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DISCUSSION PAPER SERIES

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ABSTRACT

Occupational Mobility in Europe: Extent, Determinants and Consequences

We examine occupational mobility and its link to wage mobility across a large number of EU countries using worker-level micro data. In doing so, we document the extent, the individual-level determinants and the consequences of occupational mobility in terms of wage outcomes and structural change across the EU. In addition, we identify potential explanations for the observed cross-country variation. Our results show that on average, 3% of European workers change their occupation per year, and that the extent of occupational mobility differs strongly by country. Individual characteristics play an important role for person-specific occupational mobility, but have little explanatory power for differences between countries. Occupational mobility is strongly associated with earnings mobility, and occupation movers are more likely than job movers to experience a downward rather than an upward earnings transition; by contrast, changing occupation voluntarily is more often followed by an upward wage transition. As opposed to composition effects, employment protection legislation seems to play an important role for explaining cross-country differences in occupational mobility through its impact on overall job mobility.

JEL Classification: J62, J63, P52

Keywords: occupational mobility, job mobility, wage mobility, European labour markets, EU-SILC

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1. INTRODUCTION

Occupational mobility, measured as worker transitions from one occupation to another, is an important feature of labour markets in industrialised countries. In Europe, nearly 3% of employees change their occupation from one year to the next. This type of mobility has several effects with important welfare implications (e.g. Kambourov and Manovskii, 2008). First, from a worker's perspective, occupational mobility can lead to an improved fit of individual skills and job-specific requirements. This improved matching is typically mirrored by higher wages (Topel and Ward, 1992; Groes et al., 2015; Fitzenberger and Kunze, 2005). However, changing the occupation usually also implies a loss of specific human capital and related wage premia (Gathmann and Schönberg, 2010; von Wachter and Bender, 2006), and this can contribute to a negative perception by employees of increased labour market uncertainty as a result of high occupational mobility. Ultimately, these effects of occupational mobility can have a – positive or negative – impact on their life cycle earnings. Second, these mechanisms have implications for employers who can also benefit from occupational mobility and the ensuing improved match quality (Kwon and Meyersson Milgrom, 2014). This possibly reduces unit labour costs, but the loss of skilled employees may also generate costs to employers. Third, at an aggregate level occupational mobility is an important determinant of labour market efficiency (because of the accompanying transition costs, see Cortes and Gallipoli, 2018) and income inequality (Kambourov and Manovskii, 2009). Furthermore, it is a major facilitator for coping with structural change, i.e. changing skill and task requirements, especially the decline in demand for routine tasks (Cortes, 2016; Bachmann et al., 2019).

Against this background, our paper provides a detailed analysis of occupational mobility in Europe. First, we give a descriptive overview of the incidence of occupational changes and job changes – which are generally viewed as a prerequisite for occupational changes – in 26 European countries, for the years 2011-2014. We therefore cover a period of relative stability after the Great Recession; furthermore, we are able to use a consistent occupational classification, i.e. ISCO-08 (ISCO=International Standard Classification of Occupations), which is available from 2011 onwards in the main data set we use. Second, we study the determinants of occupational mobility in a multivariate context, paying particular attention to individual and household characteristics, job characteristics, as well as the motives for a job change. Third, we examine consequences of occupational mobility in terms of structural change and the link between occupational mobility and wage transitions[1], which is particularly relevant from a welfare perspective. Finally, we provide evidence on the importance of composition and business cycle effects as well as labour market institutions for cross-country differences. In addition to the individual characteristics, these are further important determinants of occupational mobility at the country level. For our analyses, we use data from the European Union Survey on Income and Living Conditions (EU-SILC), supplemented with data from the Socio-Economic Panel (SOEP) for Germany. This allows us to obtain a representative picture of occupational mobility at the 2-digit level of the ISCO classification and corresponding wage changes related to job-to-job transitions in Europe.

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[1] Wage transitions refer to transitions between deciles of the distribution of earnings from paid labour. The terms "wage transitions" and "earnings transitions" are used interchangeably in the article.

So far, the literature on occupational mobility has mainly examined individual countries. A rising trend in occupational mobility has for example been found for the US between 1968 and 1997 by Kambourov and Manovskii (2008). More recent studies highlight the importance of occupational mobility for specific European countries: For Denmark, Groes et al. (2015) find that persons who change their occupation mostly feature very high or rather low productivity. Thus, occupational mobility follows a U-shaped pattern along the wage distribution. For the UK, Carrillo-Tudela et al. (2016) analyse the cyclicality of career changes and wage growth for the period 1993 through 2012. They show that wage increases are mostly driven by direct transitions from one job to another, while transitions out of non-participation are often involuntary. Lalé (2012) focuses on France where occupational mobility has been relatively stable in the past three decades but has increased once compositional effects are taken into account. International comparisons are rare and mostly confined to few countries. Longhi and Brynin (2010) analyse the link between occupational mobility, wages and job satisfaction for the UK and Germany. They show that occupational mobility is lower compared to the USA, and also contrast occupational and other job changes in terms of satisfaction and related wage premia.

From a theoretical point of view, one way of thinking about occupational worker mobility is the island model of Lucas and Prescott (1974). In this model, the economy consists of separate islands which are hit by idiosyncratic productivity shocks. In the original model, worker mobility, and the distribution of employment across islands, results from the probability distribution of productivity shocks. Using an extended version of the model, Lalé (2017) shows that it can be used in order to quantify the two main drivers of occupational mobility: productivity shocks and, in addition, mobility costs.

One issue this type of island model does not explicitly address is the heterogeneity of workers and firms, and the ensuing search and matching problem on the labour market. To be precise, this model can only explain worker flows that lead to changes in employment stocks, i.e. it is silent about churning flows, which cancel each other out in the aggregate. However, it has been shown that churning flows are a pervasive labour market phenomenon, and that worker heterogeneity plays an important role in this context (Burgess et al., 2000, Lazear and Spletzer, 2012). Finally, Jolivet et al. (2006) stress another dimension of job mobility, the voluntariness of labour market transitions, as being crucial for wage outcomes.

Our main contribution to the existing literature is to add a cross-country dimension to the analysis of occupational mobility and related wage changes. This provides insights into the extent of occupational mobility, its determinants, and its consequences at a European level, and furthermore explains country-specificities in this context. In particular, our study sheds light on the importance of country-specific institutional labour market settings, especially employment protection (which is crucial for the mobility costs mentioned above), with respect to occupational mobility. The link between institutional labour market characteristics and occupational mobility is particularly interesting in this cross-country setting, since labour market institutions typically display a larger variation across countries than within countries over time.

Our results reveal that on average, around 3% of European workers change occupation from one year to the next, and that this figure varies strongly between countries. Furthermore, individual-level characteristics such as age and education play an important role for person-specific occupational mobility. As for the consequences of occupational mobility, we show that occupational mobility is associated with lower wage stability, i.e. occupation changers have a higher

probability of making an upward or downward wage transition than workers who do not change occupation. Furthermore, occupation movers are more likely than job movers to experience a downward rather than an upward earnings transition; by contrast, changing occupation voluntarily is more often followed by an upward wage transition.

For the observed cross-country variation in occupational and related wage mobility, our analysis shows that individual characteristics have little explanatory power, i.e. composition effects do not seem to play an important role in this context. By contrast, labour-market institutions, especially employment protection, are an important predictor of cross-country differences. However, employment protection seems to have a rather indirect impact on occupational mobility, i.e. the negative correlation between occupational mobility and employment protection is driven by the probability to make a job change with an associated occupational change, rather than by the probability to make an occupational change given a job change. Finally, while we find a weak correlation between employment protection and wage mobility for all workers and voluntary occupation changers, EPL does not seem to play a role for occupation changers overall. Our results have important welfare implications and are informative about the theoretical models mentioned above. We discuss these topics in the conclusion.

2. DATA AND METHODOLOGY

Our calculations are based on data from the European Union Statistics on Income and Living Conditions (EU-SILC) except for measures for Germany where we use data from the German Socio-Economic Panel (SOEP) since the EU-SILC data for Germany are not available for the observation period (2011 to 2014)[2].

EU-SILC data annually provide cross-sectional and longitudinal information on sociodemographic characteristics, employment, income, poverty, household composition and other living conditions for all EU member states as well as additionally for Iceland, Macedonia, Norway, Serbia, Switzerland and Turkey. The data are provided by national statistical offices through personal interviews or by administrative data sources; they are representative for the population in the countries covered, are comparable across Europe, and comprise more than 550,000 individual observations per year. Detailed information about the EU-SILC data set can be found in Eurostat (2014).

In order to identify labour market dynamics at an individual level, we use the longitudinal version of the EU-SILC data, which is usually based on a four-years rotating panel. Accordingly, each household in the sample participates in the survey for four years and each year one quarter of the households surveyed are replaced by new households. The longitudinal version only contains persons who participated in the survey in two adjacent years. In order to construct a representative data base with a maximum number of observations for the period under consideration, the longitudinal data of single years are combined based on Engel and Schaffner (2012) and the country-specific weighting matrix is adapted accordingly.

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[2] Note that – as indicated in the introduction – we choose this time period for our analysis because there is a break in the ISCO classification in 2011, and because we aim at focusing on a recent period of relative economic stability.

For Germany, the analyses are based on data from the SOEP. This representative annual household survey on "Living in Germany" provides detailed information on labour market participation, professions and wages. With about 20,000 persons interviewed in approximately 12,000 households per year, the sample is also sufficiently large. We use version v32.1 of the SOEP in the long format, which contains data for the years 1984 to 2015. In the long format, the individual waves are already merged and harmonized. Like the EU-SILC data set, the SOEP yields representative numbers for the country's population. However, since the questionnaires as well as the resulting variables of the two household surveys EU-SILC and SOEP are not identical, we generated variables out of the SOEP to match the EU-SILC variables used. A detailed description of the SOEP data set can be found in Wagner et al. (2007).

We restrict the resulting sample from the EU-SILC and SOEP to persons between 18 and 65 years of age with dependent employment in two consecutive years between 2011 and 2014 and valid data for the crucial variables, for a total of 26 European countries. [3] Ireland cannot be included in the analyses since no longitudinal data are available for the period from 2009 to 2012. Iceland has to be dropped due to missing and invalid information in relevant variables. Serbia is also excluded from the analysis as data are only available for the years 2013 onwards. Norway cannot be considered because the job change variable is incorrectly coded. Malta only provides occupational codes at the 1-digit ISCO level and has to be dropped accordingly. For Macedonia, Switzerland and Turkey, no micro data have been provided by Eurostat so far.

In line with the literature, the analyses on occupational mobility are based on the concept of job changes. For example, Longhi and Brynin (2010) demonstrate that occupational codes are error-prone and a definition of occupational changes based on a changed 2-digit ISCO code from one year to another might purely result from a slightly different description of the occupation by the interviewed person, or from a difference in the classification of the occupation by the statistical office. For this reason, occupational changes are usually only coded as such if they go along with a job change, which is separately asked for in the questionnaires underlying the EU-SILC and SOEP data. This is all the more important because with the data we use as we find that within-job mobility at both the 1-digit and the 2-digit level is much higher than between-job occupational mobility, which is in line with findings in the literature using other data sets (e.g. Longhi and Brynin (2010) and Groes et al. (2015). While a job change covers a change of employer in both the EU-SILC and the SOEP data, it additionally includes a change of contract with the same employer in the EU-SILC data only.[4] Accordingly, job mobility might be lower in the data for Germany.

Given a job change, we code an occupational change as a change in the 2-digit ISCO code. The categories of the 1- and the 2-digit ISCO code are shown in Table C.1. While EU-SILC has been using the ISCO-08 classification since 2011, the SOEP has been providing it only since 2013. To maximize the comparability of occupational codes over time, we use the ISCO-08 occupational codes and map the old ISCO-88 codes into the new classification for Germany for the years 2011 and 2012. To this end, we use the information from years more recent than 2012 for which the SOEP includes both ISCO-88 and ISCO-08 codes. In cases where the ISCO-88 code did not change between 2011 or 2012 and 2013 or more recent years, we use the ISCO-08 code specified

[3] We thus exclude self-employment from the analysis as is standard in the literature (e.g. Kambourov and Manovskii, 2008, Longhy and Brynin, 2010, Lalé, 2012, Groes et al., 2015, as well as Carrillo-Tudela et al., 2016).

[4] Distinguishing between changes of employers and changes within the same firm is not possible, however.

in the SOEP from 2013 on. For other cases, we use the correspondence table provided by the International Labor Organization (ILO2017). For 15% of the observations in the sample for Germany, neither of these strategies provided ISCO-08 codes, and we use ISCO-88 codes in these cases. To minimize the possible over- or underestimation of occupational changes, we then compare the 2012 occupation to the 2013 ISCO-88 code.

The 2-digit ISCO code is the finest information on occupations contained in the EU-SILC data. For Germany, the SOEP even includes codes on the 4-digit level. Previous literature has been using different aggregation levels. While Carrillo-Tudela et al. (2016) use 1-digit Standard Occupational Classes and industry categories, Longhi and Brynin (2010) analyse occupational changes on the 2-digit level. Kambourov and Manovskii (2008) , Lalé (2012) as well as Groes et al. (2015) use data at three different levels from one up to four digits. While Lalé (2012) argues that the 1- and 2-digit levels provide more accurate data compared to finer codes, Kambourov and Manovskii (2008) prefer the 3-digit level as most relevant for occupation-specific human capital. The extent of occupational mobility increases the finer the level, typically by factor 2 to 3 between each two levels. In qualitative terms, the aggregation level normally does not alter the results.

In order to evaluate different levels of occupational and job mobility, the reason for change is an important information, in addition to and in combination with wage mobility. In line with the literature, we differentiate between voluntary, involuntary, and changes for other reasons. A voluntary job change comes with the intention "to take up or seek [a] better job". Involuntary changes comprise cases where temporary contracts end, employees are obliged by their employer to stop their job or the (family) business is closed, and family reasons such as care for dependent or moving because of the partner's new job or because of marriage. Other reasons are not further specified in the EU-SILC data. In the SOEP data, different reasons for job changes are asked for. Here, we define as voluntary changes those job transitions requested by the employee, or cases in which the employee resigned or the termination of the old job was mutually agreed upon by employee and employer. Involuntary changes include situations in which the old contract was terminated by the employer, the company closed down or transferred the employee, a temporary job or contract expired or a training was completed, or when a job was ended because of leave such as maternity or paternity leave. Other job changes are those where no specific reason is given by the interviewed job changer.

When linking occupational to wage mobility, we define transitions between deciles of the country-specific distribution of earnings from paid work in each year of the longitudinal data (i.e. also here, excluding self-employment). The EU-SILC data set contains information on the individual annual gross income from all types of paid labour and includes, in addition to the salary, other payments made by the employer, such as overtime, holiday allowance, 13th and 14th monthly salary, Christmas bonuses, profit participation and cash bonuses. Since the income information is provided on an annual basis, but employees differ in the number of months worked per year, we calculate labour income per month worked using the retrospective information from the employment calendar and that on income following Engel and Schaffner (2012). The SOEP only includes extra payments for additional overtime work and is thus less extensive compared to the corresponding EU-SILC variable. Finally, we restrict our analysis of wage mobility to full-time workers as the EU-SILC data do not provide information on hours worked, which prevents computing comparable monthly earnings for part-time workers.

In our analysis of institutions as determinants of cross-country differences in occupational and wage mobility, we focus on employment protection legislation (EPL) and union density which are derived from two data sources. For EPL, we use an employment protection indicator provided by the OECD; for union density, we use data provided by the Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS). Both measures are described in more detail in Section 5.

3. Occupational mobility across Europe: Extent and individual-level determinants

For our analyses, we define occupational mobility as the probability of an individual who is employed in two consecutive years to change occupation, measured at the 2-digit ISCO level, given a job change. Its distribution across European countries is depicted in Figure 1. The European average[5] of occupational mobility lies at 3%[6], but occupational mobility displays a high variation across countries: While it is rather low in Romania (0.5%) and Croatia (1.5%), it is considerably higher in countries with traditionally more permeable labour markets, reaching a maximum of 7.4% in Sweden, followed by Estonia (6.5%) and the UK (5.2%). Some Eastern European countries such as Hungary, Poland, Latvia and Lithuania show above-average occupational mobility, whereas the measure is below-average for all Southern European countries.

This country variation in occupational mobility implies relatively large differences in the number of occupation changes that a worker will experience over her lifetime: Assuming an average duration of a working life of 35 years as suggested by Eurostat (2019), the average European worker can expect to change occupation 1.05 times in his or her working life. This figure ranges from 0.18 for Romania to 2.59 occupation changes for Sweden.

[Figure 1 here]

Since the calculation of occupational mobility is based on job changes, we also show the level of job mobility in the different European countries in Figure 1. The average, 6.6%, is more than twice as high[7] as the one for occupational mobility, but the two measures show a high and highly significant correlation of 0.94 and a similar cross-country variation (with coefficients of variation of 0.5).

These results lead to a much lower cross-country variation of the probability of an occupational change given a job change – i.e. dividing the probability of changing the occupation by the probability of changing the job. Here, the coefficient of variation amounts to only 0.17. The European average of 47% indicates that almost every second job change goes along with an

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5 All EU averages are unweighted averages of the country values in the overall sample. The values for each country are calculated using individual weights in order to be representative for the country's population.

6 For the 1-digit level of occupational codes, the average is somewhat lower (2.5%), which means that the large majority of occupational changes at the 2-digit level go along with a change at the 1-digit level. These figures indicate that a relatively large share of occupational changes in our sample reflect a vertical, rather than a horizontal, change when changing their job and occupation. Our figures are furthermore of a similar magnitude as those in Lalé (2012) who reports mobility rates for the 1- and the 2-digit-level of slightly below and above 4%, respectively.

7 This is in line with the finding by Carrillo-Tudela et al (2016) for the UK that about 50% of all job changes are accompanied by an occupational change.

occupational change. The values for the individual countries are included in Figure 2. Taken together, these results imply that the differences between countries in occupational mobility are driven by differences in job-to-job transitions rather than differences in occupational mobility conditional on making a job-to-job transition.

[Figure 2 here]

Compared to previous results from the literature, our findings are at the lower bound. While Lalé (2012) finds occupational mobility in France to reach 4% for the 2-digit level between 1980 and 2009, Groes et al. (2015) report figures of 13% for Denmark for the period 1980 to 2002. For the US, Kambourov and Manovskii (2008) estimate an occupational mobility rate of 15% for the period 1968 to 1997. Apart from different time horizons and datasets used, also the sample design is an important driver of diverging figures, e.g. the inclusion of non-employment spells.

One further potential explanation for different results across countries are worker characteristics, which are known to be important determinants of job and occupational mobility (Topel and Ward, 1992; Neal, 1999; Kambourov and Manovskii, 2008). To analyse the relevance of population characteristics, we run logistic regressions for occupational mobility by estimating the following regression equation for transition y_{it} of individual i at time t in country c:

$$\boldsymbol{Pr(y_{it} = 1 | X_{it}, \gamma_c, \delta_t) = \Lambda(\alpha + \beta_1 X_{it} + \beta_2 \gamma_c + \beta_3 \delta_t)} \qquad (1)$$

where $\Lambda(.)$ is the logistic cumulative density function with $\lambda(z) = e^z/(1 + e^z)$. We control for individual and household characteristics X_{it} such as gender, age, education, marital status, the number of children in the household, the presence of young children, part-time employment and the occupation (measured at the 1-digit ISCO level) before the transition. The latter variable controls for compositional differences between countries in terms of occupational shares in total employment. Moreover, country-level GDP growth γ_c and year fixed effects δ_t are included to control for differences in economic conditions between countries and over the business cycle. It is however not possible to control for firm characteristics as these are not included in the EU-SILC data. Standard errors are clustered at the household level.

The regression results are shown in Table 1. The coefficients for the control variables are broadly in line with common findings from the literature (e.g. Carrillo-Tudela et al., 2016; Groes et al., 2015; Kambourov and Manovskii, 2008): Women show lower levels of mobility than men and married individuals are less mobile than unmarried individuals. Moreover, mobility decreases with age and increases with the education level. The number of children in the household has no statistically significant effect. With regard to the occupations from which the occupation changers leave, this is significantly more often the case for managers, skilled agricultural, forestry and fishery workers and for elementary occupations. Less occupational changes are observed for professionals, technicians and associate professionals, craft and related trade workers, as well as plant and machine operators, and assemblers, with service and sales workers being the reference group. Persons with part-time contracts show higher occupational mobility than full-time employees, which is in line with evidence from the UK (Connolly and Gregory, 2008).

[Table 1 here]

To assess whether different levels of occupational mobility are desirable from the employees' perspective, the voluntariness of the job or occupational change is an important factor. Figure 3 therefore displays the share of voluntary and involuntary occupational changes across the European countries. On average, 52% of occupation changers do so for voluntary reasons, 33% for involuntary reasons. The share of voluntary occupation changers is highest in some of the Baltic and Eastern European countries. It lies at 73% for Latvia and between 68% and 66% for Estonia, Bulgaria and Romania. In Portugal and Italy, it is lowest with shares of 31% and 32%. The share of involuntary occupational changes is negatively correlated with the overall probability of changing the occupation (-0.34, with a p-value of 0.09, no figure shown). These results are consistent with the notion that workers in countries with a relatively good economic performance (Latvia, Estonia) are more likely to change a job voluntarily, i.e. to engage in on-the-job search (see e.g. Krause and Lubik, 2006); in countries with slower economic growth such as Portugal and Italy, involuntary job changes are more important in relative terms.

[Figure 3 here]

Again, we investigate at the individual level which workers are most likely to make an occupational change, here separated by voluntariness/reason for change (Table 2). It turns out that for voluntary occupational changes, age differences become more pronounced for older workers than when looking at overall occupational change. This can easily be explained by occupation-specific human capital increasing with age, which makes occupational changes more costly when workers grow older. The oldest worker group (50-65) is, however, also more likely to make an involuntary occupational change. This could indicate the need of employers to adapt to changing requirements which is not always in line with older workers' wishes. Furthermore, it becomes apparent that differences between skill groups are also more pronounced for voluntary occupation changers than for all occupation changers: Workers with a low qualification are much less likely to make a voluntary occupational change than medium-skilled workers, and high-skilled workers are in turn even more likely to change occupation voluntarily. From a welfare point of view, this can be seen as worrying, because low-skilled workers apparently forego the opportunity to improve their position in the labour market through better matching, which is likely to exacerbate the negative (wage) effects of their low qualification.

[Table 2 here]

4. CONSEQUENCES OF OCCUPATIONAL MOBILITY FOR STRUCTURAL CHANGE AND WAGE TRANSITIONS

From an economy-wide perspective, occupational mobility can occur for two reasons: On the one hand, workers may change occupation as a response to occupation-specific labour demand, which is higher in their new occupation than in their previous occupation. In this case, net occupational flows will be sizeable relative to gross occupational flows, and the occupational structure of the economy will change strongly as a result of high individual occupational mobility. On the other hand, occupational flows may occur because of matching considerations between workers and firms. In this case, inflows and outflows between occupations virtually cancel out each other, which leads to high gross flows and very low net flows and therefore corresponds to a low degree of structural change.

In the following, we therefore investigate net occupational change and wage mobility. Both concepts are indicative of occupation-specific labour demand shocks: such a shock will lead to both higher net occupational mobility, i.e. structural change in terms of the distribution of occupations across the economy, and to higher downward wage mobility.

In order to investigate the importance of structural change versus matching reasons for occupational mobility, we calculate the net mobility rate of occupational changes as the absolute value of inflows minus outflows (conditional on job change), summed up over all occupations, normalized by total employment (see Figure 4). As for the probability of changing the occupation, which we take as a measure of gross occupational mobility in line with Lalé (2012), we use 2-digit ISCO codes for calculating the net mobility rate. For the European countries in our sample, it amounts to 1.23% on average.[8] However, some countries display very high net occupational mobility (e.g. Sweden, Estonia, Denmark), while it is very low for countries such as France, Italy and Romania (no figure shown). This points to a high degree of structural change in the latter countries. The correlation between the net mobility rate and the probability of changing occupation amounts to 0.78 and the p-value is 0.00 (no figure displayed). This strong correlation between net and gross mobility means that countries with a high level of occupational changes also display a higher level of structural change than countries with a relatively low level of occupational changes. This implies that structural change is an important reason for varying degrees of gross occupational mobility between countries.

[Figure 4 here]

Another potentially important consequence of occupational change are wage changes. Following Buchinsky and Hunt (1999), we define an earnings transition as a switch from one decile of the country- and year-specific earnings distribution to another decile, independently of occupational change.[9] Figure 5 provides an overview of the extent of earnings transitions in the EU countries. On average, 53% of European workers do not experience such a transition from one year to the next.[10] The remaining workers experience either an upward transition (22% of workers) or a downward transition (25%). The variation between countries is relatively large: The Netherlands display the highest earnings stability, with 66% of workers not making an earnings transition from one year to the next;[11] several other relatively early EU members such as Spain, Austria, France and Italy also feature above-average values of earnings stability. The lowest stability can be observed in Croatia, where only 37% of workers do not make an earnings transition. Furthermore, there is a

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8 This figure is in line with the result of net mobility amounting to 1% in France (Lalé, 2012), but lower than figures for the US (Kambourov and Manovskii, 2008) and the UK (Carrillo-Tudela et al., 2016), where net mobility was found to be 4.5% and 12%, respectively. Apart from different time horizons, also sample restrictions might be reasons for diverging results.

9 In a robustness test, we apply as an alternative measure of wage mobility absolute changes in deflated earnings that are larger than 5% compared to the previous year's individual earnings and define such changes as upward or downward mobility. This measure has the advantage that it is not affected by the degree of inequality prevailing in a specific country. The results (available from the authors upon request) are very close to our main measure.

10 The magnitude of this number should not be overinterpreted as it is a consequence of defining wage transitions as transitions across deciles of the wage distribution. Rather, it should be regarded as an indicator of the probability that a wage change is zero or relatively small.

11 Note that this could be partly driven by the selection of risk-averse workers into full-time jobs, as part-time jobs (which are excluded from this part of the analysis) make up an important share of employees in the Netherlands.

number of Eastern European countries also featuring low earnings stability, e.g. Estonia, Hungary, Slovakia and Latvia.

[Figure 5 here]

In order to investigate which workers show the highest wage mobility, we follow Bachmann et al. (2016) and run a multinomial regression model with the probability of upward, zero, and downward wage mobility (i.e. transition j) as dependent variables:

$$\mathrm{P}\left(y_{j,it}=1\middle|X_{it},\gamma_c,\delta_t\right)=\frac{\mathrm{e}^{\alpha_j+\beta_{j,1}X_{it}+\beta_{j,2}\gamma_c+\beta_{j,3}\delta_t}}{\sum_{j=1}^{3}e^{\alpha_j+\beta_{j,1}X_{it}+\beta_{j,2}\gamma_c+\beta_{j,3}\delta_t}} \quad (2)$$

As in Equation 1, we again control for individual and household characteristics X_{it}, GDP growth γ_c and include time fixed effects δ_t. The results in Table 3 show that women compared to men are more likely to experience a downward transition rather than an upward transition. Younger workers (relative to medium-aged) and low-skilled (relative to medium-skilled) workers have a lower probability of remaining in the same wage decile and a higher probability of making a downward transition, which is in line with evidence for the UK (Evans, 1999). Furthermore, high-skilled workers have a higher probability of an upward wage transition than medium-skilled workers.

[Table 3 here]

Our main interest in the context of earnings transitions is the link between earnings transitions and occupational mobility. Across Europe, amongst the workers who change their occupation, only 36% remain in the same earnings decile (Figure 6), i.e. earnings stability is much lower than for all workers. Furthermore, downward transitions can be observed for 37% of occupation changers, upward transitions for 28% of occupation changers. Thus, downward transitions are relatively more important than upward transitions for occupation changers than for all workers – a finding already established by Longhi and Brynin (2010) for the UK and Germany. In our European sample, we can again observe a large cross-country variation. Finland displays the highest level of earnings stability (50% of occupation changers stay in the same earnings decile); other countries with high earnings stability for occupation changers are Luxembourg, Slovenia, France, the Czech Republic, Spain and Germany. Romania is at the lower end of the spectrum with only 16% of occupation changers staying in the same wage decile. Cyprus, Latvia, Belgium, the Netherlands, and Lithuania are also characterised by low earnings stability. In most of these countries, occupation changers are more likely to make an upward rather than a downward transition.

[Figure 6 here]

In order to econometrically investigate the link between earnings transitions and job or occupational mobility, we use the wage transition regression displayed in Table 3 and focus on the dummies for occupational mobility. In a separate multinomial regression, we include a dummy for job mobility instead of occupational mobility (Specifications A and B in Table 4 contrast the marginal effects for the two dummy variables). It becomes apparent that job movers (Specification A in Table 4) have a lower earnings stability than individuals who do not change their job, which is consistent with higher wage cyclicality for job movers than for job stayers (Hart, 2006). This is brought about by higher probabilities of both upward and downward wage

transitions, but the higher probability of upward wage transitions of job movers is even more pronounced than the job movers' higher probability of downward wage transitions.

[Table 4 here]

If job movers in addition change occupation (Specification B in Table 4), their earnings stability is slightly higher than the earnings stability of persons who only change their job but not their occupation. Furthermore, workers with a job change without occupational change feature a higher probability of an upward wage transition and a lower probability of a downward wage transition than workers with a change of both job and occupation. We take this as an indication that the loss of human capital which goes together with an occupational change is sizeable. This is in line with the evidence presented in Kambourov and Manovskii (2009) who find substantial returns to occupational tenure.

The reason for occupational change is an important determinant of wage transitions (Specification C in Table 4): Persons who change occupation voluntarily have a higher probability of experiencing an upward wage transition than persons who do not change occupation, and with 12 percentage points, this effect is relatively large. Furthermore, the probability of experiencing a downward transition is hardly increased for voluntary occupation changers. By contrast, the probability of making an upward wage transition does not differ significantly between involuntary occupation changers and persons who do not change occupation. However, involuntary occupation changers have a 19 percentage points higher probability of experiencing a downward wage transition than persons who do not change occupation.

5. ACCOUNTING FOR CROSS-COUNTRY DIFFERENCES: COMPOSITION EFFECTS, THE BUSINESS CYCLE, AND LABOUR-MARKET INSTITUTIONS

The results in Sections 3 and 4 reveal considerable variation in occupational and wage mobility across Europe. We therefore investigate which factors can help to explain these cross-country differences. The factors considered are (i) the composition of the population in terms of individual, job and household characteristics, (ii) economic conditions, i.e. the business cycle, and (iii) the institutional framework prevailing in the labour market, such as dismissal protection.

In order to examine the importance of composition effects, we compute the predicted values for occupational mobility by country (see Figure C.1). These predicted values are based on the marginal effects for the country dummies from the logistic regression (see Table 1) and show the probability of changing the occupation while assuming the country had population characteristics corresponding to the EU average (in terms of all the individual control variables included in the regression) and average economic growth. The 95%-confidence intervals allow for a pairwise comparison of the country values: If they do not overlap for two countries, the difference between the predicted levels of occupational mobility is statistically significant, as for example for Sweden and the UK.[12] In order to gauge the importance of composition effects, one can compare the predicted values from the regressions and the raw probabilities of occupational mobility. It turns

[12] The contrary argument is not necessarily true, however: Overlapping confidence intervals do not always imply that the difference between two values is not significantly different, as long as each of the two values is not included in the confidence interval for the other.

out that the two values are very similar, with a correlation of 0.99. This closeness demonstrates that the differences between the countries in terms of population characteristics have no major role in explaining the differences in the levels of occupational and job mobility. As our regression includes indicator variables for the initial occupation at the individual level, this also applies to the share of occupations in total employment.

We analyse the importance of composition effects for earnings transitions by proceeding in a similar way as for occupational mobility: We compute predicted values from the multinomial logit regression with earnings transitions (up, zero, down) as dependent variables (see Table 3) and compare them to the descriptive evidence presented in Section 3. It turns out that as for occupational mobility, the resulting country-level figures hardly differ from the descriptive evidence for earnings transitions, with the correlation between the raw figures and the predicted values amounting for 0.98, 0.99 and 0.97 for upward, zero and downward earnings transitions, respectively. Accordingly, the factors we control for, i.e. individual characteristics, GDP growth and occupational change, do not have much explanatory power for cross-country differences in earnings transitions.

Apart from the overall economic situation and population characteristics, labour market institutions are important determinants of the permeability of labour markets in general and occupational mobility in particular. With respect to worker flows, job creation and destruction, employment protection legislation (EPL) has been identified as a crucial institutional determinant (Boeri, 1999; Haltiwanger et al., 2014). Search-theoretic models of the labour market actually do not make a clear prediction about the effect of EPL on job mobility: on the one hand, in the textbook search and matching model, EPL leads to a decline of job mobility (Mortensen and Pissarides, 1999). On the other hand, models with on-the-job search show that EPL could lead to higher job-to-job transitions if this means that employers can avoid firing costs (Postel-Vinay and Turon, 2014).

We plot occupational mobility in the individual countries against the corresponding EPL index in Figure 7. The index measures, on a scale from 0 to 6, the level of employment protection based on legal rulings and collective agreements for individual dismissals from regular contracts. It is available for 23 out of 26 countries of our sample (the information is missing for Bulgaria, Cyprus and Romania). A detailed description can be found in Venn (2009) and OECD (2015). The correlation between the EPL index and the predicted values of occupational mobility is -0.29 for the sample we analyse, with a p-value of 0.18. This shows that countries with stricter employment protection (higher EPL values) have less occupation changers. However, the correlation between the EPL index and the probability of occupational change given a job change is only 0.10 (no figure shown). This suggests that employment protection is more important for job changes (as suggested by the textbook search and matching model of the labour market), e.g. caused by dismissals of employees, than for occupational changes. Occupational mobility is thus lower in countries with high EPL because there are less job changes overall, not because there are less occupational changes for a given level of job changes.

[Figure 7 here]

Finally for occupational changes, we investigate whether there is a link between churning flows – i.e. flows over and above net occupational flows – and EPL. Theory suggests that EPL should reduce such flows, which do not contribute to structural change in the economy, particularly

strongly (see Lalé, 2017). Indeed, we find a negative correlation between EPL and churning flows in our country sample (see Figure 8).

[Figure 8 here]

Turning to the link between wage transitions and EPL, Figure 9 Panel A shows that countries with a higher degree of employment protection legislation are characterised by higher wage stability, although this relationship is not statistically significant (the correlation between "No transition", i.e. the probability of staying in the same wage decile as in the previous year, and EPL is 0.25, the p-value is 0.24). Thus, EPL seems to play a moderately stabilising role for wages when considering all workers.

[Figure 9 here]

For occupation changers, a different picture emerges: There is no systematic link between EPL and wage mobility, neither for zero wage mobility (Figure 9, Panel B), nor for upward or downward wage mobility (not displayed). At first glance, this result may appear counter-intuitive, as countries with higher EPL, i.e. higher costs of dismissals, are characterised by less job changes and therefore less occupational changes, as shown above. Therefore, there is a higher threshold for making a job change and thus an occupational change in these countries, which becomes evident in the standard search and matching model of the labour market (e.g. Mortensen and Pissarides, 1999). As a result, only the job and occupational changes that are due to a strong reason are likely to be realised. These reasons may include: On the one hand a very promising new job followed by an upward wage transition; on the other hand a dismissal followed by a downward wage transition which could be due to the revelation of lower-than-expected human capital shortly after a hiring (as in Jovanovic, 1979, or labelled "horizontal mobility" after a match-specific shock by Groes et al., 2015) or the depreciation of human capital (as in Ljungqvist and Sargent, 1998). By contrast, job and thus occupational changes within the same wage range would then be rather seldom, which would lead to a lower probability of switching to a new job in the same wage decile in countries with high EPL. However, this mechanism does not seem to hold, which implies that overall, EPL does not seem to exert an influence on who undertakes an occupational change and on the resulting wage changes.

In contrast to the zero correlation between EPL and wage stability for all occupation changers, we observe a negative correlation between zero wage mobility and EPL, with a correlation coefficient of -0.31 and a p-value of 0.16, for workers who voluntarily change their occupation (Figure 9, Panel C). This can potentially be explained with the same mechanism described above: Workers mostly change their job and occupation if there is a good reason to do so – i.e. a higher wage in the new job. However, this relationship is strongly driven by one country: When excluding Portugal, the correlation is virtually zero. Therefore, even for voluntary occupation changers, EPL does not seem to lead to a positive selection in countries with high EPL. Furthermore, there is also no significant correlation between EPL and wage transitions (up, zero, down) for involuntary occupation changers. Therefore, EPL does not seem to stabilise the wages of these persons, but it also does not seem to prevent them from getting a job with a wage comparable to their previous job when they make a job-to-job transition.

A further important index for labour market institutions is union density, defined as the proportion of trade union members as a percentage of all employees.[13] Figure 10 Panel A shows the correlation between union density and occupational mobility: Here, the correlation is almost zero (correlation coefficient: 0.01, p-value: 0.95), i.e. there is no significant relationship between union density and occupational mobility. However, the correlation between union density and occupational change given a job change, depicted in Figure 10 Panel B, is -0.59 and highly statistically significant, i.e. in countries with high union density, workers who change their job are less likely to change their occupation. This result suggests that union attachment is an important determinant of occupational mobility in Europe. Possibly, this comes about because unions provide better information on new vacancies in the same industry in the case of dismissals, or because a high union density is associated with a high degree of occupation-specific human capital. In these countries, an occupational change would lead to a high loss of occupation-specific human capital and therefore probably a wage loss, and consequently job movers change occupation less frequently than they do in countries with low union density.

[Figure 10 here]

However, this does not seem to lead to higher wage stability, i.e. countries with higher union density do not display a higher probability of no wage transition for all workers than countries with lower union density (see Figure 10, Panel C). For occupation changers, in particular for those with voluntary reasons, the correlation is slightly positive (0.11 and 0.25, respectively, no figure included), which suggests that for this group, unions may be able to stabilise the wages.

6. CONCLUSION

In this paper, we provide a set of stylised facts on occupational mobility in the European Union using worker-level data, investigate its extent and individual-level determinants, its consequences, as well as reasons for the observed cross-country variation. Focusing first on the extent and the individual-level determinants, our results show that occupational mobility is a pervasive phenomenon of European labour markets: 6.6% of European workers change their job from one year to the next, and almost half of them, i.e. 3.0% of all workers, also change their occupation. This average figure hides large cross-country differences, with occupational mobility ranging from 7.4% in Sweden to 1.5% in Croatia (and even 0.5% in Romania). Occupational changes are strongly determined by individual characteristics: Women, older workers, medium-skilled (in contrast to high-skilled) persons and persons on full-time jobs (rather than part-time jobs) change occupation less often. Household characteristics generally do not play an important role in this context, with the exception of marriage, which goes along with lower occupational mobility.

One important consequence of occupational mobility at the aggregate level is its effect on the structure of the economy. We find that net occupational mobility amounts to 1.93 on average in the European Union when measured at the 2-digit level. Compared to the US, this is a relatively low figure, as Kambourov and Manovskii (2008) report the extent of occupational mobility in the US to have reached 6% at the end of the 1990s, with a strong upward trend.

[13] Data source: Visser (2016)

At the individual level, a crucial consequence of occupational mobility is its link to wage mobility. Our results show that of those who change occupation, only a third remains in the same wage decile. This is a much lower figure than for all workers, of whom more than half stay in the same wage decile from one year to the next. Furthermore, occupation movers have a higher probability of making a downward transition than job movers (without occupational change). We view this as an indication that occupational change is likely to involve some loss of human capital, which confirms results for individual countries (e.g. von Wachter and Bender, 2006). This negative effect is much more pronounced for workers who change occupation involuntarily, compared to workers who change occupation voluntarily.

Finally, we investigate potential reasons for the observed cross-country differences. We find that composition effects in terms of population characteristics can only account for a very small share of the cross-country variation in both occupational mobility and wage transitions. The same is true for GDP growth, which does not have much explanatory power in this context. We do however find a significant correlation between gross and net occupational mobility. This indicates that occupational mobility plays an important role for structural change in the economy, as in the island model of Lucas and Prescott (1974).

Another potential reason for cross-country differences in occupational and wage mobility are labour-market institutions. Our results show that occupational mobility is negatively correlated with employment protection legislation (EPL) at the country level, i.e. countries with higher EPL display lower occupational mobility. However, this result is mainly driven by the extent of job mobility at the country level, and not cross-country variation for occupational mobility given job mobility. This means that for workers who change their job, the probability of also changing their occupation is virtually identical in countries with high and low EPL. However, the extent of churning flows, i.e. occupational changes which do not lead to changes in occupational employment shares, is negatively correlated with EPL. Finally, our results show that EPL is not systematically correlated with wage transitions. This implies that workers change jobs and hence occupations less often in countries with high EPL, and if they change occupation, the wage outcomes are very similar as in countries with low EPL.

Although our analysis is not causal in nature, our results provide some indication about the potential welfare effects of institutions, especially EPL. Lower turnover leading to lower occupational changes in countries with high EPL implies that these countries have greater difficulties in adapting to structural change, which often requires occupational changes. This can potentially have negative effects on allocative efficiency and thus productivity (Hopenhayn and Rogerson, 1993; Bartelsman et al., 2009; Haltiwanger et al., 2014). These issues would of course have to be investigated using causal methods, which is beyond the scope of this paper. From the perspective of individual workers, the welfare implications are not that clear-cut. On the one hand, job security is generally regarded as valuable to workers (Reichert and Tauchmann, 2017), i.e. EPL would have a positive impact on worker welfare. On the other hand, however, the fact that countries with higher EPL do not exhibit more favourable wage transitions for occupation changers could imply that EPL is not only protecting workers from dismissals, but may also be preventing beneficial wage transitions, which could prove harmful to workers in the long run. An explicit analysis of this issue is however left for future research.

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A. TABLES

Table 1: The determinants of occupational change

	Marginal effect	S.E.
Gender (reference group: Men)		
Women	-0.0038 ***	0.0013
Age group (reference group: Age 25-39)		
Age 18-24	0.0301 ***	0.0043
Age 40-54	-0.0219 ***	0.0017
Age 55-65	-0.0309 ***	0.0019
Education level (reference group: Medium qualification)		
Low qualification	0.0008	0.0018
High qualification	0.0078 ***	0.0019
Marital status (reference group: Unmarried)		
Married	-0.0069 ***	0.0015
Household characteristics (reference group: No children (in age group))		
Number of children	-0.0003	0.0009
Youngest child between 0-3	-0.0005	0.0023
Youngest child between 4-6	-0.0004	0.0023
Job characteristics (reference group: Full-time contract)		
Part-time contract	0.0111 ***	0.0019
Occupation (reference group: Service and sales workers, 1-digit ISCO-08 code 5)		
Managers (1)	0.0076 **	0.0035
Professionals (2)	-0.0155 ***	0.0021
Technicians and associates (3)	-0.0053 **	0.0023
Clerical support workers (4)	0.0035	0.0025
Skilled agricultural, forestry and fishery workers (6)	0.0151 *	0.0080
Craft and related trade workers (7)	-0.0025	0.0026
Plant and machine operators, and assemblers (8)	-0.0047 *	0.0025
Elementary occupations (9)	0.0161 ***	0.0032
Further controls		
GDP growth	-0.0016 **	0.0008
Year 2012	-0.0058 **	0.0024
Year 2013	-0.0018	0.0020
Country FE	YES	
Observations	273,132	

Notes: Marginal effects for the probability to change occupation from a logit model including country fixed effects. Standard errors are clustered on the household level. */**/*** denote statistical significance at the 10%/5%/1% significance level. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Table 2: The determinants of voluntary or involuntary occupational change

	Voluntary change		Involuntary change	
	Marginal effect	S.E.	Marginal effect	S.E.
Gender (reference group: Men)				
Women	-0.0156	0.0199	0.0045	0.0182
Age group (reference group: Age 25-39)				
Age 18-24	0.0203	0.0321	0.0074	0.0280
Age 40-54	-0.0688***	0.0245	0.0310	0.0214
Age 55-65	-0.2000***	0.0346	0.0954**	0.0372
Education level (reference: Medium qualification)				
Low qualification	-0.0985***	0.0300	0.0559*	0.0292
High qualification	0.0597**	0.0250	-0.0331	0.0211
Marital status (reference: Unmarried)				
Married	-0.0014	0.0234	-0.0136	0.0207
Household characteristics (reference group: No children (in age group))				
Number of children	0.0178	0.0139	-0.0058	0.0131
Youngest child between 0-3	-0.0482	0.0343	0.0406	0.0337
Youngest child between 4-6	-0.0011	0.0352	0.0014	0.0319
Job characteristics (reference group: Full-time contract)				
Part-time contract	-0.0244	0.0240	0.0050	0.0217
Further controls				
GDP growth	0.0104	0.0126	-0.0029	0.0112
Year 2012	0.0083	0.0384	0.0103	0.0343
Year 2013	-0.0041	0.0321	0.0149	0.0285
Country and occupation of origin FE	YES			
Observations	7,851			

Notes: Marginal effects for the probability to change occupation voluntarily or involuntarily from a multinomial logit model including country and occupation of origin fixed effects. Standard errors are clustered on the household level. */**/*** denote statistical significance at the 10%/5%/1% significance level. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Table 3: Determinants of wage mobility, including occupational change

	Downward transition		No transition		Upward transition	
	Marginal effect	S.E.	Marginal effect	S.E.	Marginal effect	S.E.
Gender (reference group: Men)						
Women	0.020***	0.004	0.002	0.005	-0.022***	0.004
Age group (reference group: Age 25-39)						
Age 18-24	0.048***	0.012	-0.051***	0.013	0.004	0.010
Age 40-54	-0.014***	0.005	0.042***	0.006	-0.028***	0.005
Age 55-65	-0.011*	0.006	0.041***	0.009	-0.029***	0.007
Education level (reference group: Medium qualification)						
Low qualification	0.052***	0.007	-0.031***	0.008	-0.021***	0.005
High qualification	-0.069***	0.004	0.000	0.006	0.069***	0.005
Marital status (reference group: Unmarried)						
Married	-0.006	0.004	-0.001	0.006	0.007	0.004
Household characteristics (reference group: No children (in age group))						
Number of children	-0.006**	0.003	-0.002	0.003	0.008***	0.003
Youngest child between 0-3	0.002	0.007	-0.013	0.009	0.011	0.007
Youngest child between 4-6	0.010	0.007	-0.008	0.009	-0.002	0.007
Wage decile of previous job (reference group: Decile 5)						
Decile 1	-0.231***	0.006	0.159***	0.012	0.071***	0.011
Decile 2	-0.105***	0.007	0.088***	0.011	0.017	0.010
Decile 3	-0.047***	0.008	0.019*	0.011	0.028***	0.010
Decile 4	-0.016*	0.008	0.008	0.011	0.008	0.010
Decile 6	0.042***	0.009	-0.002	0.011	-0.040***	0.010
Decile 7	0.033***	0.009	0.043***	0.011	-0.076***	0.010
Decile 8	0.041***	0.009	0.082***	0.011	-0.123***	0.009
Decile 9	0.021**	0.009	0.164***	0.011	-0.185***	0.009
Decile 10	-0.028***	0.009	0.344***	0.010	-0.316***	0.007
Job characteristics (reference group: No occupational change)						
Occupational change	0.077***	0.014	-0.148***	0.016	0.071***	0.013
Further controls						
GDP growth	0.001	0.002	-0.004	0.003	0.003	0.002
Year 2012	0.009	0.006	-0.004	0.007	-0.005	0.007
Year 2013	0.027***	0.005	-0.005	0.006	-0.022***	0.005
Country FE	YES					
Observations	145,114					

Notes: Marginal effects for workers to experience a downward transition, no transition or an upward transition (between the deciles of the wage distribution) from a multinomial logit model including country fixed effects. Standard errors are clustered on the household level. */**/*** denote statistical significance at the 10%/5%/1% significance level. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

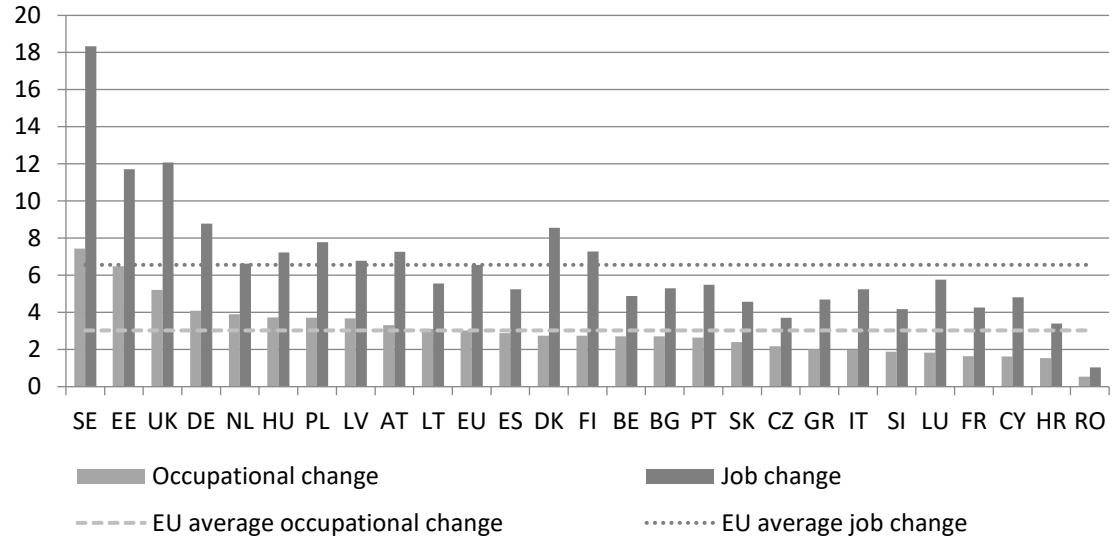
Table 4: Determinants of wage mobility: Job change and occupational change by voluntariness

		Downward transition		No transition		Upward transition	
		Marginal effect	S.E.	Marginal effect	S.E.	Marginal effect	S.E.
Specification A:	Job change	0.065***	0.009	-0.155***	0.011	0.090***	0.009
Specification B:	Occupational change	0.077***	0.014	-0.148***	0.016	0.071***	0.013
Specification C:	Voluntary occ. change	0.036*	0.019	-0.153***	0.022	0.117***	0.020
	Involuntary occ. change	0.192***	0.027	-0.225***	0.028	0.033	0.021
	Other occ. change	0.056**	0.028	-0.072**	0.033	0.016	0.027
Observations by regression		145,114					

Notes: Marginal effects from three separate specifications of a multinomial logit models where each regression includes country, year and wage decile fixed effects as well as individual and household characteristics and GDP growth as control variables (see Table 3 which contains the full results of the regression model for Specification B). Standard errors are clustered on the household level. */**/*** denote statistical significance at the 10%/5%/1% significance level. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

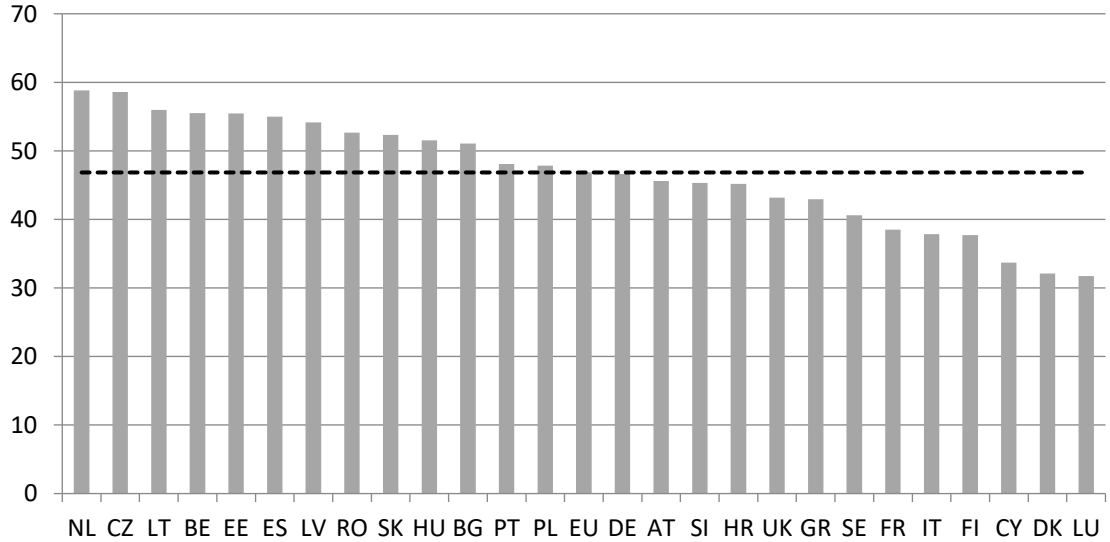
B. FIGURES

Figure 1: The probability of occupational and of job change, in %



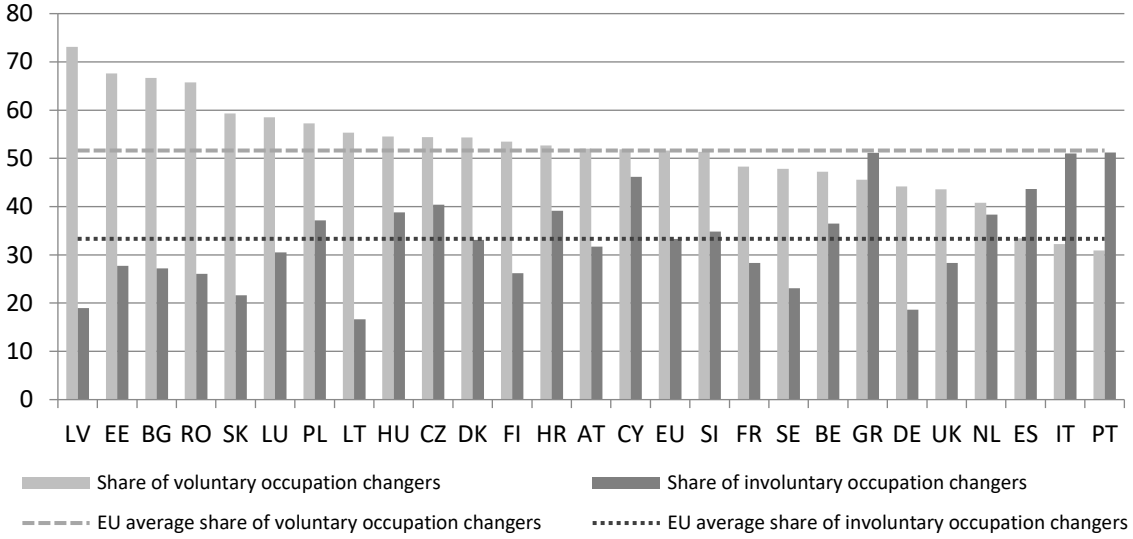
Notes: Probabilities for persons with dependent employment in at least two consecutive years to change occupation or job. The horizontal lines depict the unweighted average across all country values in the sample ("EU"). Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Figure 2: The probability of occupational change given job change, in %



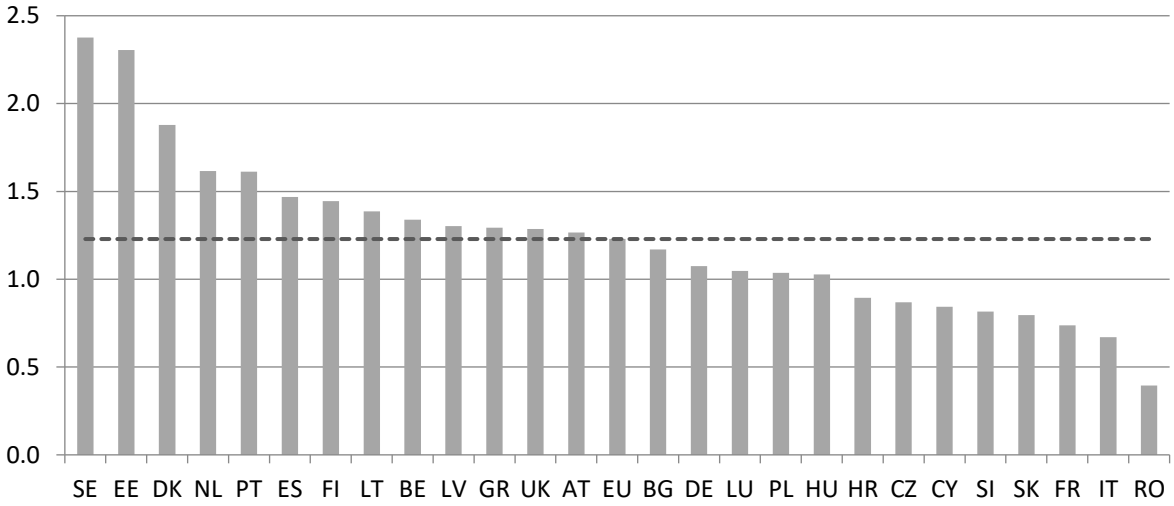
Notes: Probabilities for persons with dependent employment in at least two consecutive years to change occupation, given a job change. The horizontal line depicts the unweighted average across all country values in the sample ("EU"). Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Figure 3: Voluntary and involuntary occupational changes, in %



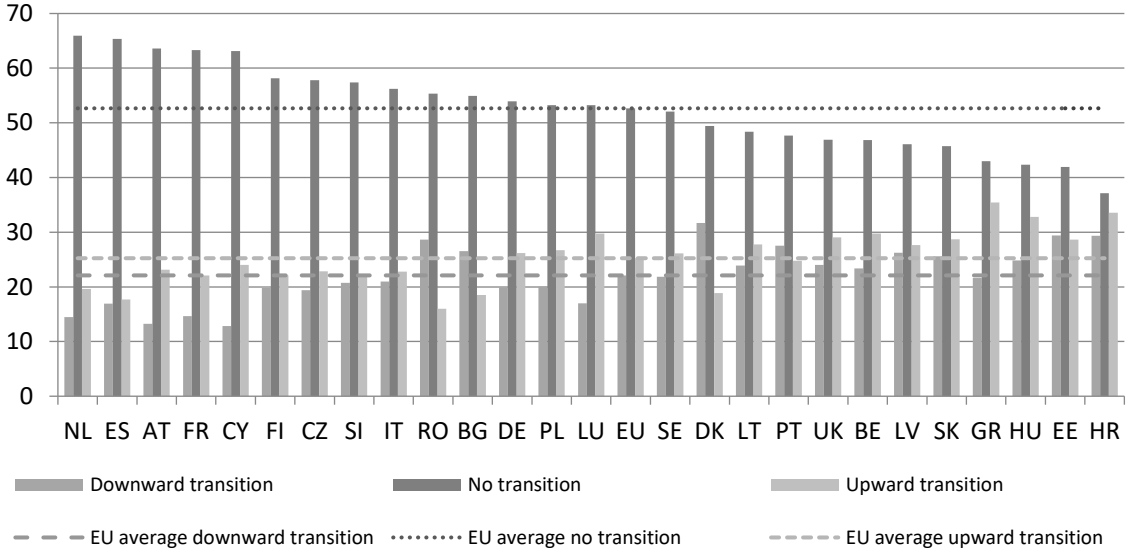
Notes: Probabilities for persons with dependent employment in at least two consecutive years to change occupation for voluntary or involuntary reasons. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Figure 4: Net occupational mobility, in %



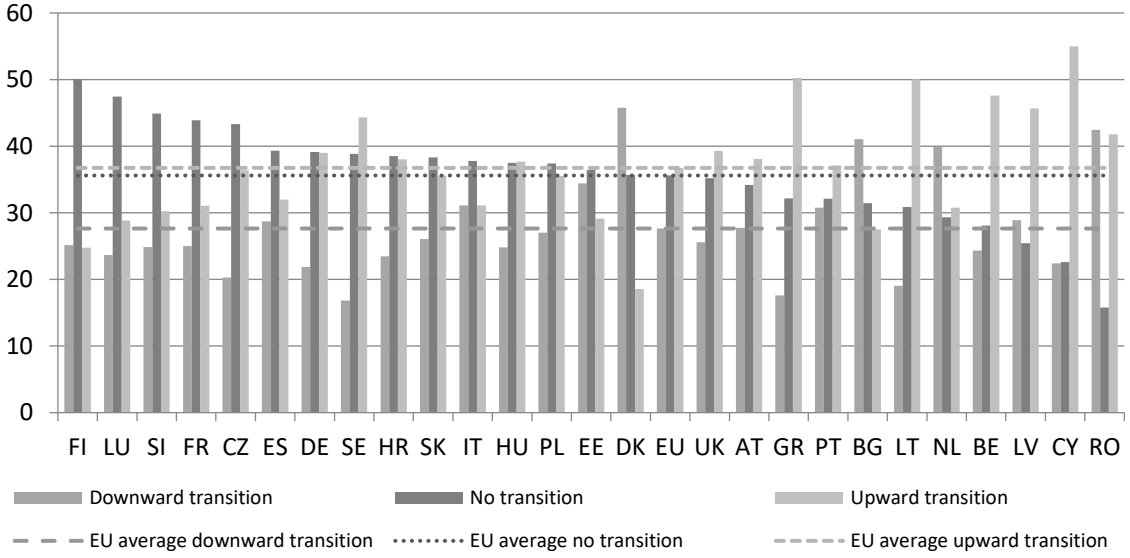
Notes: Net occupational mobility, measured as absolute value of inflows minus outflows (conditional on job change), summed up over all occupations, normalized by total employment. The horizontal line depicts the unweighted average across all country values in the sample ("EU"). Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Figure 5: Wage mobility, all workers, in %



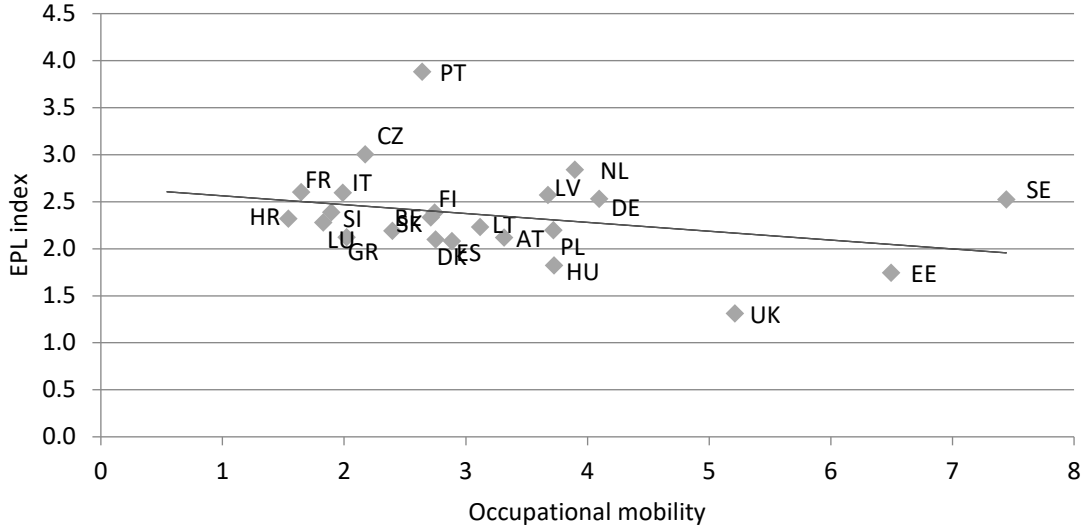
Notes: Probabilities for persons with dependent employment in at least two consecutive years to experience a downward transition, no transition or an upward transition between the deciles of the wage distribution. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Figure 6: Wage mobility of occupation changers, in %



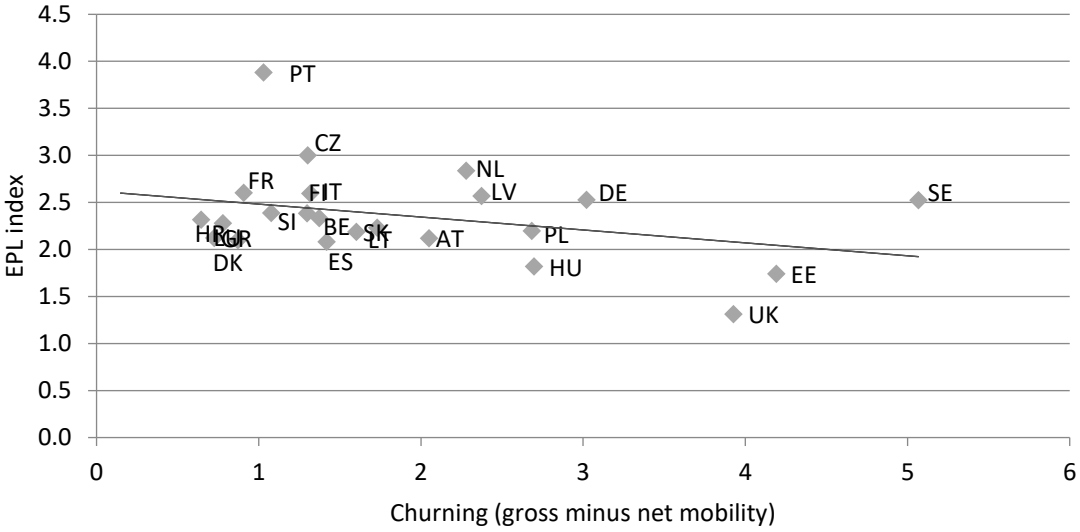
Notes: Probabilities for persons with dependent employment in at least two consecutive years who change occupation to experience a downward transition, no transition or an upward transition between the deciles of the wage distribution. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Figure 7: Occupational change and employment protection legislation



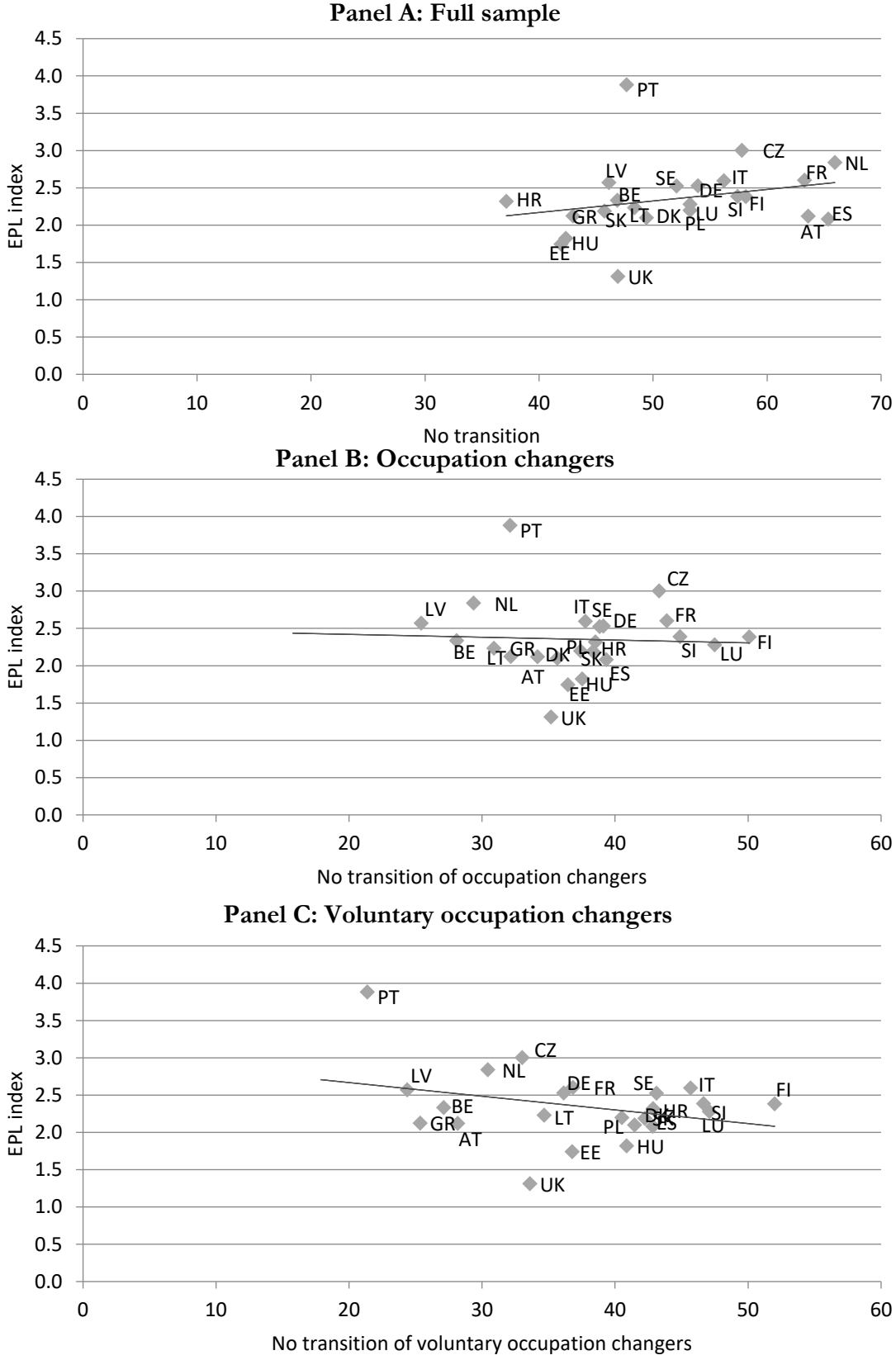
Notes: Raw correlation between employment protection, measured by the EPL index, and the probability of occupational change. The correlation is -0.29, with a p-value of 0.18 Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Figure 8: Churning flows and employment protection legislation



Notes: Raw correlation between employment protection, measured by the EPL index, and occupational churning (i.e. the difference between gross and net mobility). The correlation is -0.34, with a p-value of 0.12 Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

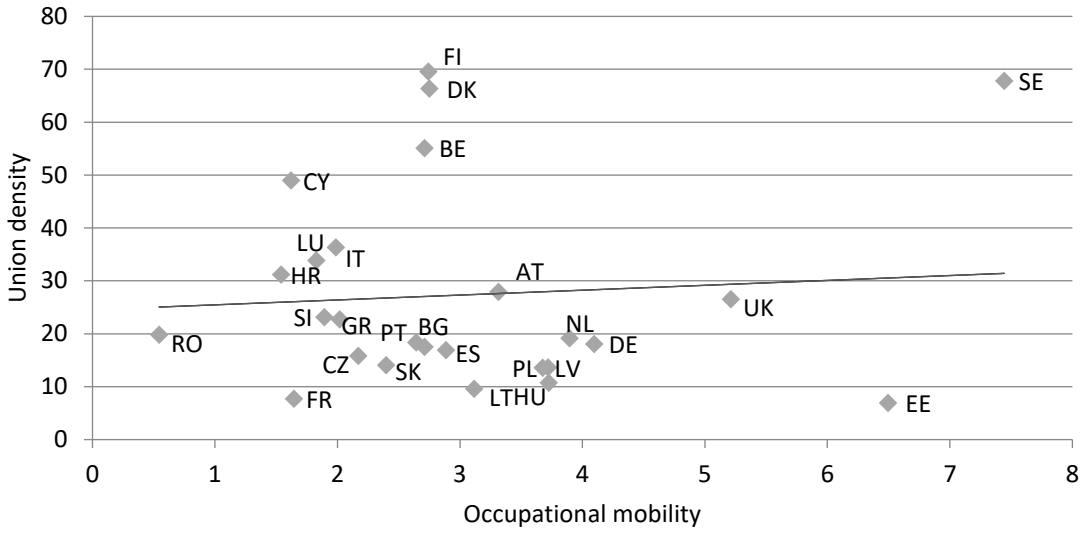
Figure 9: Probability of wage transition and employment protection legislation



Notes: Raw correlation between employment protection, measured by the EPL index, and the probability of remaining in the same wage decile, i.e. not making a wage transition. The correlation for panels A, B and C are 0.25, -0.05 and -0.31 with p-values of 0.24, 0.83 and 0.16, respectively. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

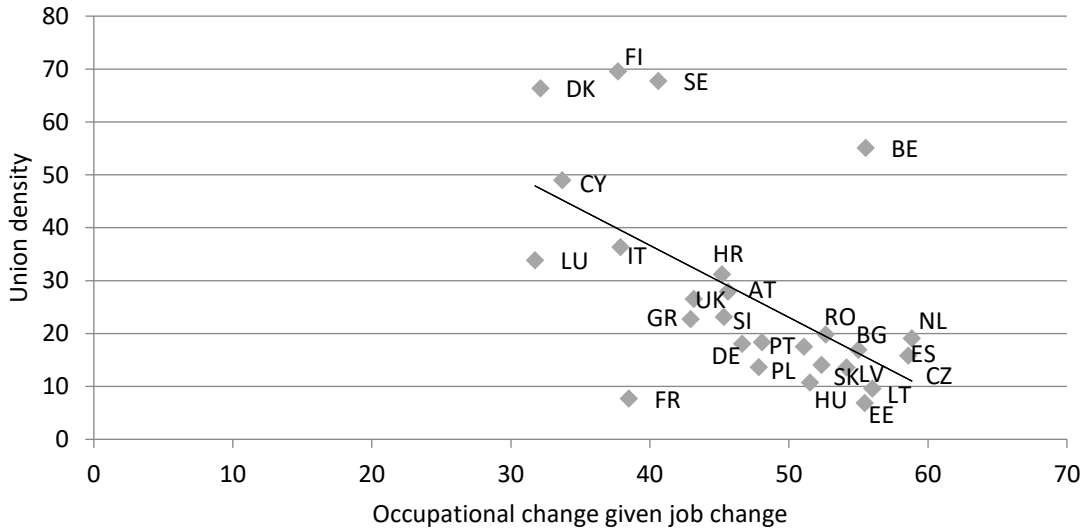
Figure 10: Union density and labour market mobility

Panel A: Occupational change



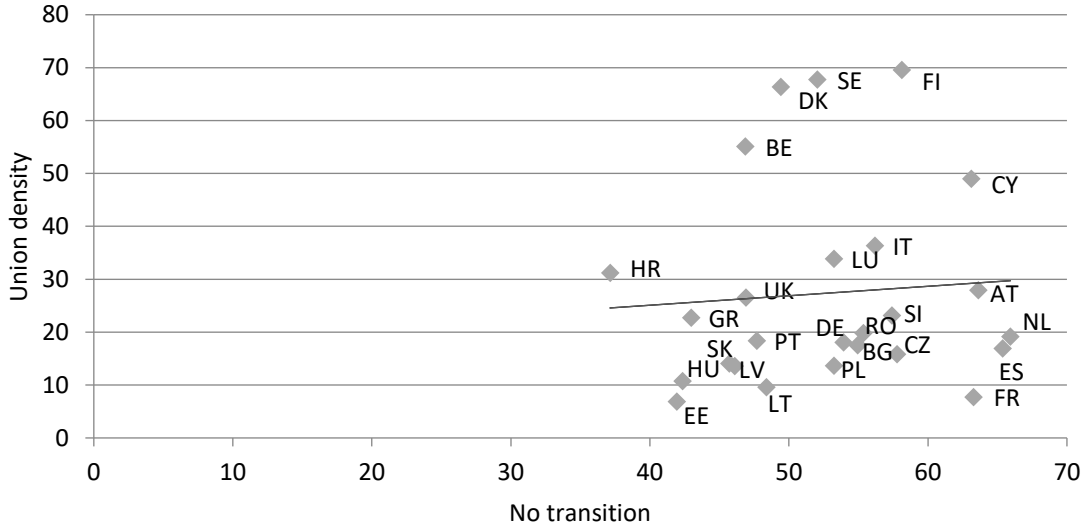
Notes: Raw correlation between union density and the probability of occupational change. The correlation is 0.07, with a p-value of 0.72. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Panel B: Occupational change given job change



Notes: Raw correlation between union density and the probability of job changers to also change occupation. The correlation is -0.59, with a p-value of 0.001. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

Panel C: Wage stability



Notes: Raw correlation between union density and the probability of workers to remain in the same wage decile, i.e. to not make a wage transition. The correlation is 0.07, with a p-value of 0.72. Own calculations based on EU-SILC and SOEP data for the years 2011-2014.

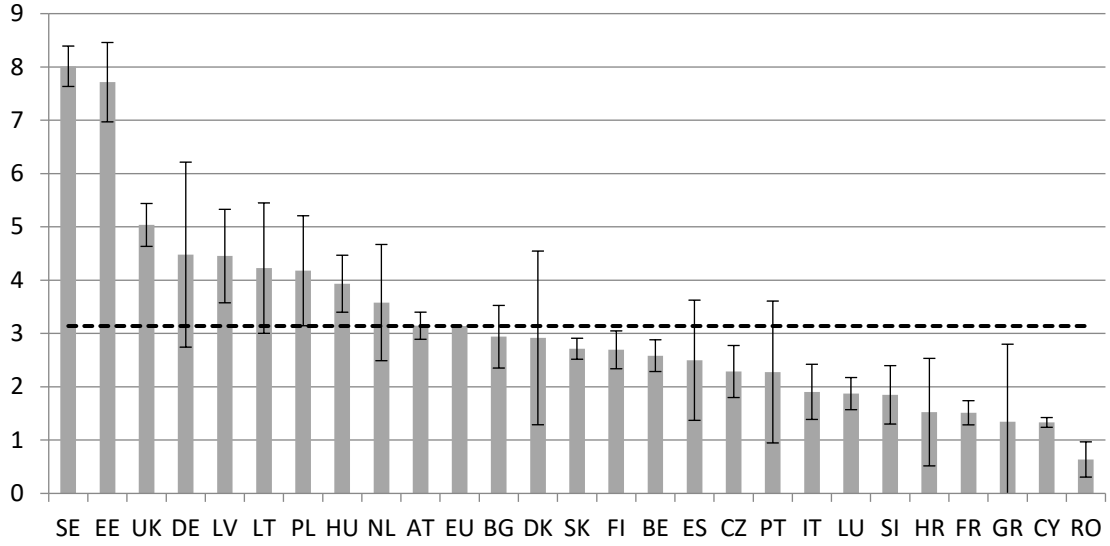
C. APPENDIX

Table C.1: 1- and 2-digit ISCO-08 codes

1	Managers		
		11	Chief executives, senior officials and legislators
		12	Administrative and commercial managers
		13	Production and specialised services managers
		14	Hospitality, retail and other services managers
2	Professionals		
		21	Science and engineering professionals
		22	Health professionals
		23	Teaching professionals
		24	Business and administration professionals
		25	Information and communications technology professionals
		26	Legal, social and cultural professionals
3	Technicians and associate professionals		
		31	Science and engineering associate professionals
		32	Health associate professionals
		33	Business and administration associate professionals
		34	Legal, social, cultural and related associate professionals
		35	Information and communications technicians
4	Clerical support workers		
		41	General and keyboard clerks
		42	Customer services clerks
		43	Numerical and material recording clerks
		44	Other clerical support workers
5	Service and sales workers		
		51	Personal service workers
		52	Sales workers
		53	Personal care workers
		54	Protective services workers
6	Skilled agricultural, forestry and fishery workers		
		61	Market-oriented skilled agricultural workers
		62	Market-oriented skilled forestry, fishery and hunting workers
		63	Subsistence farmers, fishers, hunters and gatherers
7	Craft and related trades workers		
		71	Building and related trades workers, excluding electricians
		72	Metal, machinery and related trades workers
		73	Handicraft and printing workers
		74	Electrical and electronic trades workers
		75	Food processing, wood working, garment and other craft and related trades workers
8	Plant and machine operators, and assemblers		
		81	Stationary plant and machine operators
		82	Assemblers
		83	Drivers and mobile plant operators
9	Elementary occupations		
		91	Cleaners and helpers
		92	Agricultural, forestry and fishery labourers
		93	Labourers in mining, construction, manufacturing and transport
		94	Food preparation assistants
		95	Street and related sales and service workers
		96	Refuse workers and other elementary workers
0	Armed forces occupations		
		01	Commissioned armed forces officers
		02	Non-commissioned armed forces officers
		03	Armed forces occupations, other ranks

Source: Adapted from ILO – International Labor Organization (2017).

Figure C.1: Predicted values for the probability of occupational change



Notes: Predicted values for persons with dependent employment in at least two consecutive years to change occupation. The horizontal line depicts the unweighted average across all country values in the sample ("EU"). Own calculations based on EU-SILC and SOEP data for the years 2011-2014. tu