<sup>1</sup> Percentages don't add up to exactly 100 due to imprecise rounding.  
Source: Linked Employer-Employee Data (LIAB); own calculations