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Who benefits from a job change: The dwarfs or the giants?

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Abstract

Empirical studies have shown that voluntary job-to-job changes have a positive effect on wage mobility. In this paper, we suggest that the impact of a job change on wage growth depends on the position in the wage distribution. Using panel data from the UK and Germany, we investigate the effect of employer changes and within-firm job changes on year-to-year wage mobility. We show that a change of employer results into a wage increase for the low-paid workers but not for the high-paid workers. Within-firm job changes produce, on average, moderate wage gains for the low-paid workers in the UK, but have no effect in Germany. Results on 3-year wage mobility are shown to be very similar to the results on year-to-year wage growth.

Keywords: low pay, high pay, job mobility, wage mobility.

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1 Introduction

Job mobility is an important determinant of lifetime wage growth. Topel and Ward (1992) suggest that job mobility accounts for one third of overall wage growth in the early stages of the working career. However, the effect of a job change on the wage growth remains an open issue. Some theories predict a positive effect, others a negative one. Empirical research has failed to resolve this debate since it has produced contradictory findings (see section 2). In all these studies, however, the effect of a job change on wage growth is assumed to be independent of the position in the wage distribution. This assumption is questionable since on-the-job search theory suggests that the decision of a worker to change job is contingent on the level of the initial wage. More specifically, on-the-job search theory suggests that both the hazard rate of leaving the current job and the difference between the current wage and the reservation wage decrease with the current wage (Mortensen, 1986; van den Berg, 1992). A low-paid worker expects more job changes in his working life than a high-paid worker in order to improve his earnings. Therefore, compared to a high-paid worker, a low-paid worker chooses a reservation wage that is relatively higher than the current wage (van den Berg, 1992). In this way, the low-paid worker reduces the costs related to the job change, as he can attain his preferred life-time earnings level in a fewer number of steps. If workers receive wage offers relatively close to their reservation wage, then the wage gains from a job change are relatively higher for the low-paid than for the high-paid worker. Therefore, distinguishing between the different parts of the wage distribution can resolve the ambiguity of the effect of a job change on wage growth.

Workers' characteristics have been shown to affect their likelihood of voluntary and involuntary job mobility (Jung & Winkelmann, 1993). The type of job change - within

the firm or with another employer - is also relevant for the differences between low-paid and high-paid workers. According to various theories, wage careers within firms deviate from the assumptions of the fully competitive labour market model. Employers in large firms often pay a wage above the market wage, in order to retain the most productive workers. Therefore, on average, we would expect positive returns due to job changes in the internal labour market. However, since high-paid workers are more involved in training and therefore develop more firm-specific skills (Arulampalam et al., 2004), they are expected to derive more utility than low-paid workers from a promotion or a job shift within the same firm.

The aim of this paper is to compare the effect of a voluntary job change on wage growth for the low-paid and the high-paid worker, accounting for the different mechanisms driving them to change jobs, and differentiating between external and in-firm job changes. We define as low-paid the workers belonging to the lowest quartile of the wage distribution and as high-paid workers those belonging to the highest quartile of the wage distribution. From a policy perspective, this is an important issue as the demand for low-skilled/low-paid employment has considerably decreased over the past decades (Acemoglu, 2003). Moreover, the creation of jobs of a given quality and earnings level (i.e. high-level jobs) is considered to be a significant policy tool to tackle earnings inequality within European labour markets (Salverda et al., 2001).

Another novel aspect of this study is that it investigates the costs and benefits related to a job change in a cross-country comparative perspective. These costs and benefits are not uniform across countries, since they can be influenced by labour market institutions. More specifically, in the presence of strong wage regulation - due to collective bargaining or a

national minimum wage - downward wage adjustments will be rather rare at the bottom of the earnings distribution, but not necessarily at the top. Furthermore, in countries where jobs are closely linked to educational qualifications, a change of employer will mean fewer costs being incurred by a worker who invests in firm-specific skills. Such a worker is more often a high-paid worker than a low-paid worker. Therefore, the analysis is performed in two countries: in Germany where all of the above-mentioned institutional characteristics prevail, and in the UK, where these characteristics are absent.

Investigating the effect of job mobility on wage growth entails several methodological complications. The most important one is the endogeneity of job mobility. The wage is not only dependent on a job change, it is also a determinant of it (Topel & Ward, 1992; Le Grand & Tåhlin, 2002). To tackle this endogeneity, we apply a two-step approach of the Heckman type. In a first step, we model job mobility with a panel multinomial logit model. In a second step, we use the predicted probabilities derived from the first step to control for endogeneity in a panel wage-growth equation. The interesting feature of our approach is that we control for unobserved heterogeneity in both steps of the estimation procedure.

The remainder of this paper is organized as follows. Section 2 elaborates on the findings of the relevant literature. The role of the institutional framework is explained in section 3. The econometric model is developed and explained in Section 4. The data used in our analysis are discussed in Section 5. Some descriptive results are reported in Section 6. Section 7 reports on the results from the two-step estimation of the effect of job mobility on wage growth. Conclusions are drawn in Section 8.

2 The link between wage mobility and job change

Several theories attempt to establish a link between job turnover and wage dynamics. Four main approaches can be identified in the standard economic theory: the movers-stayers approach, the job-search approach, the job-matching approach, and the human capital approach.

The movers-stayers model of Blumen et al. (1955) is rooted in psychology. In this model, some workers are expected to be more likely to move than others. This instability is assumed to lower productivity, and thereby to reduce the wage of movers below the wage of stayers.

The job-search model (Burdett, 1978; Jovanovic, 1979b; Mortensen, 1986) predicts a positive effect of job mobility on wages. According to this model, workers enter the labour market with a given and fixed stock of human capital. Firms differ in the level of productivity they can extract from the workers. Hence, workers' productivity depends on the firm they are employed in. Employed workers are assumed to continue searching for a firm in which they will be more productive. As a result, job mobility will affect wage growth positively.

In both the movers-stayers model and the job-search model, productivity is assumed to be fixed and known ex-ante. Therefore, these two models suggest that controlling for individual and job heterogeneity eliminates the effect of job mobility on wages. This prediction is not supported by longitudinal empirical research. A series of studies, such as those conducted by Light and McGarry (1998) and Munasinghe and Sigman (2004), finds that job mobility has an effect on wages even after controlling for observed and unobserved personal and job characteristics. In general, voluntary employer changes are associated

with wage gains in the US (Royalty, 1998; Gladden & Taber, 2000) and in Europe (Davia, 2005; Perez & Sanz, 2005). Black (1980) suggests that the positive wage gains are higher when on-the-job search precedes a voluntary job change. However, these gains decrease with age as well as with tenure and with the number of job changes (Jovanovic, 1979b; Blau & Kahn, 1981; Bartel & Borjas, 1981; Topel & Ward, 1992; Farber, 1994; Light & McGarry, 1998; Dustmann & Meghir, 2005).

The matching model (Jovanovic, 1979a) has a dynamic approach as it allows for both within-jobs wage growth as well as between-jobs wage growth. According to this model, the worker's productivity, although fixed, is unknown ex-ante to employers. Therefore, jobs are considered as 'pure experience goods'. In other words, there is initially an uncertainty about the worker's productivity. As job tenure increases, the employer gains additional information about the actual productivity of the worker. Due to this learning effect, wages grow also within jobs. Wages can also grow due to job changes, as a reward for searching for more efficient job matches. Due to the initial uncertainty about the worker's productivity, this approach allows for an effect of job mobility on wage growth even after correcting for personal and job characteristics. However, employers may interpret frequent job changes as a signal for poor productivity. Hence, frequent job mobility may reduce future wage prospects. A contradicting approach stems from Lazear (1986). In his 'raiding' model, Lazear suggests that firms compete for high-quality workers. For this reason, job movers are workers with high skills and high quality, and job mobility has a positive effect on wage growth.

According to human capital theory (Becker, 1962), productivity is largely determined by firm-specific human capital. Job mobility is strongly related to investments in specific

human capital. Returns to job mobility depend on the transferability of specific human capital across jobs. The more specific human capital can be transferred, the smaller the wage loss will be due to a job change. Therefore, human capital theory does not provide clear predictions about the wage differences between movers and stayers. Mincer (1986, 1988) finds evidence that, although movers gain from changing a job, stayers experience a higher wage growth as they invest more in specific human capital in the form of getting involved in job training.

The effect of within-firm job changes has received much less attention in economics, whereas within-firm mobility is found to account for a considerable part of the life cycle earnings variation (McCue, 1996). Efficiency wage theory suggests that employers of large firms motivate their employees by offering them wages above the market rates. According to this theory, then, we would expect positive returns of within-firm job changes (see, for example, Shapiro & Stiglitz, 1984; Akerlof & Yellen, 1986).¹ Empirical studies, however, provide contradicting evidence. Lazaer (1999) argues that promotions have an immediate positive effect on wages. Booth et al. (2003) quantify this effect to 5% for the British workers. However, Hannan et al. (1990) find that within-firm job mobility does not result in faster wage growth for West German workers, while Baker et al. (1994) find that the wage premium of an in-firm promotion in the US is significantly less than the average wage disparity between the same job positions.

The predictions of economic theory on the differences in the wage returns of a job change between low-paid and high-paid workers have remained largely unexplored. The

¹All the above-mentioned approaches assume that job turnover is voluntary and direct (job-to-job). Involuntary mobility and mobility through unemployment is associated with loss of specific human capital and therefore result in slowed wage careers. In this paper, however, we restrict our analysis to job-to-job transitions.

basic job search model of Mortensen (1986) shows that the instantaneous quit rate declines with the current wage. van den Berg (1992) goes one step further. He predicts a relationship between the wage returns of a job change and the level of the current wage by deriving a numerical approximation of the reservation wage. His derived formula for the reservation wage is:

$$\xi(w) = w + \frac{r + \varphi(w)}{1 - c'(w)\varphi(w)}c(w) + o(c(w)), \quad (1)$$

for every $w \in [0, \bar{w}]$.

The term $o(c(w))$ can be neglected as $dt \rightarrow 0$. w is the current wage and $\bar{w}$ is a number $0 < \bar{w} < +\infty$. λ is the job offer arrival rate in a Poisson process, $\varphi(w)$ is the hazard rate of leaving the current job and $c(w)$ represents the search costs.²

Equation 1 suggests that the gap between the reservation wage and the current wage, $\xi(w) - w$, is a decreasing function of the current wage. This result is quite plausible: a low-paid worker needs a larger relative increase of his income in order to change job than his high-paid colleague. This is because the low-paid worker expects many job changes in order to reach a higher earnings level. Therefore, he wants to minimize the search costs that he will pay, and he sets his reservation wage relatively higher than his current wage

²The approximation of $\xi(w)$ is done by van den Berg with a Taylor series around $c(w) = 0$. The following assumptions hold:

1. $0 < \lambda < +\infty$.
2. The job offers are random draws from a wage offer distribution $F(x)$. $F(x)$ is a strictly increasing differential function on $[0, \bar{w}]$, where $\bar{w}$ is a number $0 < \bar{w} < +\infty$. For $x \leq 0$, $F(x) = 0$, while for $x \geq \bar{w}$, $F(x) = 1$. Further $0 < w \leq \bar{w}$.
3. $c(w)$ is a continuously differentiable function on $[0, \bar{w}]$.
4. For each $w \in (0, \bar{w}]$, $c'(w) < 1/\lambda$.

Assumption 4 means actually that $c(w)$ increases only slowly, as a function of w .

than his higher-paid colleague. Since it is reasonable to assume that both the cost of job search and the rate of change in the cost of job search is higher in the external than in the internal labour market this gap between the reservation wage and the current wage decreases faster with the wage in the external labour market than in the internal labour market.

3 The role of the institutions

The two countries - UK and Germany - included in this study present important differences with respect to their labour market institutions. In fact, they are often perceived as different worlds of labour and as each other's opposites within Europe. The liberal British labour market is characterized by low levels of job protection through public regulation. Efficiency in the British labour market is achieved through a high level of labour market mobility and job turnover. Government intervention is reduced to a minimum, and the extent and impact of collective bargaining is rather limited (only 22% in the private sector). Minimum wage regulation was been absent from 1993 until 1999, when a national minimum wage was introduced. Wage inequality is much higher in the UK than in Germany; the D9/D1 ratio (the ratio of the 90th to the 10th percentile of the wage distribution) in 1996 was 4.14 compared to 2.67 for Germany (Salverda et al., 2001).

Compared to the UK, the German labour market is characterized by a high level of job protection through public law and an extended system of collective bargaining. Even the wages of the upper middle-class workers are set by collective employment agreements. Minimum pay regulation is determined at both the sectoral level and the regional level. Specifically, collective bargaining covers about 70% of the West German workers in the pri-

vate sector. Jobs are closely linked to educational credentials, which are acquired through formal education and apprenticeship. Apprenticeship lasts for a period of up to three years and many young people go through it. Furthermore, employers are directly involved in the provision and delivery of apprenticeships (Hannan et al. 1997). Thus, apprenticeships are aimed at developing skills that are transferable across jobs and employers (Winkelmann, 1996). This strengthens the position of workers who change jobs. As a result, in Germany we expect to find smaller differences between internal (within-firm) job moves and external job moves, as skills are more transferable across employers. In the UK, on the other hand, job-specific skills, acquired in the internal labour market, are more important. Since educational qualifications act more as a signal or a screening device for learning about the ability of the worker's potential to acquire these skills, job movers may suffer from a severe loss of human capital.

The macroeconomic performance of the two countries also shows considerable variation since the early 1990s. The UK was engaged in a considerably stronger economic upturn than Germany. The average annual GDP growth rate in the UK was twice that of Germany in the period 1991-2004 (2.8 and 1.4 percent respectively). The average labour productivity (for the years 1992-2004), in the UK, measured in GDP per hours worked was 2.58, whereas it was only 1.97 in Germany. The male unemployment rate in the UK dropped sharply from 12.1 percent in 1993 to 5.5 percent in 2003, while in Germany it increased from 5.9 percent to 8.7 percent in the same time period. Male labour force participation rates remained stable between 1991-2004 in the UK (79.6% and 78.9% respectively), but decreased considerably in Germany (77.6% and 71% respectively).³ Consequently, we expect to find higher returns to job mobility for the British workers than for the German

³All the data in this paragraph come from OECD (2006).

workers.

4 The two-step Heckman empirical model

We aim at investigating the wage returns to job mobility in the different parts of the wage distribution. This is done by modelling the year-to-year relative wage growth of individuals. Let w_{it} be the natural logarithm of the wage of the individual i in the time period t . Consider the following standard panel wage equation that includes job mobility as one of the predictors:

$$w_{it+1} - w_{it} = \mathbf{x}'_{it}\boldsymbol{\beta} + \sum_{j=1}^2 p_{ijt}b_j + \sum_{j=0}^2 \sum_{k=1}^2 (p_{ijt}d_{ik(t+1)}c_{jk}) + u_i + \varepsilon_{it} , \quad (2)$$

where $\mathbf{x}_{it}$ is a vector of covariates including a constant term (see note in Table 2). p_{ijt} is an indicator variable representing the position in the wage distribution and taking one of the two values 0 or 1. The index $j = 0, 1, 2$ corresponds to low-paid, medium-paid and high-paid, respectively. The categorical variable for the job change appears in the equation as dummies ($d_{ik(t+1)}$) indicating whether a change of employer or job change within the firm takes place between t and $t+1$ ($d_{i1(t+1)} = 1$ for an external job change and $d_{i2(t+1)} = 1$ for an in-firm job change). If we restrict $c_{jk} = c_k$ we get a simpler model, in which the effect of the job change is independent of the position in the wage distribution. To capture the differentiating effect of the job change in the various parts of the wage distribution, we interact the dummies for the job change with the dummies for the position in the distribution. For identification, we assume that $b_0 = 0$ and $c_{j0} = 0$. The term u_i represents the individual-specific unobserved fixed effects and ε_{it} the idiosyncratic error. The term

ε_{it} is assumed to be normally distributed with mean 0 and uncorrelated with u_i .

Clearly, the issue of initial conditions emerges in our analysis. This means that the group of individuals that is in a certain pay level at a given point in time may be endogenous. However, controlling for initial conditions in a panel model is rather difficult and thus left as an issue for further research. By controlling for observed and unobserved heterogeneity we are able to control at least partly for the possible endogeneity of initial conditions.

Furthermore, in this study we focus on another problem of endogeneity: the endogeneity of the job change. There are two potential sources for endogeneity. The first is reverse causality; the decision of a worker to change job may be caused by the expectation of a higher wage-growth in the new job. Munasinghe (2000) suggests, accordingly, that high wage-growth jobs are less likely to end than low wage growth jobs. Secondly, there may be unobserved factors such as ability and effort affecting both the wage and the decision of a worker to change jobs. Both sources of endogeneity might lead to bias in the parameter estimates.

The estimation of equation 2 involves a panel model with a continuous dependent variable and a categorical endogenous predictor (for changes of employer and for job changes with the same employer). In a cross sectional framework, endogeneity is usually tackled by the approach introduced by Heckman (1978, 1979) and developed further by others, such as Vella and Verbeek (1999). Other approaches, such as the endogenous switching model used by Perez and Sanz (2005) provide a better estimate of the effect of job mobility on wages, but fail to control for unobserved personal characteristics. Our approach is to employ a two-step procedure of the Heckman type in a panel framework, applying correc-

tion for unobserved heterogeneity: first, we model the probability of job mobility; second, we estimate a wage regression that includes the correction terms for endogeneity that are derived from the first step.

In order to respect the panel structure of our sample in the first step, we apply a random-effects multinomial logit model for job mobility, distinguishing between no job change, external job change, and within-firm job change. The multinomial logit model has been criticized for producing biased estimates when the assumption of the Independent Irrelevant Alternatives (IIA) is violated. However, Bourguignon et al. (2007) argue that the multinomial logit model can be trusted in the first step of a cross-sectional selection model when the propensity scores are transformed in a certain way before being used as controls for endogeneity in the second step of the estimation procedure. The transformation they suggest is based on the approach of Dubin and McFadden (1984). We use non-pay related components of job satisfaction as the exclusive variables that allow the identification of the model. For the UK, we use the satisfaction with working hours and with the work content. For Germany, we use the variable indicating how much the worker is worried about job security. We also tested other instruments, such as the housing tenure status. The results we obtained were similar. The components of job satisfaction that are used as exclusive instruments are not influenced by the satisfaction for the wage. The overall job satisfaction would be inappropriate as exclusive variable as it is correlated with the wage (see, among others, Clark, 1999). This correlation, however, is produced mainly by the satisfaction for the wage. In BHPS, respondents are asked to report their satisfaction for pay, working hours, work content, as well as their overall job satisfaction. In GSOEP, respondents are asked to report their overall job satisfaction, and their worry about job security. Thus, we can safely assume that our exclusive variables are uncorrelated with wage growth.

The probability that worker i makes a job change k at time point t , conditional on observed characteristics $\mathbf{z}_{it}$ and unobserved characteristics μ_{is} can be written as follows:

$$P(d_{ikt} = 1) = \frac{\exp(\mathbf{z}_{it}'\boldsymbol{\gamma}_k + \mu_{ik})}{1 + \sum_{n=1}^2 \exp(\mathbf{z}_{it}'\boldsymbol{\gamma}_n + \mu_{in})} , \quad (3)$$

where $\mathbf{z}_{it}$ is a vector of covariates including human capital and job characteristics. $\mathbf{z}_{it}$ also includes a vector of intercepts. k represents the three destination states: remaining in the same job, moving to another job outside the firm, and changing job with the same employer. Parameters are estimated by maximum likelihood using LatentGold (Vermunt & Magidson, 2007). The likelihood contribution of an individual i is the joint probability of obtaining the T outcomes of $d_{i1}, d_{i1}, \dots, d_{iT}$. This joint probability can be written as:

$$P(\mathbf{d}_i|\mathbf{z}_i) = \int_{\boldsymbol{\mu}} f(\boldsymbol{\mu}_i) P(\mathbf{d}_i|\mathbf{z}_i, \boldsymbol{\mu}_i) d\boldsymbol{\mu}_i , \quad (4)$$

where

$$P(\mathbf{d}_i|\mathbf{z}_i, \boldsymbol{\mu}_i) = \prod_{t=0}^T [P(d_{it}|\mathbf{z}_{it}, \boldsymbol{\mu}_i)]^{\delta_{it}} , \quad (5)$$

and

$$\delta_{it} = \begin{cases} 1 & \text{if } d_{it} \text{ is observed in time period } t \\ 0 & \text{otherwise} \end{cases} . \quad (6)$$

We use this model to estimate the probability of a job change with another employer $\left(\hat{P}(d_{i1t} = 1)\right)$ and the probability of a job change with the same employer $\left(\hat{P}(d_{i2t} = 1)\right)$. Note that the unobserved individual effects (μ_{is}) are specific for each destination state s . They follow the normal distribution with variance Σ_{μ} , $\mu_{is} \sim N(0, \Sigma_{\mu})$. For the identification of the model we assume that $\mu_{i0} = 0$. In the variance-covariance matrix Σ_{μ} , we also

impose the restrictions:

$$\begin{aligned}\sigma_{11} &= (v_1)^2, \quad \sigma_{22} = (v_2)^2 \\ \text{and } \sigma_{12} &= \sigma_{21} = (v_1 * v_2)\end{aligned}$$

Therefore, the variance-covariance matrix Σ_μ of the random effects has the structure (Vermunt et al., 2008):

$$\Sigma_\mu = \begin{Bmatrix} 0 & 0 & 0 \\ 0 & (v_1)^2 & (v_1 * v_2) \\ 0 & (v_1 * v_2) & (v_2)^2 \end{Bmatrix} \quad (7)$$

The second step of the estimation procedure is a fixed-effects linear wage regression. The Hausman test rejects the null assumption of the joint coefficients' equality of the fixed-effects and random-effects model, suggesting that the fixed-effects specification should be preferred. The inverse Mills ratios (λ_1 and λ_2), derived from the first step, are used as controls for endogeneity. For computing the inverse Mills ratios we use the specification of Dubin and McFadden (1984):

$$\lambda_s = \sum_{\substack{j=0 \\ j \neq s}}^2 \left(\frac{\hat{P}_j \ln \hat{P}_j}{1 - \hat{P}_j} - \ln \hat{P}_s \right), \quad (8)$$

where $\hat{P}_s = \hat{P}(d_{ikt} = 1)$. For a particular individual, this is the expected posterior mean of this probability. The dependent variable is the year-to-year wage growth $w_{it+1} - w_{it}$. The wage regression can be written as follows:

$$w_{it+1} - w_{it} = \mathbf{x}'_{it} \boldsymbol{\beta} + \sum_{j=1}^2 p_{ijt} b_j + \sum_{j=0}^2 \sum_{k=1}^2 (p_{ijt} d_{ik(t+1)} c_{jk}) + \sum_{r=1}^2 \lambda_{rit} \delta'_r + u_i + \varepsilon_{it}. \quad (9)$$

where w_{it} is the natural logarithm of the hourly wage and $\mathbf{x}'_{it}$ is a vector of covariates. ε_{it} is the idiosyncratic error, while u_i represents unobserved individual specific characteristics.

The vector β and the scalars b_j , c_{jk} , δ'_1 and δ'_2 are the regression parameters to be estimated.

5 Data and main concepts

Our data cover the period 1991-2004 and originate from two national panel datasets. For the UK, we use the BHPS - British Household Panel Survey (Taylor et al., 2006), which contains information on labour market participation and income of approximately 10,000 individuals per wave aged 16 years or above. For Germany, we use the GSOEP - German Socio-economic Panel (Wagner et al., 1993), which covers about 13,000 individuals aged 16 years or above. Waves 8-21 are used, which refer to the period 1991-2004. We only use data for the former West Germany as the labour market of East Germany differed considerably from that of the West Germany, especially at the beginning of the 1990s. The information from the two datasets has been made highly comparable for the purpose of this study.

The sample is restricted to full-time working males between 25 and 55 years of age. Specifically, we select males that declared paid employment as their main activity and who work at least 35 hours a week. We exclude the self-employed and the apprentices. Our main economic variable is the gross hourly wage. This hourly wage is calculated from the previous month's earnings from paid employment, and the usual number of hours worked per week. Monthly pay includes overtime but no other kind of additional payments. Including additional payments, such as bonuses and fringe benefits, would certainly be informative since the high-paid might receive more of these payments than the low-paid. However, in GSOEP, information on these payments is only available on a yearly basis and therefore it does not necessarily refer to the current job. Unfortunately, these panel surveys offer no information on the reservation wage so we are assuming that the workers accept job offers with a wage close to their reservation wage. We define as low-paid and high-paid workers those belonging to the lowest and the highest quartile of the wage distribution, respectively. We should stress here that there is no widely agreed threshold for high pay. This threshold is sometimes defined in terms of the median wage (e.g. 1.5 times the median wage) or in terms of quartiles or deciles. A caveat is always involved when comparing countries with very different wage distributions. Setting the high-pay threshold to 1.5 times the median wage would result in having very different population proportions

for the various countries, while choosing the fourth quartile as the threshold implies that workers included in different country samples vary a lot with respect to the proportion of the median wage they earn.

Following similar approaches in the literature (Perez & Sanz, 2005), we define as voluntary, a job change that is direct, i.e. without any intervening spell of unemployment or inactivity. Since our focus is on voluntary separations, involuntary job changes are excluded from the analysis.

6 Descriptive results

The composition of our sample is represented in Table 1. Workers staying in the same job and workers changing an employer do not differ significantly. Especially in Germany, the two groups look remarkably similar. However, in both countries stayers are, on average, older than movers. Moreover, external movers are employed more often than stayers in small firms and in the sectors of trade, banking and finance and less often than stayers employed in the sector of ‘other services’. These differences between external movers and stayers are more pronounced in the UK. Employer changes are more common for workers in construction and trade and less common for workers in manufacturing. The same applies for workers of small and medium sized firms, as well as for white collar workers.

Large differences in human capital characteristics emerge between workers that change jobs within the same firm and the rest of the workers. There are more highly educated among the workers that change jobs within the firm than among the rest of the workers. Work-related training also more often precedes an in-firm job change. This type of job change is also more common for white collar workers and for large-firm employees. With respect to sector differences, German in-firm movers are more usually employed in banking and finance, while their British colleagues are also more usually employed in banking and finance, but also in ‘other services’, and less usually employed in manufacturing, construction and trade.

Table 2 presents the proportion of job movers as well as the relative wage growth between t and $t+1$ averaged over the years, with a breakdown according to the initial position in the wage distribution. It shows that job mobility rates and the corresponding

Table 1: Composition of the sample
(in percentages)

	Germany			UK		
	Stayers	Movers		Stayers	Movers	
		External	In-firm		External	In-firm
Married	82.2	79.8	84.4	75.6	63.5	67.1
Age (in years)	38.9	36.4	36.7	39.1	34.9	36.4
Education						
Low	20.7	21.0	10.3	18.9	17.7	10.0
Medium	32.1	31.7	30.5	58.0	60.3	48.0
High	47.3	47.3	59.2	23.2	22.0	42.0
Training^a	34.0	30.9	48.2	3.5	4.7	11.6
Industry						
Manufacturing	26.2	25.5	23.2	46.0	37.7	35.3
Energy	1.6	1.7	0.6	1.5	0.8	3.1
Mining	3.4	2.6	4.2	1.1	0.6	0.6
Agriculture	5.7	3.2	5.9	0.8	0.9	0.2
Construction	6.5	8.5	4.0	9.8	13.9	3.5
Trade	11.6	16.9	13.0	7.2	13.2	3.3
Transport	9.9	10.1	7.4	4.9	6.7	6.4
Banking, Finance	12.7	17.4	17.4	3.7	2.3	7.6
Other services	22.5	14.1	24.5	25.0	23.9	40.0
Firm size						
Small firms	26.3	35.6	17.7	13.6	29.3	2.9
Medium-sized firms	25.9	28.3	24.7	26.0	33.6	12.4
Large firms	47.8	36.1	57.6	60.4	37.1	84.7
Temporary contract	2.4	10.4	2.8	3.8	13.1	6.1
White collar	47.0	43.2	62.5	39.0	45.9	52.3
Apprenticeship^b	74.4	72.5	70.2			

^aThis refers to whether individuals have followed training the year prior to the survey.

^bThis refers to whether individuals have ever followed an apprenticeship.

wage returns are higher in the liberal British labour market than in the regulated German labour market. Furthermore, Table 2 indicates that in both countries, the low paid tend

Table 2: Proportion of job movers and stayers, and associated relative wage growth (in percentages)

		UK			Germany		
		Stayers	Movers		Stayers	Movers	
			External	In-firm		External	In-firm
Low paid	proportion	80.2	10.8	9.0	92.0	6.8	1.2
	wage change	13	27	24	12	14	14
Medium paid	proportion	80.1	7.3	12.6	93.4	4.6	2.0
	wage change	5	8	10	4	6	8
High paid	proportion	78.4	6.3	15.2	92.3	4.7	3.1
	wage change	0	1	3	1	2	1
Total	proportion	79.8	8.0	12.3	92.8	5.2	2.1
	wage change	6	13	11	5	7	6
	cases	12,968	1,300	1,999	11,404	639	258

The wage change refers to the year-to-year wage change as a proportion of the initial wage.

Note: A worker is low paid when his earnings belong to the lowest quartile of the hourly wage distribution, and high paid when his earnings belong to the upper quartile of the wage distribution. The worker is middle paid if his earnings are in the second or third quartile of the distribution.

to change employer more often than the high paid, while the high paid change jobs within the firm more often than the low paid. The average relative gain for the low paid, in terms of year-to-year wage growth, is larger than for the high paid. On average, high-paid workers do not experience any significant relative change in their wage. In the UK, the low-paid workers that change a job experience an average increase of 27% in their wage, while their high-paid colleagues only a 1% increase. The figures for Germany are 14% and 2% respectively.

7 Results from the two-step estimation

First-step results: the job mobility equation

Table 3 shows the main results of the first-step regression for job mobility. The main finding is that the probability of changing job varies across the different parts of the wage

Table 3: Random effects multinomial logit model for the job change
(robust standard error)

		UK		Germany	
		External movers	Internal movers	External movers	Internal movers
Hours satisfaction (reference category 1 - not satisfied at all)	value 2	-0.170 (0.229)	0.025 (0.214)		
	value 3	-0.265 (0.200)	-0.044 (0.186)		
	value 4 (neutral)	-0.410** (0.202)	0.076 (0.186)		
	value 5	-0.499*** (0.196)	0.128 (0.181)		
	value 6	-0.484*** (0.195)	0.057 (0.181)		
	value 7 (completely satisfied)	-0.713*** (0.219)	0.204 (0.192)		
Worry about job security (very concerned)	Somewhat concerned			-0.533*** (0.107)	-0.062 (0.236)
	Not concerned at all			-0.710*** (0.111)	-0.190 (0.240)
Position in the distribution (low paid)	medium paid	-0.195** (0.086)	0.159** (0.073)	0.000 (0.087)	-0.077 (0.191)
	high paid	-0.313*** (0.117)	0.012 (0.091)	0.033 (0.129)	0.248 (0.239)
Constant		0.426 (0.967)	-2.208*** (0.753)	0.499 (1.068)	-5.783*** (2.069)
Random effect		0.911*** (0.068)	-0.686*** (0.050)	-0.536*** (0.094)	1.605*** (0.127)
Log likelihood		-11,397.50		-5,281.75	

Reference categories in brackets

Note: The following variables are included as controls in the regression: a dummy for married, age in years, age squared, labour market experience in months, experience squared, education with respect to high school (low, high-school, tertiary), a dummy for formal training in the previous year, the industry sector (sic level 1), the firm size (small, medium and large firms), the type of contract (permanent/temporary), tenure in months, yearly dummies, and the regional unemployment rate. For Germany, we also included a dummy indicating whether the worker ever acquired apprenticeship qualifications.

* significant at 10%; ** significant at 5%; *** significant at 1%

distribution only in the UK. In this country, we find that the higher the position in the distribution the lower the probability of changing employer. The probability of an internal job change is higher for the middle part of the wage distribution than for the upper or lower parts. Our exclusive variables (satisfaction for working hours and satisfaction with work content in the UK and worry concerning job security in Germany) are strongly significant for external mobility. These variables also have the expected effect: the more satisfied a

worker is, the lower the probability of changing employer. For the UK, Table 3 shows only the results for working hours satisfaction. The results for work content satisfaction are similar. Despite the lack of significance of the exclusive variables in the in-firm mobility equation, additional tests on the wage equation confirmed the adequacy of the instruments.⁴

The estimates for the rest of the covariates are not presented here. However, all the estimates are consistent with previous findings. Correction for unobserved heterogeneity is important in both countries: unobserved idiosyncratic characteristics, such as ability and effort, affect the likelihood of a job transition. The estimated variance-covariance matrices of the individual effects are:

$$\begin{array}{cc} \text{UK} & \text{Germany} \\ \Sigma_{\mu} = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0.830 & -0.625 \\ 0 & -0.625 & 0.471 \end{pmatrix} & \Sigma_{\mu} = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0.287 & -0.860 \\ 0 & -0.860 & 2.576 \end{pmatrix} \end{array}$$

The variance-covariance matrices show that the individual effects for external and internal job changes are negatively correlated in both countries. Therefore, in both countries workers with a higher propensity for changing employer have a lower propensity for changing their job within the firm.

Second-step results: wage mobility

Table 4 presents the results of the second step, the fixed-effects regression on wage growth. We applied four versions of the model, namely first a simple fixed-effects regression, a second one correcting for endogeneity, a third one correcting for the position in the wage distribution but not endogeneity and finally a model applying both corrections.

For both countries, in Models 1 and 2 the F-test for the individual effects does not reject the null hypothesis that individual effects u_i are jointly significantly different from zero.

⁴Specifically, the Wald test for the overall significance of the exclusive variables rejects the null hypothesis that these variables can be omitted from the regression. The full results for this regression can be obtained from the author.

Table 4: Second step regression - Fixed effects model for wage growth
(robust standard error)

	UK				Germany			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Mills ratios								
Mills ratio for external job change		0.042*** (0.007)		0.002 (0.007)		-0.018*** (0.004)		-0.004 (0.004)
Mills ratio for in-firm job change		-0.114*** (0.010)		0.001 (0.008)		-0.023*** (0.003)		0.002 (0.003)
Job change (reference category: no change)								
External job change	0.031*** (0.008)	0.018* (0.010)			0.032*** (0.008)	0.031*** (0.010)		
In-firm job change	0.025*** (0.007)	0.023*** (0.006)			-0.008 (0.012)	-0.005 (0.010)		
Position in the distribution (reference category: low paid)								
Medium paid			-0.260*** (0.007)	-0.259*** (0.008)			-0.217*** (0.005)	-0.217*** (0.005)
High paid			-0.521*** (0.541)	-0.520*** (0.114)			-0.441*** (0.089)	-0.439*** (0.150)
Cross terms								
Low paid * No change			ref	ref			ref	ref
Low paid * External change			0.065*** (0.013)	0.067** (0.020)			0.061*** (0.011)	0.062*** (0.014)
Low paid * In-firm change			0.051*** (0.014)	0.054** (0.018)			-0.023 (0.024)	-0.017 (0.025)
Medium paid * No change			ref	ref			ref	ref
Medium paid * External change			-0.001 (0.010)	-0.001 (0.013)			0.002 (0.009)	0.002 (0.010)
Medium paid * In-firm change			0.008 (0.008)	0.007 (0.007)			-0.004 (0.015)	-0.000 (0.012)
High paid * No change			ref	ref			ref	ref
High paid * External change			-0.033** (0.016)	-0.035 (0.021)			0.010 (0.015)	0.005 (0.019)
High paid * In-firm change			0.012 (0.011)	0.011 (0.010)			-0.024 (0.017)	-0.029* (0.015)
Constant	0.801 (0.817)	0.412 (2.306)	0.245 (0.736)	0.235 (2.169)	0.346*** (0.106)	1.334*** (0.155)	0.200** (0.094)	0.121 (0.164)
R^2	0.006	0.036	0.196	0.196	0.014	0.019	0.223	0.220
F-test ($u_i = 0$)	0.62	0.72	1.36***	1.36***	0.57	0.58	1.30***	1.26***

* significant at 10%; ** significant at 5%; *** significant at 1%

The list of the control variables is the same as in Table 3.

Therefore, the OLS specification is to be preferred to these fixed-effects models. However, the joint zero-hypothesis for the individual effects is rejected when we take into account the position in the wage distribution (Models 3 and 4). The inclusion of the ‘position’ terms also increases the percentage of variance explained (in terms of the R^2) from 3.6% to 19.6% in the UK and from 1.9% to 22.3% in Germany.

The significance of the endogeneity terms depends on the model specification. The t-tests for the inverse Mills ratios that provide a test for endogeneity (Vella & Verbeek, 1999) indicate that there is evidence in favor of endogeneity in Model 2 (see Table 4) but not in Model 4, the model that corrects for the position in the wage distribution. This finding suggests that the endogeneity of job mobility in the wage equation disappears when we correct for the position in the wage distribution. Therefore, the discussion of the results is based on Model 3 for both countries.

Our model contains two dummies for the position in the distribution and six cross-terms between the position in the distribution and the type of job change (see equation 2). The parameters corresponding to the dummies for the position in the distribution represent the difference in wage growth of the low-paid worker with the middle-paid and high-paid worker, respectively. The cross-terms represent the difference in the wage growth between the relevant groups of movers and stayers. For example, the term ‘external change * high paid’ represents the difference in wage growth between the high-paid external mover and the high-paid stayer. In other words, we estimate conditional effects with these cross-terms. In both countries, the low-paid worker experiences, on average, a higher relative wage growth than the high-paid worker, regardless of whether he changes job or not. This difference is more pronounced in the UK than in Germany. Moreover, in both countries, the low-paid external mover enjoys a higher wage growth than the low-paid stayer (6.5% higher in the UK and 6.1% higher in Germany). The British low-paid in-firm mover also experiences a 5.1% higher wage growth than the low-paid stayer. The wage growth of the German low-paid in-firm mover does not differ significantly from the wage growth of a colleague who stays in the same job. A change of employer has a negative effect on the wage growth of the British high-paid worker. The German high-paid external mover does not differ significantly from a colleague who stays in the same job. Finally, the wage growth of the high-paid in-firm mover does not differ significantly from the growth of the high-paid stayer, in any of the two countries under scrutiny. If within-firm job changes were

to refer only to promotions, this finding would be surprising. However, in our sample, in-firm job changes also include job changes at the same level and demotions.⁵ Furthermore, as indicated by Baker et al. (1994), a wage gain from a job promotion might not take immediate effect, but be delayed until a certain point in the future.

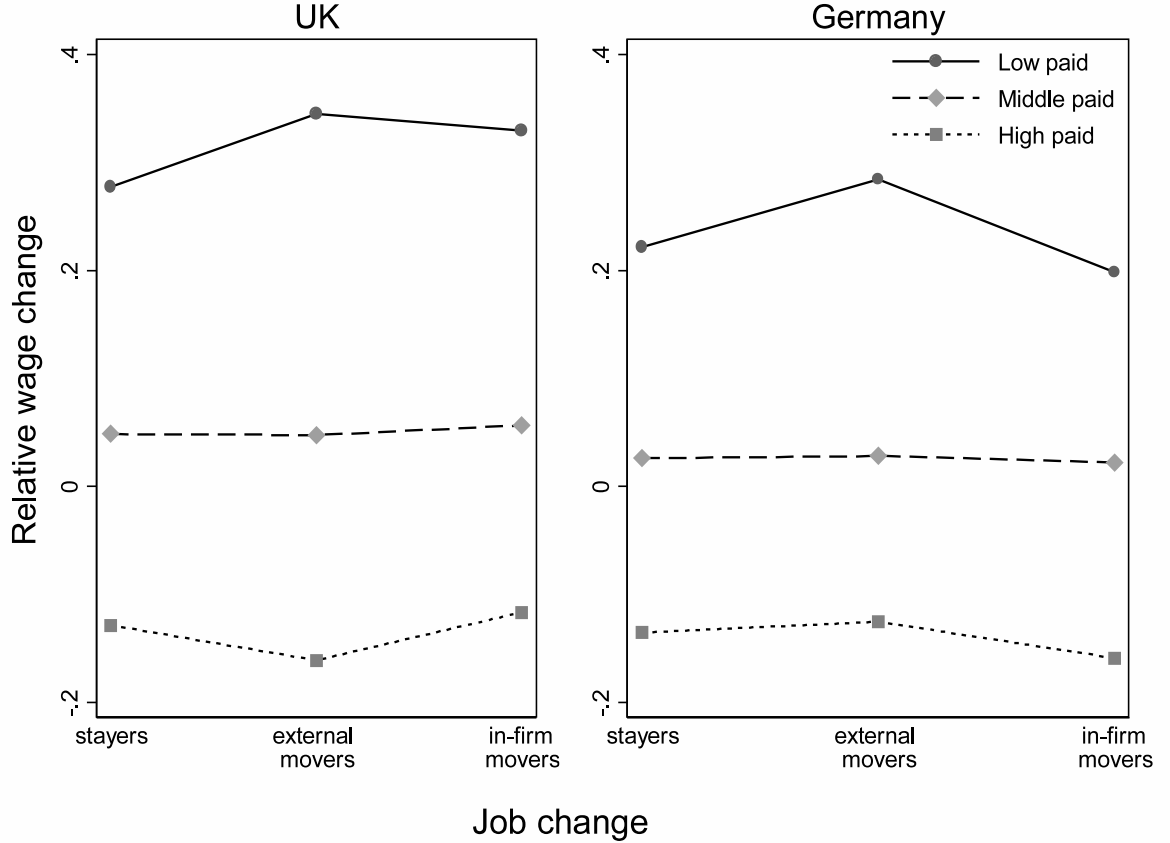


Figure 1: Wage changes across job transitions

In order to visualize the above-mentioned effects, in Figure 1 we present the estimated wage change for the stayers, the external movers, the within-firm movers, and for the low-paid, medium-paid and high-paid workers. The baseline of this figure represents the wage growth of a low paid stayer having average personal and job characteristics. Figure 1 shows that, in both countries, the low-paid worker that changes employer enjoys a considerably

⁵For the UK, two-thirds of the internal job changes are related to promotions. For Germany, we cannot distinguish promotions from other types of internal job changes.

high relative wage increase. The British low-paid in-firm mover also enjoys a wage gain. This gain is, however, smaller than the gain of a colleague who changes employer. The rest of the effects are negligible. For the high-paid worker, we find that his average wage growth is negative regardless of the type of job transition made.

Two words of caution should be added to the interpretation of these results. First, the finding that the low-paid worker experiences, on average, a higher relative wage growth than the high-paid worker should not be interpreted as an indication of decreasing earnings inequality. This finding is due to the fact that we are only observing part of the overall wage mobility, as we have excluded workers moving in and out of paid employment. Secondly, our wage measure is the hourly wage. The high-paid worker might derive more utility than the low-paid worker from bonuses paid on a yearly basis or from fringe benefits.

A sensitivity analysis: long-term effects

So far, we have only modelled year-to-year wage growth. However, wage gains from a job change might not take immediate effect, but be delayed until a certain point in the future (Blau & Kahn, 1981). Workers might accept the same, or even a lower, wage when changing a job, if they expect a steeper wage growth in the new job.⁶ Therefore, it is also necessary to compare the long-term wage growth of movers and stayers. For this purpose, we repeat the same multivariate analysis by using the wage growth between t and $t + 3$ as the dependent variable. In this analysis, our sample consists of workers that were continuously employed from t until $t + 3$ and did not change jobs between $t + 1$ and $t + 3$. Thus, we compare workers that changed jobs between t and $t + 1$ and then remained in this new job at least until $t + 3$, with workers that remained in the same job from t until $t + 3$.

Table 5 shows the results of the second-step regression for the long-term wage growth.⁷ This table indicates that the main finding remains the same. The low-paid worker that changes employer experiences a larger wage growth than the low-paid stayer. An employer change is also profitable for the middle-paid worker in the UK. The gains of the middle-paid

⁶A reservation wage lower than the current wage is not allowed by a job-search model, but is allowed by a job-matching model.

⁷The results of the first step of the estimation are not presented, but are available on request from the author.

Table 5: Long-term effects - Fixed-effects model for wage growth
(robust standard error)

	UK				Germany			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Mills ratios								
Mills ratio for external job change		0.051*** (0.010)		0.008 (0.009)		-0.021*** (0.006)		-0.009 (0.006)
Mills ratio for in-firm job change		-0.147*** (0.017)		-0.024 (0.015)		-0.030*** (0.005)		-0.007 (0.004)
Job change (reference category: no change)								
External job change	0.050*** (0.011)	0.033*** (0.011)			0.026** (0.012)	0.027* (0.015)		
In-firm job change	0.023*** (0.009)	0.019** (0.009)			0.012 (0.017)	0.011 (0.019)		
Position in the distribution (reference category: low paid)								
Medium paid			-0.314*** (0.010)	-0.300** (0.013)			-0.212*** (0.006)	-0.212*** (0.007)
High paid			-0.595*** (0.014)	-0.569** (0.017)			-0.428*** (0.009)	-0.424*** (0.010)
Cross terms								
Low paid * No change			ref	ref			ref	ref
Low paid * External change			0.064*** (0.019)	0.059** (0.021)			0.078*** (0.018)	0.083*** (0.024)
Low paid * In-firm change			0.061*** (0.019)	0.065** (0.022)			-0.016 (0.038)	-0.016 (0.038)
Medium paid * No change			ref	ref			ref	ref
Medium paid * External change			0.027** (0.014)	0.024* (0.013)			-0.031** (0.014)	-0.032** (0.016)
Medium paid * In-firm change			0.016 (0.010)	0.016 (0.011)			0.022 (0.021)	0.024 (0.024)
High paid * No change			ref	ref			ref	ref
High paid * External change			-0.028 (0.021)	-0.033 (0.022)			0.010 (0.026)	0.013 (0.027)
High paid * In-firm change			-0.008 (0.014)	-0.013 (0.015)			-0.027 (0.027)	-0.026 (0.027)
Constant	1.121 (0.937)	0.512 (5.400)	0.697 (0.839)	0.638 (4.926)	0.692*** (0.155)	0.547*** (0.186)	0.534*** (0.139)	0.478*** (0.167)
R^2	0.015	0.057	0.231	0.231	0.034	0.041	0.235	0.235

* significant at 10%; ** significant at 5%; *** significant at 1%

The list of the control variables is the same as in Table 3.

British worker are, however, lower, than the gains of his low-paid colleague. By contrast, in a three-year period, the German middle-paid external mover experiences a lower wage growth compared to the middle-paid stayer. In both countries, a high-paid worker who changes employer does not differ with respect to wage growth from a colleague who stays in the same job. Finally, as in the case of the year-to-year wage growth, a job change within the same firm is only profitable for the British low-paid worker. Therefore, we can conclude that the main findings of our study indicate little sensitivity to the time period for which the wage growth is observed.

8 Conclusions

Most studies on the effect of job mobility on wage growth implicitly assume that this effect is the same at all wage levels. However, according to the theoretical model of Mortensen (1986) and van den Berg (1992), both the hazard rate of changing a job and the difference between the current wage and the reservation wage are decreasing functions of the current wage.

These predictions were tested with a panel regression model, using data from the UK and Germany. Since we had no information on the reservation wage, we approximated the reservation wage with the wage in the new job. The prediction that the probability of changing jobs is higher for the low-paid worker than for the high-paid worker is only verified for the British external movers. In all other cases, no differences between the low-paid workers and the high-paid workers emerge. By contrast, the findings on wage growth are more in accordance with the expectations of the on-the-job search model. The relative wage returns to external job changes are higher for the low-paid worker than for the high-paid worker in both countries. On average, the low-paid external mover enjoys a 6.5% in the UK and a 6.1% in Germany higher wage growth than the low-paid stayer. The wage growth of the high-paid external mover is, on average, the same (in Germany) or even lower (in the UK) than the wage growth of the high-paid stayer. This means that a voluntary change of employer might be a good career move for the low-paid worker. With respect to in-firm job changes, our results are in accordance with the predictions of the on-the-job search model only in the UK. In the liberal UK labour market, the low-paid worker enjoys a higher wage growth than his high-paid colleague by an in-firm job change.

In Germany, however, an in-firm job change does not produce any gains or losses either for the low-paid worker or for the high-paid workers.

The main findings of this study remain the same if we extend the period for which we model wage growth, from one to three years. The only difference refers to the middle-paid worker who derives long-term gains from an employer change in the UK, as opposed to losses in Germany.

Caution should be taken with respect to the initial conditions problem. Several studies, such as Stewart and Swaffield (1999) and Cappellari and Jenkins (2004) suggest that initial conditions are endogenous. Other studies, such as Ramos (2003) argue that initial conditions are less of a problem. In this study, we have considered initial conditions (i.e. the selection in the pay level) exogenous as controlling for endogeneity would complicate our analysis. Further research can elaborate on the possible bias that initial conditions may cause.

Country differences concerning the return to job change emerge in two points. Firstly, the differences in wage returns from an external job change between low-paid, medium-paid and high-paid workers are more pronounced in the UK than in Germany. In fact, the findings for the UK are in accordance with the predictions of the on-the-job search model, as wage returns to an external job change decrease with the position in the wage distribution. Secondly, we found some evidence of positive returns to job changes in the internal labour market only in the UK. We expected more returns to in-firm job changes in the UK than in Germany. However, such country differences were found only for the low-paid workers.

Further research can shed more light on the alternative explanations of why people change jobs. Devine and Kiefer (1991) suggest that empirical findings on the effect of job mobility on wage mobility are contradicting because of heterogeneity in the reasons that drive individuals to change jobs. This is particularly important for the high-paid workers. Our study suggests that changing jobs does not, on average, result in higher hourly wages for this group of workers. These workers are likely to benefit more often from bonus payments that are paid on a yearly basis, or from other forms of fringe benefits.

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