Job Stability in Europe Over the Cycle[1]

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Abstract. *This paper investigates the evolution of job tenure for the time period 2002 to 2012 using micro data from the European Union Labour Force Survey (EU-LFS). Overall, the data show a slight increase in average job tenure at the EU level which can be explained by disproportional layoffs of short-tenured workers during the crisis. When controlling for changes in the demographic composition of the workforce, an underlying negative trend in mean tenure becomes visible. Job tenure evolved very differently across the EU before and during the crisis, highlighting the importance of the institutional framework, especially of employment protection legislation.*

1. Introduction

Changes in the economic environment over recent decades have led to growing concerns about decreasing job stability. In particular, the potential decline in the prevalence of jobs that last for a long period of time (that is, 'a job for life') has been intensively discussed in both academic research and the media (Hall, 1982, is a seminal paper). The fear is that globalisation and technological progress such as advances in communication technologies have induced changes in the labour market, requiring employees to be more flexible. Workers have to adapt to more frequent transitions between jobs and intermittent spells of unemployment. These changes in the labour market are likely to affect job satisfaction and worker well-being (European Commission, 2001). Job tenure, i.e. the length of time a worker has been continuously employed by the same employer, is of paramount interest to workers in this context since it can be interpreted as a measure of job stability (Neumark, 2000).

Apart from long-term trends, the evidence from the recent financial and economic crisis suggests the labour turnover rate was strongly affected, with potentially severe consequences for job tenure. The crisis has led to a large and persistent increase in unemployment in many European countries but also to a divergent development of labour markets across the European Union. Since worker turnover is closely connected with the length of time in a job, it is expected that the Great Recession also had an effect on job tenure.

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Against this background, our paper analyses the evolution of job tenure measured by the length of uncompleted employment spells at the same employer[3] for the time period 2002 to 2012 for a large number of European countries using worker-level data from the European Union Labour Force Survey (EU-LFS). In doing so, we provide evidence both for longer-term trends as well as recent developments which took place during the Great Recession. In particular, we provide aggregate evidence on the evolution of job tenure at the European level, but also for specific countries. Furthermore, the richness of the EU-LFS data allows us to analyse heterogeneities with respect to both worker and job characteristics. Finally, we analyse cross-country differences, pointing out the importance of the institutional framework in the form of employment protection legislation. Therefore, this study fully exploits the richness of the micro data from the EU-LFS from 2002 to 2012 to examine how job tenure has evolved across EU countries during the pre-crisis and crisis period.

Our analysis is related to several strands of the literature. Job tenure was analysed in an international context by Auer and Cazes (2000) and Cazes and Tonin (2010). Both studies, the first one for the 1990s and the second one for the time period 1996 to 2006, find that mean tenure remained relatively stable in most European countries and increased only slightly in a few countries during the observation period. However, the authors report pronounced level differences between countries which they attribute to heterogeneous labour market institutions and workers' labour market behaviours. Examining data for eight EU countries, Japan, Russia, and the USA for the mid-1990s, Burgess (1999) found that the UK and the USA had relatively low-tenured working relationships. These results suggest that tenure is generally low in countries that are characterised by flexible labour markets. Besides, results from Burgess (1999) suggest that employment protection legislation (EPL) has a positive effect on mean tenure. Furthermore, Boockmann and Steffes (2010) found that labour market institutions play an important role in reducing mobility and thus prolonging tenure.

The relationship between job characteristics, i.e. temporary contracts, and tenure has also been examined. This is of primary interest in the context of job stability because temporary contracts are increasingly prevalent in the EU. However, this does not necessarily imply any immediate effects on mean tenure since temporary contracts are designed differently across countries with respect to termination time and contract renewals. Auer and Cazes (2000) detect no clear pattern between temporary work and job tenure.

The literature identifies different patterns and trends in the relationship between sociodemographic characteristics and mean tenure before the crisis, which hold for the majority of EU countries. Cazes and Tonin (2010) show that young workers do not experience a systematic decline over time, except for those in the central and eastern European (CEE) countries. After controlling for age, however, they report some reduction in average tenure in the majority of the

[3] Note that this definition comprises accumulated durations of subsequent jobs at the current firm and is sometimes referred to as "employment tenure" in the literature (e.g. Auer and Cazes, 2000).

EU countries. Against this background, our study explicitly analyses the role of demographic change for tenure.

While there is detailed research on job tenure in the pre-crisis period across European countries as mentioned above, the impact of the Great Recession on job tenure has not been examined for European countries. Studies for the time period before the Great Recession show that job tenure behaves counter-cyclically and therefore moves with the unemployment rate (Auer and Cazes, 2000). It decreases in economic booms when unemployment falls and job creation increases, leading to new hires and voluntary job-to-job transition (for the USA, see Shimer, 2005; for Germany, see Bachmann, 2005). The opposite picture is found during recessions, where exit flows from employment increase as firms dismiss workers. As a result, unemployment rises and job tenure tends to increase (Eurofound, 2014). Importantly, workers along the tenure distribution are affected differently, with those who have little seniority being more likely to lose their job during recessions than high-tenured workers (Abraham and Medoff, 1984; Jovanovic, 1979).

Long-run trends and more recent developments such as the Great Recession may have affected job tenure of different subgroups adversely, i.e. analysing tenure at the aggregate level may mask changes for subgroups of the population. In order to reveal variation in job stability within each group we additionally investigate the evolution of job tenure for different worker groups and job types. We analyse changes at the EU aggregate level as well as for specific countries and focus initially on the comparison of mean job tenure across countries and subpopulations. Our study therefore contributes to the literature by creating a complete picture of the changes in job stability across countries and subgroups both taking a longer-term perspective, and looking at its evolution during the recent financial and economic crisis

The remainder of the article is structured as follows. The next section provides a brief description of the EU-LFS data set. The third section displays an overview of the aggregate evolution of job tenure with respect to both trends and cyclical features for the EU at the aggregate level and for specific countries for the period 2002 to 2012. Section 4 will then focus on heterogeneity in job tenure between sociodemographic groups and job types by drawing on the shift-share method to control for compositional changes over time. In order to explicitly analyse these heterogeneities, we conduct a regression analysis. Finally, section summarises and concludes the discussion.

2 The EU-LFS data

In order to compute job tenure from European countries, we use the European Labour Force Survey (EU-LFS). The micro data set comprises a large number of representative national household surveys that provide quarterly and annual information on labour participation of persons. The EU-LFS covers all EU Member States without Croatia (EU 27) as well as Norway, Iceland and Switzerland. The Labour Force Surveys are conducted by the national statistical agencies thereby applying harmonized concepts and definitions, which enables us to perform cross-country comparisons at the aggregate level and for subgroups. The EU-LFS data set is provided by Eurostat in the form of repeated cross-sections.

The data include a variable containing the time at which a person began working at her current employer. We utilize this information to compute person-specific job tenures. Due to the survey design, the data do not show a smooth distribution of tenure and particularly contains implausible values of zero for specific tenure classes such as between 37 and 43 months. We therefore recalculate job tenure following the EU-LFS user guide (Eurostat, 2011, p. 54).

At the individual level, we focus on dependent-status employees, and omit individuals living in institutional households (e.g., retirement homes or military barracks), children under the age of 15 and adults aged 65 and over. The study covers the time period 2002 – 2012. The starting point of this time period is chosen because data availability is severely limited before 2002, in particular, several countries (including Germany) are missing. Thus, we analyse an entire decade which allows us to make a distinction between a "pre-crisis period" (2002-2007) and a "crisis period" (2008-2012).[4] The country sample includes 26 EU Member States, namely Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, The Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. Malta is not included because no data are available before 2008.

The final data set contains information on tenure for each country as well as for subpopulations and job characteristics by country which are largely available in the data set. It allows us for example to distinguish gender, age groups, and the type of employment contract, i.e. temporary or permanent jobs, and to investigate how worker composition in terms of these characteristics changes over time. Given the lack of a panel dimension, life-cycle issues can unfortunately not be taken into account. Table A1 of the appendix summarizes the sample separately for the pre-crisis and crisis period.

3 The aggregate evidence

The analysis begins by looking at the EU aggregate level and then moves to examine individual countries. Figure 1 illustrates the evolution of mean tenure and the unemployment rate in the EU between 2002 and 2012, including all EU-27 countries but Malta. In 2002, mean tenure is 116.5 months (almost 10 years). From 2003 to 2005, it is somewhat higher at 118 months, only to fall to its previous level by 2008. Between 2008 and 2012, which covers the period of the Great Recession, mean tenure increases continuously reaching its highest level of 123 months in 2012. Hence, the results are in line with the previous findings that tenure behaves counter-cyclical.

The strong correlation between mean tenure and the unemployment rate is positive and pronounced. The correlation coefficient corresponds to 0.78 which is statistically significant at the 1% significance level. The strong relationship becomes especially visible in a recession since during an economic crisis short-tenured jobs are more likely to be destroyed than long-tenured jobs and less new (and thus short-tenured) jobs are created. However, as the economy recovers, workers are re-hired, thereby reducing mean tenure given that these workers have zero tenure by definition.

[4] *Since the crisis started in most countries in the third quarter of 2008, this leads to a slight underestimation of the effects of the crisis.*

Although Figure 1 suggests a common trend across countries at the EU level before and during the crisis, one can expect variation between countries because of differences in the population compositions or the institutional framework of the labour market. Indeed, a closer look reveals deep cross-country differences questioning the general counter-cyclical nature of job tenure as illustrated in Figure 2 which depicts mean tenure and the unemployment rate by country and year. Hence, it allows us to separate longer-term trends in mean tenure from the cyclical component. To the extent that the development of mean tenure was purely cyclical, both lines should move relatively closely together in each country. This is observable for Belgium, Estonia, Greece, Ireland, Italy, the Netherlands, Poland, Portugal, Slovakia, Spain, and the UK where mean tenure and the unemployment rate are positively and statistically significantly correlated at least at the 10% significance level. A few countries such as Hungary and Latvia experience the reverse. That is, job tenure and unemployment have different trends. The unemployment rate in Germany, in contrast to all other countries, even decreases slightly yet tenure increases. Whereas Latvia and Lithuania display massive increases in unemployment combined with little change in tenure. Reasons for these divergent behaviour may be the institutional framework during the observation period, which is analysed in Section 4.

In the following, we will continue with a detailed discussion of pre-crisis trends and changes in the Great Recession in mean tenure across countries. However, it should be pointed out that the time period preceding the Great Recession was a time of strong growth, at least in some EU countries, which might in itself have been unusual. This should be taken into account when comparing the evolution of job tenure between the pre-crisis period and the crisis period.

During the pre-crisis period, trends in mean tenure appear to be relatively stable at the EU level. At a more disaggregate level, it becomes apparent that the 26 countries are about equally split with regard to increases and decreases in mean tenure: 12 countries have a higher level of mean tenure in 2007 compared to 2002, 10 countries have a lower level and, 4 countries display virtually no change. Cyprus, France, Greece, Germany and Portugal show the most notable increases. For Greece and Portugal, higher unemployment is likely to explain the increase in mean tenure to an important extent.[5] The reason for this is that the increase is probably due to the layoff of many short-tenured workers and reduced hirings, which lead to less new jobs, i.e. even less short-tenured workers. The other two countries, by contrast, have stable or slightly decreasing unemployment rates, respectively. Since labour market reforms leading to lower turnover and, hence, increased tenure levels are not a likely explanation for cross-country differences (e.g., Germany passed large-scale reforms during the observation period aiming at labour market liberalisation and, if anything, leading to a decrease in mean tenure), an ageing work force may constitute an alternative explanation. On the other hand the massive fall in mean job tenure in Denmark and some CEE countries (Poland, Romania, and Slovakia) can be explained by the decrease of the unemployment rate before the crisis. Although the marginal positive trend in mean job tenure in the Baltic States, Latvia and Lithuania, accompanied by a strong decrease in the unemployment rate can potentially be related to the national labour market institutions. This is because their labour markets are

[5] *However, other factors such as the ageing of the population or labour market institutions play a role as well, see Sections 4.1 and 5.*

characterized in the literature as very flexible fostering voluntary worker turnover (Eamets et al., 2003) which implies that unemployment levels sink and mean tenure may slightly rise.

So far, the discussion in this article has focused on the evolution of mean tenure. However, countries differ not only in terms of the development of mean tenure but also in terms of their initial level of tenure. Therefore, Figure 3 illustrates mean tenure in 2002 before the Great Recession. EU Member States display considerable variation: mean tenure is lowest in Latvia with 86 months (7 years) and highest in Slovenia with 137 months (11.5 years). The Continental European countries (Austria, Belgium, Germany, Luxembourg, and the Netherlands) and the Mediterranean countries exhibit comparably high average tenure. By contrast the Central and Eastern European (CEE) countries as well as Ireland and the UK are characterized by low average tenure. Spain and Slovenia are important exceptions to this pattern. Spain has a lower average tenure than the other Mediterranean countries and Slovenia exhibits an extremely high average tenure compared to the other CEE countries. The Scandinavian countries do not constitute a uniform group, but are instead scattered across the distribution of EU countries: Workers in Sweden are on average rather high-tenured, while the opposite is the case in Denmark. Cazes and Tonin (2010) draw a similar picture for mean tenure across the EU-24 countries previous to the crisis.

We now turn to the Great Recession which is of predominant interest in this study. The reaction in job tenure is likely to be influenced by three components: the depth of the recession, the national labour market institutions and the institutional reforms as a response to the crisis. Figure 3 clearly shows that job tenure increased in most European countries during the recession period. In total, 17 countries had higher mean tenure in 2012 compared to 2007. As one can see from Figure 2, those countries with the strongest reaction in the unemployment rate also experienced the most sizeable increases in tenure (Bulgaria, Estonia, Greece, Italy, Ireland, Portugal, and Spain). The Netherlands feature no change in mean tenure levels which can be explained by no or only slight increases in the unemployment rate (i.e. little change in hirings and layoffs) during the crisis period.

Concerning the remaining seven countries that have lower mean tenure in 2012 than in 2007, increases in unemployment and decreases in mean tenure are both relatively small. The only significant decreases in mean tenure can be observed in Luxembourg and Lithuania. While Luxembourg was hardly hit by the crisis, the opposite is true for Lithuania (Figure 2). Surprisingly, in terms of timing, the reduction in mean tenure in Lithuania ends at exactly the same time as unemployment reaches its peak. Put differently, in contrast to all other EU Member States, layoffs in Lithuania appear to have affected long-tenured workers proportionally more than short-tenured workers. This could for example be explained by a labour market reform in reaction to the crisis that was targeted at fostering early retirement and at enabling employers to more easily dismiss old workers. Indeed, in 2009 a law was enforced allowing firms to fire employees up to three instead of five years before entitlement to old age pension (Masso and Krillo, 2011). This is also in line with Lithuania displaying extremely high flows from employment to non-employment due to (early) retirement in the crisis period (RWI, 2014).

4 Worker and job heterogeneities

Sociodemographic and job characteristics can potentially help to explain the evolution of mean tenure within individual countries, and hence the differences in mean tenure between the

European countries. Therefore, our goal in this section is to compare job tenure for subgroups of the working population before the Great Recession and the tenure changes occurring during the crisis. In particular, we aim to investigate whether subpopulations were affected in the Great Recession to varying extents. In order to do so, we employ two approaches. First, we analyse mean tenure by subgroups before and during the crisis which allows to identify trends and extreme cases. Second, we apply a shift-share analysis to examine to what extent the evolutions of tenure within countries are caused by compositional effects. The method enables us to decompose the total observed difference over time into two components. The first is due to changes in the distribution of subgroups, holding tenure within groups constant, and the second is caused by differences within subgroups, holding the distribution of groups constant. The components are obtained by

$$\Delta Tenure = \sum_i \Delta Share_i * \overline{Tenure_i} + \sum_i \overline{Share_i} \Delta Tenure_i \quad (1)$$

where $\Delta Tenure$ represents the difference in mean tenure between two time periods, i denotes the group, and $Share_i$ the share of this group in the total workforce. The bars denote the mean over both time periods. The first term on the right hand side of the equation equals the difference in mean tenure attributable to shifts in employment shares between groups with different tenure, and the second term reports the difference in mean tenure within each group for fixed employment shares. We focus on the results for age groups and contract types.

4.1 Worker characteristics: Age

By nature the relationship between tenure and age is strong and positive since one further year of tenure is by definition one further year of age. This becomes apparent in

Figure 4, where we distinguish between individuals aged 15 to 24, 25 to 34, 35 to 54 and 55 and older: Mean tenure is systematically higher for older age groups compared to younger age groups. The change over time, however, is not very pronounced when aggregating over EU countries; the oldest age group (55 years and over) exhibits a slight increase in mean tenure during the crisis (2008 – 2012), while age group 35 – 54 experiences a slight decrease in mean tenure. Mean tenure of the two youngest age groups (15 – 24 and 25 – 34) remains constant over the observation period.

A closer assessment of the data reveals various cross-country heterogeneities among age groups. Figure 5 separates between countries, where the dispersion in mean tenure between age groups is large, and countries where it is small. A large dispersion exists for example in Germany, France and Sweden. For these countries, the oldest age group (55 years and over) exhibits mean tenures of roughly 250 months, while means in the second oldest age group (35 – 54) are approximately 100 months lower. Bulgaria, Lithuania, and the UK have particularly low dispersion in mean tenure across age groups with a maximum distance of around 40 months. One possible difference between low- and high-dispersion countries is the degree of job mobility and job security. In high-dispersion countries, job changes seem less frequent and, thus, tenure is more strongly related to age.

Concentrating on the importance of the crisis for the evolution of mean tenure, Figure 6 provides country-specific levels of mean tenure before and during the crisis by age groups. Countries with large mean tenures among older workers (55 years and over) before the crisis are Slovenia, Belgium, France, Italy, and Luxemburg (mean tenure is larger or equal to 250 months). Countries

with rather low mean tenures among older workers are the Baltic States, Estonia, Latvia and Lithuania, and the United Kingdom (roughly 150 months). For the youngest age group (15 – 24), the highest tenures are apparent in the countries Italy, Portugal, Greece, Austria, and Slovakia (all above 25 months before and during the crisis) while mean tenure is very low in Sweden and Finland (roughly 15 months), respectively. These findings are in line with Cazes and Tonin's (2010) results for age-specific mean tenure across EU countries before the Great Recession.

The comparison of the pre-crisis period to the crisis period suggests that changes in mean tenure are small in all age groups when aggregating data across EU countries (Figure 6). However, there are specific countries that deviate from this aggregated perspective. In Bulgaria and Romania, very young workers (age 15 – 24) exhibit a large relative increase in mean tenure (greater than 20%). An explanation for this increase could be a large number of job losses among young workers during the crisis. In addition, both countries have altered the regulations for atypical working contracts in particular for young people during the crisis (Clauwaert and Schömann, 2012) which might have caused the observed increases in mean tenure for young workers. In several countries, however, changes have materialised in a decrease of mean tenure (e.g. in Austria, Hungary and the Netherlands). Among older workers (55 years and over). Increases in mean tenure during the crisis were relatively large (about 5%) in Cyprus, Spain, and the UK, but in several (mostly small) countries, such as Lithuania, Luxembourg, and the Netherlands, mean tenure decreased for this age group. In Lithuania the fall of old workers' mean tenure is very high which might be responsible for the exceptional decrease in mean tenure of the entire workforce (see Section 3) during the crisis. Explanations for this phenomenon might be, as mentioned previously, either a reform of early retirement or a legislation simplifying the dismissal of old workers.

Results from a shift-share analysis in Table 1 provide a more precise description of the underlying mechanisms. For the entire observation period (2002 – 2012), the increase of mean tenure at the EU level that is due to a compositional change in the age structure of the population is large (+9.3 months) which is in line with the values in Table A1 of the appendix. Before the Great Recession, the corresponding figure is 4 months, for the crisis period it is 5 months. This suggests that during both periods under observation, the increase in mean tenure seems to be related to a change in the share of age groups. In this specific case – and taking into account the demographic change in terms of higher life expectancy and lower birth rates – the share of older workers has increased and therefore seems to be a driving force for a higher mean tenure.

Interestingly, the contribution to the overall change in mean tenure in the pre-crisis period (+0.57 months) from factors other than an ageing population was strongly negative (-3.6 months). Cazes and Tonin (2010) report similar results. During the crisis, however, mean tenure isolated from the compositional aspects due to ageing increases by about 0.9 months. This rise is particularly driven by countries such as Bulgaria (+6 months), Estonia (+9 months), Ireland (+6 months), Spain (+9 months), and the United Kingdom (+7 months). Furthermore, the shift-share analysis indicates that the upturn in mean tenure in Germany during the Great Recession is driven by the ageing of the labour force. This explains why mean tenure rises even though the unemployment rate was unaffected by the crisis.

The shift-share analysis with respect to age thus yields two important findings. First, older age groups have much longer tenures which to a large extent is due to the strong positive correlation between tenure and age. Second, mean tenure increased strongly across all age groups during the

crisis. This might explain why overall mean tenure increased remarkably during the crisis. Yet, the shift–share analysis provides evidence that large parts of the increase in tenure (aggregated across EU countries), especially in the pre-crisis period, were due to changes in the age composition of the labour force. In other words, apart from the crisis, the compositional aspect from a growing share of older workers is relevant when explaining why there is a rise in overall tenure. In conclusion, our results suggest that exogenous impacts from the crisis may be responsible for a considerable upward shift in tenure while it seems that there exists a long-run trend towards shorter job tenure. This finding is remarkable because it indicates that there is a declining trend in tenure once age effects are taken into consideration.

In the further course of the analysis, we examine changes in job tenure over time and differences across countries by gender and skill group (results available from the authors upon request). The findings imply that mean tenure is somewhat larger for male workers at the EU level. This is similar to Farber (2010) as well as Auer and Cazes (2000) showing that men exhibit longer tenures than women. However, some countries feature the opposite relationship, e.g. the Baltic States where female labour participation is high. Overall, an increase in job tenure can be observed during the crisis for both men and women.

Concerning the skill level, for the EU aggregate we find no strong differences in mean tenure across skill groups and no trend over the total observation period, which is in line with Burgess (1999). From the country perspective, the data show both higher mean tenure for high-skilled than for low-skilled workers and the opposite. Nevertheless, with respect to the evolution of tenure over time, the analysis indicates that countries that were hit strongly by the recession experience a larger increase in mean tenure among medium-skilled individuals which is, for example, the case in Spain and Portugal.

4.2 Job characteristics: Contract type

This section assesses mean tenure for permanent and temporary employment for the EU aggregate level and specific countries since cross-country differences in the prevalence of temporary contracts may explain cross-country differences in the development of mean tenure. This is particularly important because the increasing spread of temporary employment in recent decades goes hand in hand with a tendency towards dual or segmented labour markets (Boeri, 2011; Cahuc et al., 2016).

Since permanent employees are by definition more likely to remain in the current employment relationship than temporary workers, mean tenure of permanent workers can be expected to be higher. Additionally, in many EU Member States temporary contracts are used solemnly as a probation period for newly hired workers. Indeed, Figure 7 depicts that average tenure is more than four times higher for workers with a permanent contract than for those with a temporary contract.

Concerning time trends, average tenure remains rather stable during the pre-crisis period for temporary and permanent workers alike (Figure 7). However, mean tenure of permanent workers increases with the beginning of the crisis in 2008/2009, growing from 131 months in 2008 to 138 months in 2012. At the same time, mean tenure of temporary employees behaves counter-cyclically; it increases during recessions and decreases during booms. This said, overall changes are

small in absolute terms, that is, the mean tenure of temporary workers increases by only two months between 2007 and 2012.

Turning to temporary employment, Figure 8 depicts year-to-year changes during the observation period for selected countries. The figure displays a mixed picture with respect to the development of mean tenure of temporary workers across countries. Temporary workers in Denmark have experienced a strong decline in mean tenure until 2005, followed by a rather stable level until 2012. In contrast, mean tenure of temporary employment increased in Spain over the entire observation period. In Greece, mean job tenure levels for temporary employees behave counter-cyclically, i.e., mean tenure levels decrease during a boom and increase during a recession. The opposite holds for Lithuania, where it behaves pro-cyclically.

In order to shed light on these differences, Figure 9 plots mean tenure of temporary workers as well as the share of temporary workers among the working population by country for the pre-crisis period and the Great Recession. For both measures, considerable variation across countries and time becomes apparent. In Austria, the Czech Republic, Greece, Italy and, the UK, the mean tenure levels of temporary workers is comparably high with around three years. In contrast, temporary workers have especially low mean tenure in Estonia, Lithuania, and Slovakia. One reason for this could be that these countries have temporary contracts with exceptionally low durations compared to other countries. Estonia, Lithuania and Slovakia also have very low shares of temporary employment among total employment (lower panel of Figure 9) implying that temporary contracts are rare and, given that a worker is temporarily employed, this status changes quickly. At the same time, countries with the highest shares of temporary employment (Poland, Portugal, and Spain) are characterised by higher average levels of mean tenure among temporary workers.

In general, temporary employment appears to be less common in the CEE countries (except for Poland). Auer and Cazes (2000) found a comparable distribution of temporary employment across the EU. This points towards a positive relationship between employment protection legislation and the prevalence of temporary employment. In other words, in many countries with strict employment protection legislation (for example, Portugal), companies tend to use temporary employment to ensure flexibility over the business cycle which is investigated in more detail in Section 5.

However, the results do not directly confirm the hypothesis that temporary workers are necessarily the first to lose their job when a crisis hits the economy. While the share of temporary workers is indeed strongly reduced during the Great Recession in Spain, for example, Portugal actually shows an increase. In general, no clear relationship can be established with the pre-crisis mean tenure level, the share of temporary employment prior to the crisis or its change during the crisis. In total, 15 countries experience a decrease and 11 countries show an increase in mean tenure levels (upper panel of Figure 9). Nevertheless, this result is not too surprising because among temporary workers there is no clear hypothesis which workers should be the first to lose their job. Firm-specific human capital accumulation should not differ significantly given the limited variation in tenure within temporary employment. Additionally, country-specific labour legislation of temporary employment should also play an important role. If, for example, workers have to receive a permanent contract

after a certain time period, firms might actually be inclined to lay off temporary workers close to this time limit first in order to maintain a certain degree of flexibility during a recession.

The shift-share analysis allows to study to which extent observed changes in aggregate mean tenure are caused by changing mean tenure levels of permanent and temporary workers or by a changing composition of the workforce with respect to these two contract types. The results for the EU aggregate level show that average tenure for given shares increased slightly by 2.6 months over the period 2002 to 2007, but that the changing composition of temporary and permanent workers counteracted this increase. This negative share component shows that temporary contracts became more common reducing overall tenure. During the crisis, the share component is negligible and tenure for a given share composition increases quite strongly (Table 2).

The result that the change in the importance of temporary employment hardly plays any role for the evolution of tenure during the Great Recession is surprising but is confirmed when analysing the development for individual countries. While the sign differs, a changing composition of contract types, i.e., more or less temporary employment, is relatively unimportant for the majority of countries in this context. The only exceptions are Spain, where falling shares of temporary employment are correlated with increasing mean tenure levels, and the Netherlands, where an increasing share of temporary employment is associated with a reduction in mean tenure. Instead of composition effects, actual changes in mean tenure for the two contract types dominate the development. In this context, it is worth mentioning that the increase of the share of temporary workers in the Netherlands during the crisis was extraordinary (Figure 9 lower panel) and probably related to an accelerated move of the nation's economy from an industry to a more service-orientated economy (Gielen and Schils, 2014). In total, 20 out of the 26 analysed countries experience an increase in mean tenure during the crisis, holding the shares of contract types constant (Table 2).

Similar analyses for economic sectors and occupations indicate extremely large differences in the mean job tenure level across economic sectors (results available from the authors upon request) confirming the findings of Auer and Cazes (2000). During the Great Recession, most economic sectors experience a modest increase in mean tenure which is mainly due to a change in tenure within sectors, rather than a changing sectoral composition. Moreover, for occupations a similar picture can be drawn.

5 Econometric findings

In the final step of the analysis, we perform a multivariate regression analysis on the relationship between tenure before and during the Great Recession with a wide range of sociodemographic and job characteristics while taking into account country-specific variation. This allows us to draw conclusions on the influence of each observed and time-constant unobserved country-specific factor on tenure. The regression includes sociodemographic variables such as age, gender, and skill-level. The job characteristics are described by the economic sector and occupation. In order to focus on country-specific variation of tenure, we exclude the contract type, that is, whether a worker has a permanent or temporary contract from the regressions. Contract types are therefore subsumed under country-specific institutions and thus country dummies must be interpreted in this regard. Moreover, we focus on interpreting the characteristics discussed in the previous sections

using the additional variables as controls. The controls comprise place of birth, type of employment (full-time, part-time), work pattern (shift work), and company size.

Estimated coefficients from linear regressions that are fully interacted with the crisis dummy are reported in Table 3. The second column reports pre-crisis values while the third column displays changes during the crisis. Both depend in their interpretation on the specific reference categories. The basic reference group consists of medium aged and skilled, non-migrant males working in Austria[6] in manufacturing as a service and sales employee with a non-shift and full-time contract in a company with 20-49 employees. This reference group, after controlling for all sociodemographic and job characteristics, has on average a mean tenure level of 160 months during the pre-crisis period. Similarly, for the same group job tenure decreases by 5.6 months during the crisis. This is a striking result since it states that, ceteris paribus, a sizeable and significant negative impact of the crisis on mean tenure in several European countries occurs. In particular, the corresponding coefficient suggests that mean tenure decreases by 5.6 months on average during the crisis in the reference country, Austria. A decline in average tenure during the crisis period was reported in Austria when using descriptive techniques, although of a much lower magnitude of around 1 month (Figure 2). 16 countries depict an interaction term of less than 5.6 months, thus indicating a negative trend in job tenure, too. Only 9 countries Bulgaria, Cyprus, Finland, Ireland, Italy, Latvia, Slovenia, Spain, and the UK experience a rise in mean tenure.

These fundamental differences suggest that the development of tenure in the period of the Great Recession is largely determined at the country level. In addition, most of the countries with a rise in mean tenure have in common the fact that their overall economy suffered disproportionately strongly from the financial crisis (compare Figure 2). This emphasises that country-specific labour market performance, structure and institutions, social security systems, and corresponding reforms are relevant in explaining country differences in tenure as mentioned in section 4.

The results for age groups confirm the descriptive pattern that job tenure is substantially longer for older workers than for younger workers. The estimated coefficients show that mean tenure for younger age groups (15–24 years and 25–34 years) is much lower than for the reference group of prime-age workers (35–54 years) in the pre-crisis period and that this difference narrows slightly during the crisis. For the oldest age group (55 years and over), mean tenure is considerably larger than for the reference group.

Therefore, the regression findings are in line with the implications of the shift–share-analysis previously presented because they indicate that age effects are part of the explanation for overall increasing mean tenure. Put differently, the underlying negative trend in mean tenure only becomes visible when controlling for the composition of the workforce in terms of age. A potential reason is demographic change, i.e., higher life expectancy and lower birth rates. The ensuing higher share of older workers is a driving force for a higher mean tenure. Thus, isolating the crisis–tenure relationship from other factors is central to revealing a potential structural trend towards shorter tenures.

[6] A robustness test using Belgium instead of Austria as the reference country in the regression yields very similar results.

Furthermore, the estimates confirm the descriptive evidence that mean tenure is larger for men than for women. However, when controlling for other factors, the gender gap in tenure is relatively small. It corresponds to 3 months before and to 1.3 months during the Great Recession. Interestingly, the pre-crisis level of mean tenure is more than 20 months higher for medium-skilled than for high-skilled workers. One likely explanation is that high-skilled workers more often look for a new job while still in employment and thus are more likely to move job voluntarily than medium- and low-skilled workers.

Turning to job characteristics, the relationship between tenure and economic sector highlights important differences between sectors. Again, the regression results in Table 3 are in line with the descriptive evidence since a strong variation in mean tenure across economic sectors becomes visible. The estimates imply that tenure is very high for the energy and water supply and very low for the restaurant and hotel sector. In general, sector-specific changes in mean tenure during the crisis are considerably smaller when looking at the terms interacting the crisis dummy with economic sectors. This is true also for mean tenure with respect to occupations. This result is noteworthy because it implies that changes in tenure during the crisis seem not to be strongly related to specific types of occupations but rather to specific types of workers.

Table A2 in the appendix displays estimated coefficients for the additional control variables. Natives experience substantially higher job tenures than migrants. Tenure is positively related with firm size and negatively with working hours. Lastly, shiftwork goes together with longer job durations. Changes due to the crisis are not very pronounced for all control variables.

In order to get an impression about the importance of the different (groups of) explanatory variables for job tenure, we conduct a variance decomposition. As one can see, the relative importance of worker characteristics in explaining job tenure is very high (Table A3 in the appendix). Two-thirds of the model's explanatory power can be attributed to age, which partly reflects the fact that age naturally rises with tenure. Job characteristics and country specific factors account for 14 percent and 8 percent of the total variation, respectively. Within the group of job characteristics, industry and occupation are most important. Lastly, the explanatory power of the crisis indicator is rather small.

As stated previously, the country dummies represent country-specific labour market performance, structure and institutions – including the prevailing employment protection legislation (EPL) in each country – social security systems, and corresponding reforms during the observation time. In the literature (Auer and Cazes, 2010) labour market institutions, in particular EPL, are identified as a driver of cross-country differences in job tenure. EPL measures the costs that arise for firms in case of the dismissal of an employee. The stricter EPL, the more costly it is for employers to lay off workers. Therefore, it reduces labour turnover (Blanchard and Portugal, 2001) which leads to higher job tenures.

We will first investigate the relationship descriptively before the Great Recession and secondly utilize our regression results to shed some light on changes during the crisis. Note that in the pre-crisis period, mean tenure in continental European countries (Austria, Belgium, Germany, Luxembourg, and the Netherlands) and the Mediterranean countries is comparably high, while the CEE countries plus Ireland and the UK are characterised by low average tenure. Slovenia and Spain

are notable exceptions to this pattern: Spain has a lower average tenure than the other Mediterranean countries, and Slovenia has an extremely high average tenure compared to the other CEE countries. This cross-country pattern of mean tenure in the pre-crisis period broadly fits the diversity of the EPL index constructed by the OECD (2004) governing regular employment across the EU.

As becomes visible in Figure 10, countries with a low degree of employment protection such as Ireland and the UK display relatively low mean tenure in the pre-crisis period, while the opposite is true for Italy and Portugal. This is in line with the theoretical expectation that employment protection reduces worker turnover (Mortensen and Pissarides, 1999) and confirms the evidence provided in Cazes and Tonin (2010) for the pre-crisis period. However, labour market institutions such as employment protection legislation are not the only determinants of mean tenure as is clear from a comparison of Estonia and Poland which have similar employment protection legislation (EPL) indices but very different mean tenure levels. In some countries, other labour market institutions are thus likely to have played an important role as well. This is for example true for short-time working schemes and working-time accounts, which helped to avoid many layoffs especially in Germany (Burda and Hunt, 2011). Still, the correlation coefficient of mean tenure and EPL index is 0.62 and is statistically significant at the 1% significance level.

For the time period of the Great Recession, one can expect that the degree of EPL is also correlated with the change in tenure across countries. The reason for this is that, in a flexible labour market with a low degree of employment protection legislation, companies will react quickly to the economic situation and mean tenure should move closely with the unemployment rate. In contrast, in labour markets with a high degree of employment protection legislation, companies will smooth their hiring behaviour over the business cycle, and mean tenure will, if at all, react with a certain time lag (Mortensen and Pissarides, 1999). At the same time, in countries with high employment protection, workers have more difficulties finding a new job once they are not employed (Martin and Scarpetta, 2012). Finally, job-to-job transitions leading to new worker-firm matches decrease (Boeri, 1999). All these factors contribute to an increase in job tenure which can be expected to be stronger in countries with higher EPL.

These expectations are indeed borne out by our empirical evidence. As we are dealing with changes during the recession, it is particularly important to control for GDP growth. We therefore use the country fixed effects for the time period 2008 to 2012 from the regression presented in Table 3, which additionally control for worker and job composition. Correlating the change in tenure measured in this way with the degree of employment protection yields a clear negative correlation (Figure 11). This means that countries with a low degree of employment protection, such as Ireland and the UK, feature a much stronger increase in tenure during the recession than countries with less strict EPL, such as Portugal or the Czech Republic implying that in countries with lower employment protection, more short-tenured jobs are destroyed which leads to an increase in mean tenure. Furthermore, temporary employment seems to play some role as well as the large increase in mean tenure for Spain indicates. These results are thus in line with the evidence presented in Gnocchi et al. (2015) who show for a panel of OECD countries that lowering employment protection increases the volatility of employment.

6 Conclusion

In summary, at the EU level, average job tenure increased slightly from 116.5 months in 2002 to 123 months in 2012. As this observation period includes the Great Recession, cyclical factors are likely to be an important explanation: First, short-tenured jobs were disproportionately destroyed during the crisis; second, there was less job creation during the crisis, leading to a lower number of newly created jobs (Bachmann et al, 2015). This is in line with evidence from the US provided by the Bureau of Labor Statistics (BLS) which reported that median tenure increased between 2006 and 2014 (BLS, 2014). Consequently, mean tenure is characterised by a strong cyclical component that has to be separated from long-term trends.

However, at the individual country level, strong heterogeneities prevail before the Great Recession and in the reaction to the recession. Possible reasons for diverging pre-crisis levels of mean tenure include composition effects in terms of the workforce or industry structure, different labour market institutions or country-specific preferences of workers in terms of the 'lifetime employment relationship'. In terms of labour market institutions, employment protection legislation, and the prevalence of temporary contracts and, more generally, labour market flexibility appear to be particularly important.

Even when abstracting from cyclical effects, there appears to be no evidence that mean tenure decreased in Europe between 2002 and 2012. However, it is paramount to control for sociodemographic developments when comparing the evolution of mean tenure across countries. When controlling for an ageing workforce, an underlying negative trend towards shorter job tenure becomes transparent for many countries. The shift–share analysis suggests that layoffs due to the crisis as well as an ageing workforce may be responsible for a considerable upward shift in tenure; at the same time, there seems to be a long-term trend towards shorter job tenure for given age groups. The regression results confirm that age effects seem to be a driving force for an increasing mean tenure, even during the crisis. Together, an ageing workforce and an underlying negative trend in mean tenure for given age groups lead to the result that average tenure remains stable when abstracting from cyclical effects.

Tenure also varied strongly by job characteristics during the observation period. Cross-country differences in the impact of the crisis on temporary employment suggest that the role of temporary employment in national labour markets varies considerably between EU countries. However, large job losses among temporary workers and a corresponding increase in average tenure can only be observed in very few countries, most notably Spain. Therefore, the conclusion of Bentolila et al. (2012) that the spread of temporary jobs is an important predictive factor for labour market developments during the Great Recession cannot be generalised beyond a small number of countries in our context. Overall, the results from the regression analysis suggest that age is the prime explanatory factor for tenure, followed by job characteristics, especially the economic sector and occupation.

Moreover, our analysis confirms the results in Cazes and Tonin (2010) that shows a strong positive correlation between the degree of employment protection and mean tenure. In addition, we show that employment protection also played an important role during the Great Recession: Countries

with a low degree of employment protection experienced stronger increases in tenure during the Great Recession than countries with higher strictness of employment protection. The reason for this are more layoffs in countries with little employment protection.

Our results are informative about several (policy) debates. First, the underlying trend towards declining job tenure in Europe uncovered by our analysis is relatively sizeable. From the shift-share analysis, we can see that this effect amounts to -2.58 months over the time period 2002 to 2012, when we observe an overall increase in job tenure of 6.71 months. This can be seen as problematic, because declining job stability is likely to adversely affect individual worker welfare. An analysis of potential factors explaining this underlying trend, such as increased voluntary job-to-job transitions – which would point to supply-side factors of the labour market – or more frequent dismissals – which would point to demand-side factors – constitutes an important field of research. Second, while the widespread use of temporary contracts in a number of European countries continues to be a cause for concern because of the emergence of dual labour markets, the Great Recession does not seem to have increased this structural problem. Third, employment protection legislation seems to have some stabilising effects on European Labour markets during the Great Recession. The welfare effects of this stabilization are not clear-cut however. Finally, as our analysis uses repeated cross-sections, it must remain silent about life-cycle issues. In particular, the question whether the higher prevalence of temporary contracts among younger workers means that labour-market careers can be expected to be more unstable in the future is of great importance. In order to answer this question, one would have to conduct a cohort-based analysis in the spirit of Erlinghagen and Knuth (2002) or Hanushek et al. (2016). These issues are however beyond the scope of this paper and are therefore left for future research.

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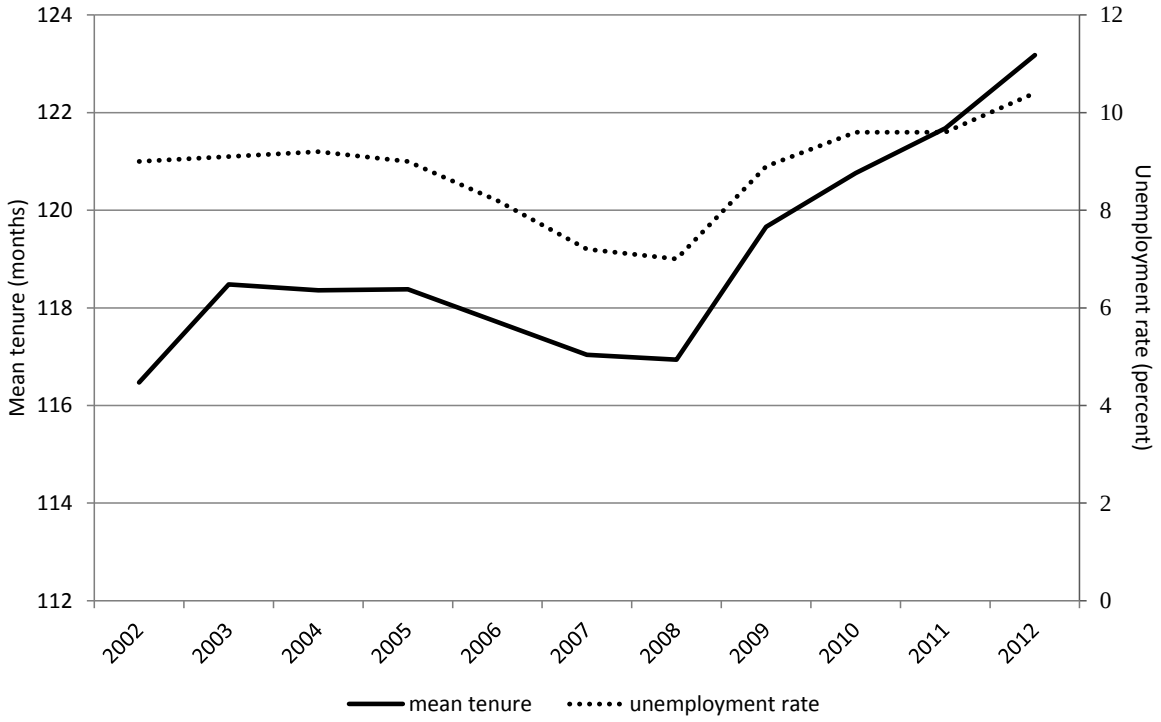
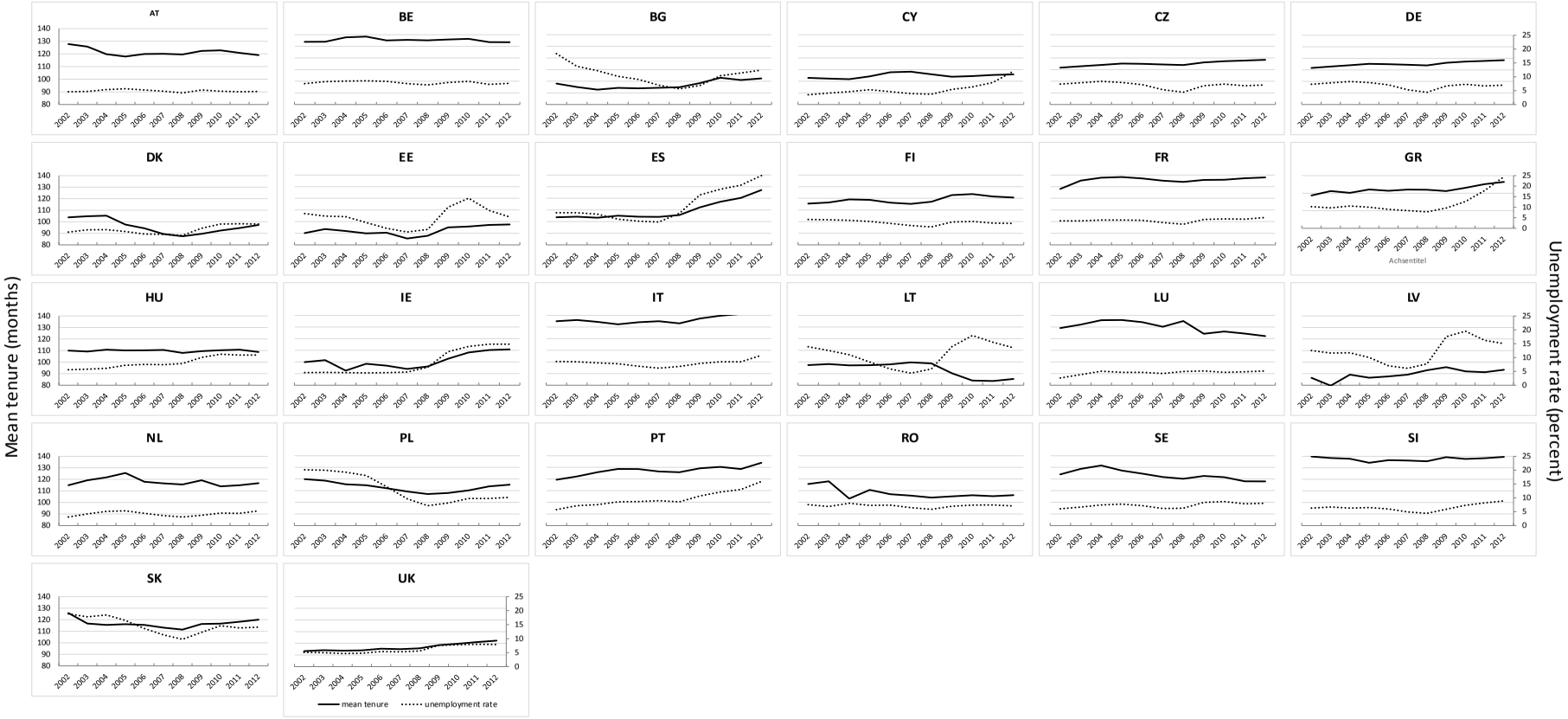
Figure 1. Mean tenure and unemployment rate in the EU, 2000-2012 (in months/in %)



Notes: Mean tenure is plotted against the primary axis. Note that the axis starts at 112 months to make the variation visible. The unemployment rate is plotted against the secondary axis.
Source: EU-LFS, own calculations.

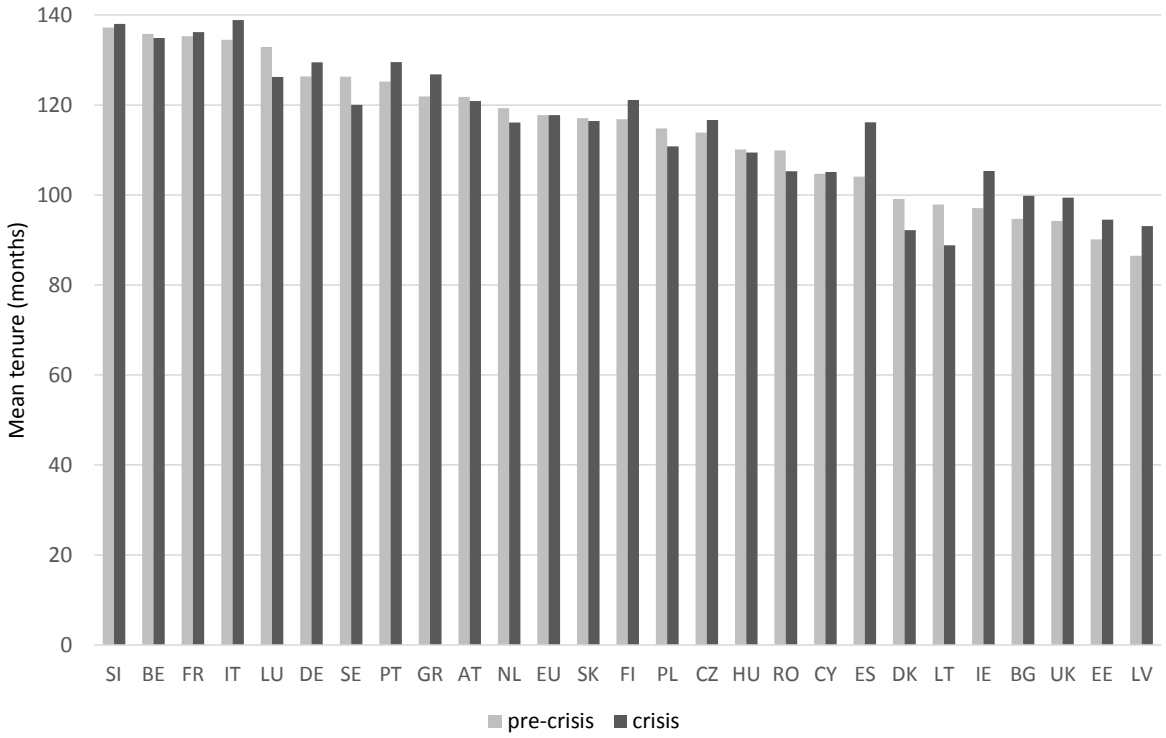
Figure 2. Mean tenure and unemployment rate by Member State, 2002-2012 (in months/in %)



Notes: Country codes: AT: Austria, BE: Belgium, BG: Bulgaria, CY: Cyprus, CZ: Czech Republic, DE: Germany, DK: Denmark, EE: Estonia, ES: Spain, FI: Finland, FR: France, GR: Greece, HU: Hungary, IE: Ireland, IT: Italy, LT: Lithuania, LU: Luxembourg, LV: Latvia, NL: The Netherlands, PL: Poland, PT: Portugal, RO: Romania, SE: Sweden, SI: Slovenia, SK: Slovak Republic, UK: United Kingdom. Mean tenure is plotted against the primary axis. Note that the axis starts at 80 months to make the variation visible. The unemployment rate is plotted against the secondary axis.

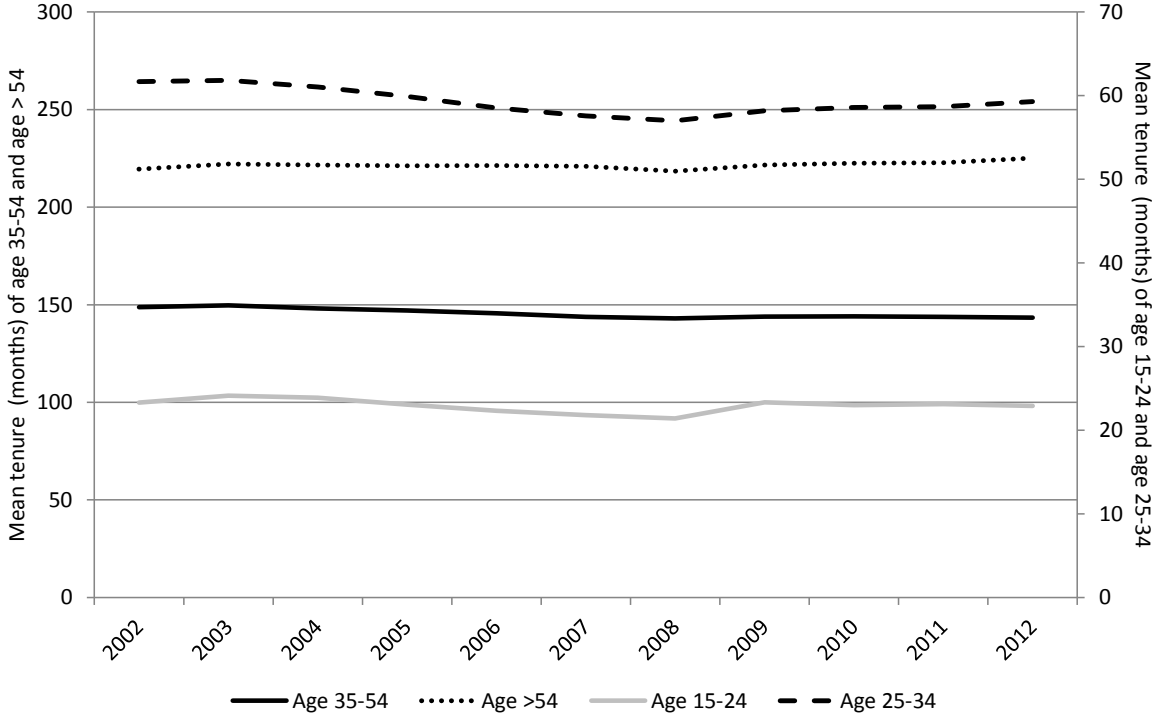
Source: EU-LFS, own calculations.

Figure 3. Mean tenure before and during the crisis by Member State (in months)



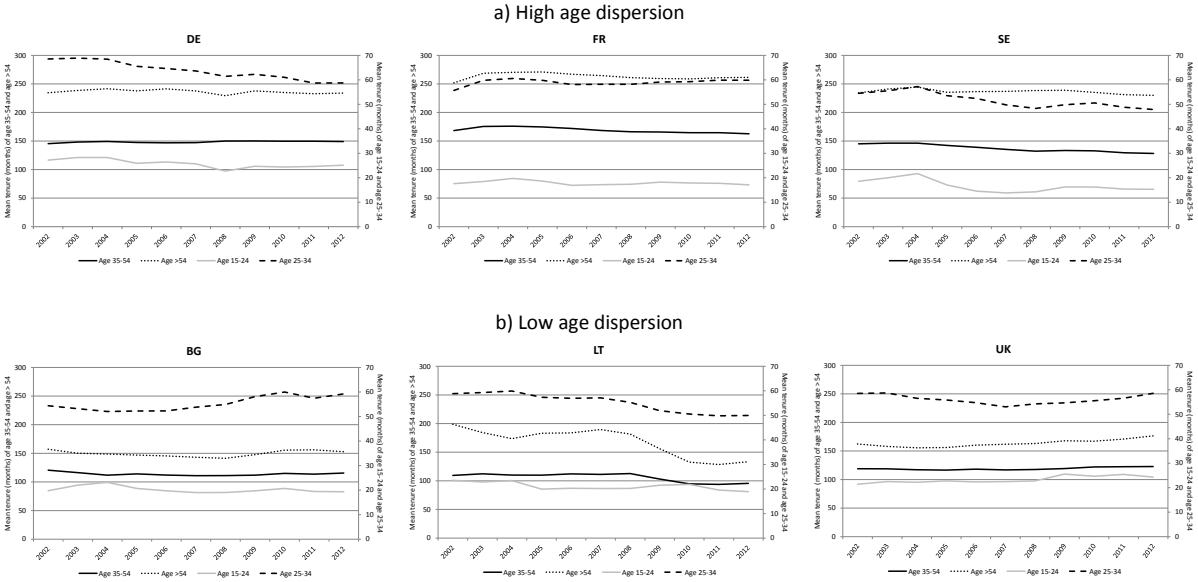
Notes: Countries are sorted in order of their pre-crisis mean tenure level.
See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Figure 4. Mean tenure by age group in the EU, 2002-2012 (in months)



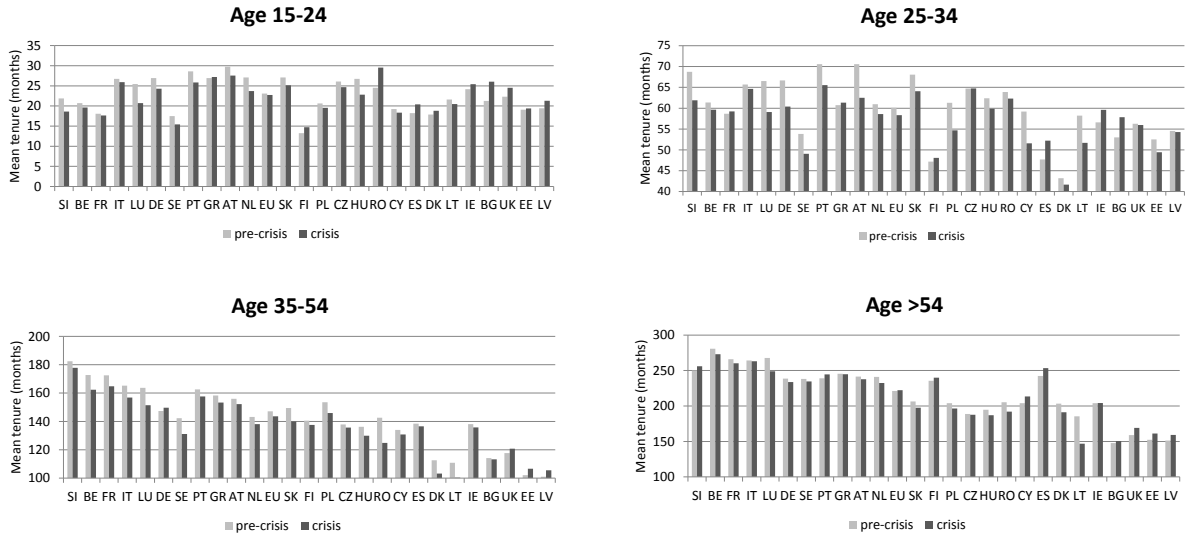
Notes: Mean tenure for age group 35 - 54 and 55+ is plotted against the primary axis. Mean tenure for age group 15 - 24 and 25 - 34 is plotted against the secondary axis. Note that we distinguish between primary and secondary axis to make the variation visible in all age groups.
Source: EU-LFS, own calculations.

Figure 5. Mean tenure by age group for selected Member States, 2002-2012 (in months)



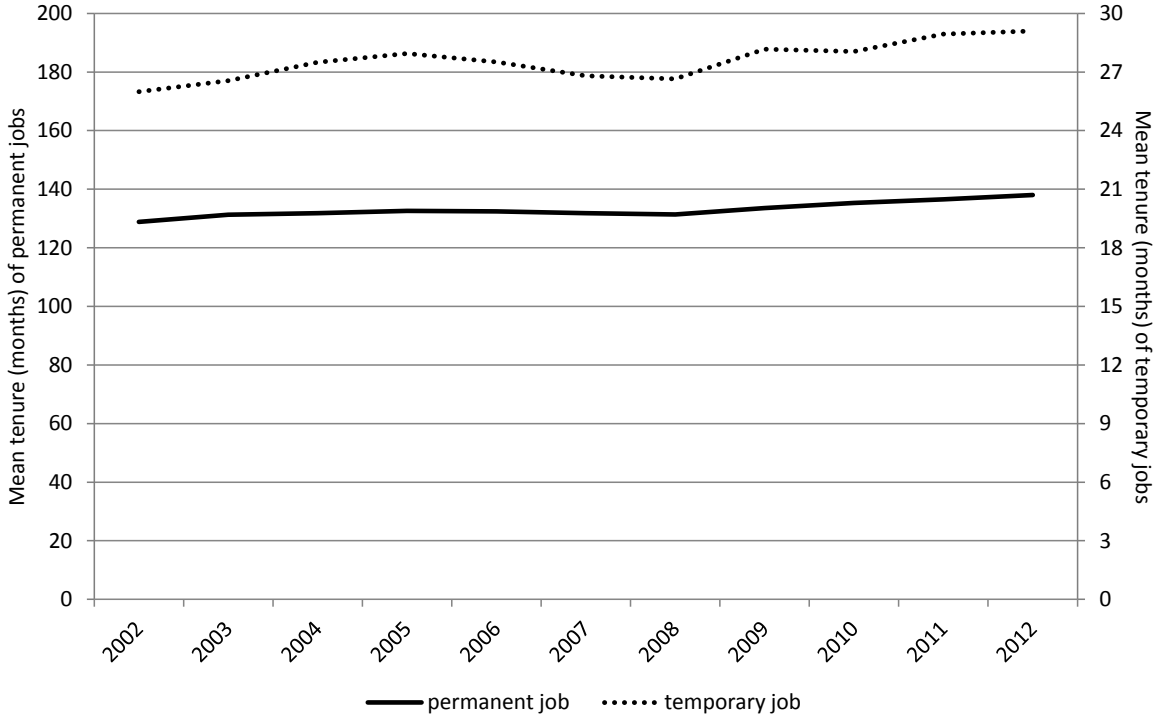
Notes: Mean tenure for age group 35 - 54 and 55+ is plotted against the primary axis. Mean tenure for age group 15 - 24 and 25 - 34 is plotted against the secondary axis. Note that we distinguish between primary and secondary axis to make the variation visible in all age groups.
See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Figure 6. Mean tenure by age group before and during the crisis by Member State (in months)



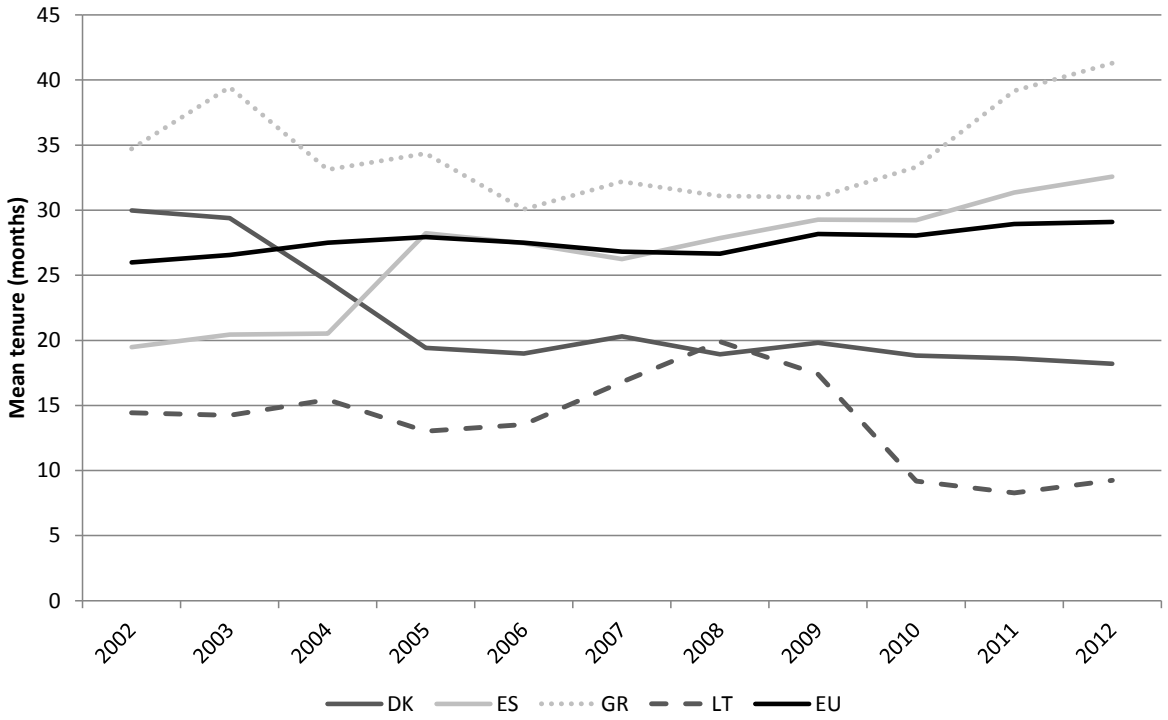
Notes: For specific age groups, the vertical axis starts at values above zero to make the variation visible. Values are 40 months (25 - 34); 100 months (35 - 54 and 55+).
See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Figure 7. Mean tenure by contract type in the EU, 2002-2012 (in months)



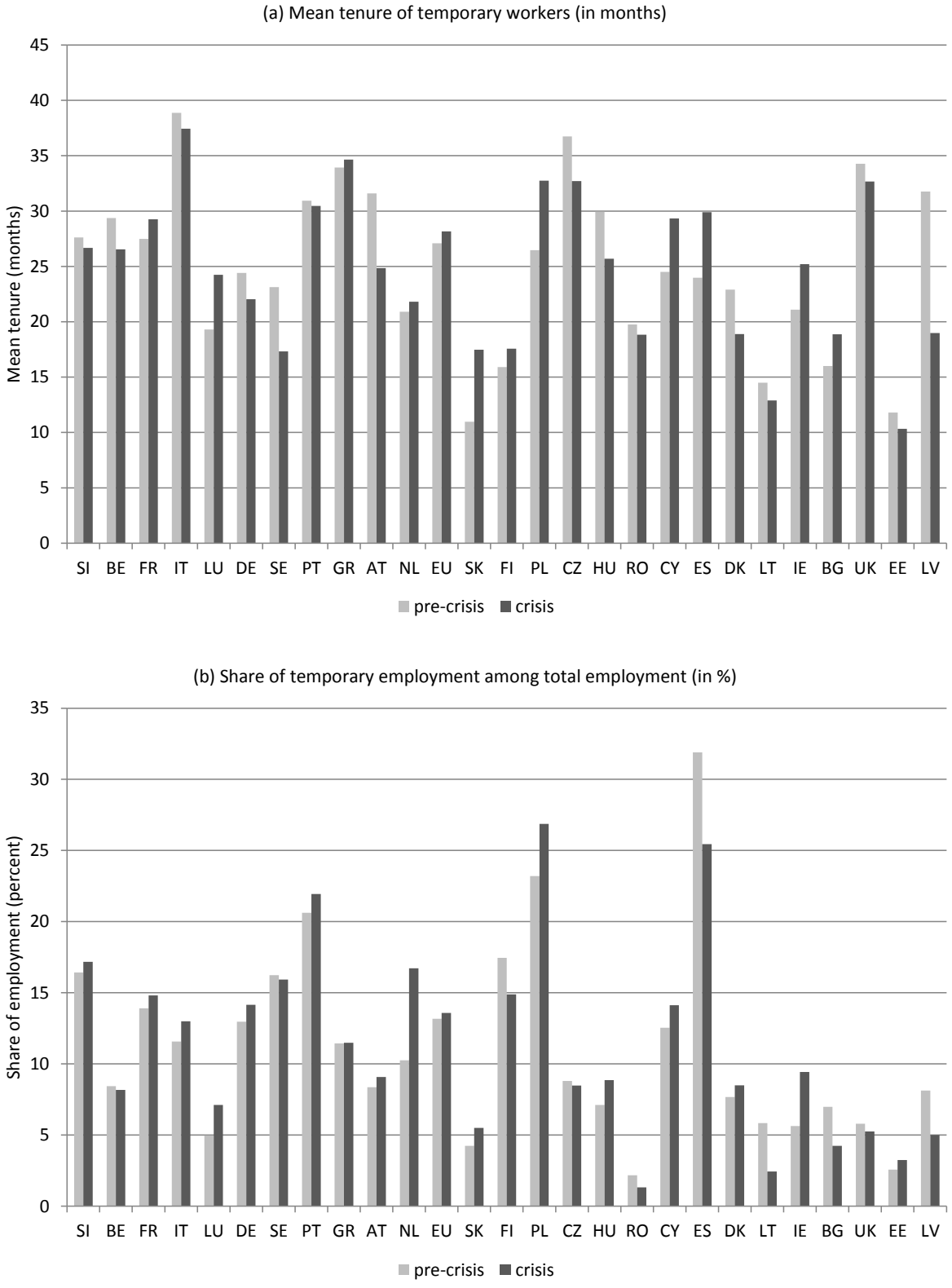
Notes: Permanent jobs are plotted against the primary axis and temporary jobs are plotted against the secondary axis.
Source: EU-LFS, own calculations.

Figure 8. Mean tenure of temporary workers for selected Member States, 2002-2012 (in months)



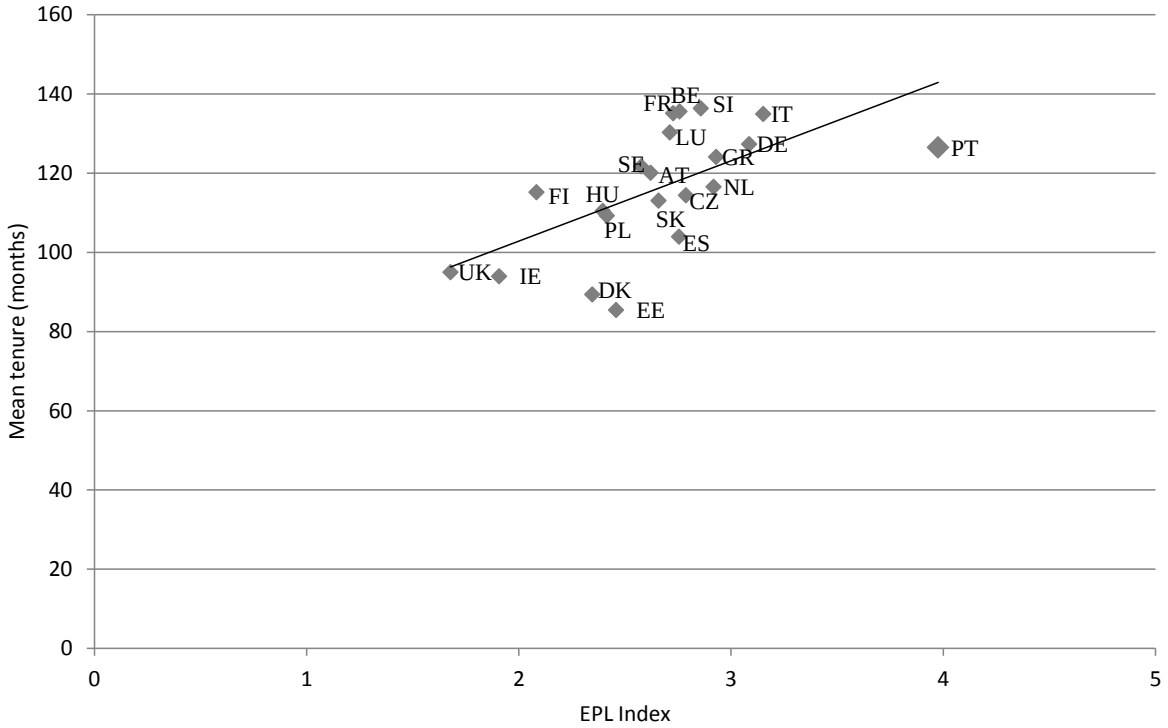
Notes: See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Figure 9. Mean tenure of temporary workers before and during the crisis by Member State



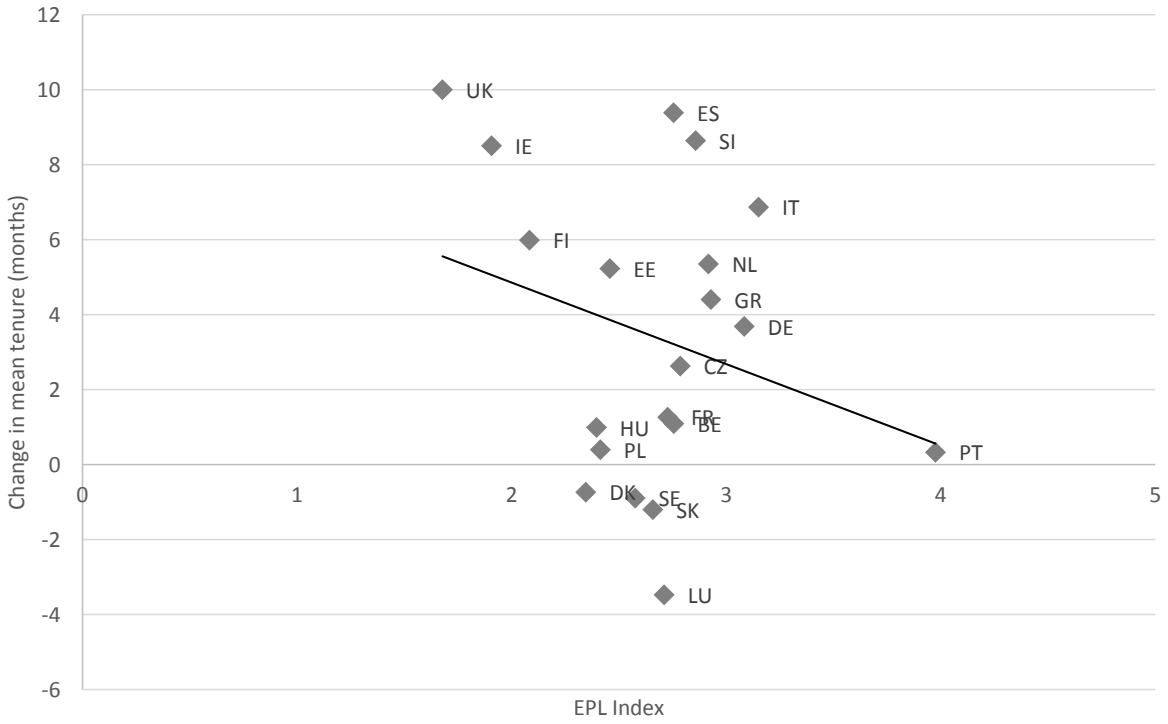
Notes: Countries are sorted in order of their pre-crisis mean tenure level.
See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Figure 10. Relationship between mean tenure and the EPL index for Member States, 2007 (in months)



Notes: For the missing countries, the index of EPL is not available.
See Figure 2 for the country codes.
Source: EU-LFS, OECD, own calculations.

Figure 11. Relationship between the change in mean tenure during the recession and the EPL index for Member States (in months)



Notes: For the missing countries, the index of EPL is not available.
See Figure 2 for the country codes.
Source: EU-LFS, OECD, own calculations.

Table 1. Shift–share analysis of change in mean tenure, according to age (in months)

	2002-2007			2007-2012			2002-2012		
	Due to changing composition	Due to changes within group	Total change	Due to changing composition	Due to changes within group	Total change	Due to changing composition	Due to changes within group	Total change
EU	**4.19**	**-3.62**	**0.57**	**5.21**	**0.93**	**6.14**	**9.29**	**-2.58**	**6.71**
AT	4.32	-11.98	-7.66	2.32	-3.37	-1.05	6.81	-15.52	-8.71
BE	7.45	-5.70	1.75	4.49	-6.57	-2.08	11.87	-12.20	-0.33
BG	3.55	-7.13	-3.59	2.32	5.70	8.02	6.16	-1.73	4.44
CY	3.15	2.18	5.33	1.80	-4.14	-2.34	4.87	-1.87	3.00
CZ	2.36	0.40	2.76	5.15	-1.15	4.00	7.53	-0.77	6.75
DE	4.26	0.23	4.49	3.92	-0.74	3.18	8.16	-0.49	7.66
DK	-1.54	-12.91	-14.45	2.72	5.09	7.82	1.45	-8.08	-6.63
EE	-1.50	-3.12	-4.63	3.05	8.98	12.03	1.60	5.80	7.40
ES	4.29	-4.01	0.28	14.19	8.89	23.08	18.55	4.81	23.36
FI	4.88	-5.12	-0.24	2.77	2.68	5.46	7.70	-2.48	5.22
FR	5.18	1.91	7.09	5.89	-3.05	2.84	10.67	-0.74	9.93
GR	8.03	-1.30	6.73	8.47	0.28	8.75	16.78	-1.30	15.48
HU	5.26	-4.73	0.53	4.94	-6.70	-1.76	10.36	-11.59	-1.23
IE	1.80	-7.71	-5.91	10.80	6.04	16.84	13.29	-2.36	10.93
IT	7.39	-7.39	0.00	10.13	-2.10	8.03	17.71	-9.67	8.04
LT	3.41	-1.06	2.35	4.99	-19.18	-14.19	8.55	-20.40	-11.84
LU	7.96	-6.84	1.12	3.74	-11.78	-8.04	11.51	-18.43	-6.92
LV	1.67	1.09	2.76	3.72	0.51	4.23	5.35	1.63	6.98
NL	5.88	-4.20	1.68	-1.01	1.14	0.13	4.87	-3.06	1.80
PL	-2.33	-8.31	-10.64	7.27	-1.37	5.90	4.52	-9.26	-4.74
PT	6.55	0.53	7.08	8.78	-1.28	7.50	15.30	-0.72	14.58
RO	9.31	-19.35	-10.04	4.79	-4.32	0.47	14.33	-23.90	-9.57
SE	3.45	-5.72	-2.27	1.13	-4.92	-3.79	4.54	-10.60	-6.06
SI	2.93	-6.38	-3.45	9.46	-6.29	3.16	12.05	-12.34	-0.29
SK	2.90	-15.61	-12.71	8.84	-1.94	6.90	13.12	-18.92	-5.81
UK	3.81	-2.16	1.65	0.69	6.59	7.28	4.58	4.35	8.93

Notes: The crisis period takes into account changes which occurred between 2007 and 2008 because the crisis started in 2008 in the large majority of countries.
See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Table 2. Shift–share analysis of change in mean tenure, according to contract type (in months)

	2002-2007			2007-2012			2002-2012		
	Due to changing composition	Due to changes within group	Total change	Due to changing composition	Due to changes within group	Total change	Due to changing composition	Due to changes within group	Total change
EU	**-2.06**	**2.64**	**0.57**	**0.45**	**5.69**	**6.14**	**-1.62**	**8.33**	**6.71**
AT	-1.31	-6.35	-7.66	-0.43	-0.62	-1.05	-1.73	-6.98	-8.71
BE	-0.89	2.63	1.75	0.49	-2.57	-2.08	-0.41	0.08	-0.33
BG	1.07	-4.66	-3.59	1.19	6.83	8.02	2.29	2.14	4.44
CY	-3.48	8.81	5.33	-1.83	-0.51	-2.34	-5.16	8.15	3.00
CZ	-0.26	3.02	2.76	-0.28	4.28	4.00	-0.57	7.32	6.75
DE	-2.45	6.94	4.49	0.22	2.96	3.18	-2.25	9.92	7.66
DK	-2.51	-11.93	-14.45	0.31	7.50	7.82	-2.19	-4.44	-6.63
EE	0.17	-4.80	-4.63	-1.15	13.18	12.03	-1.14	8.54	7.40
ES	2.35	-2.07	0.28	6.98	16.10	23.08	10.13	13.23	23.36
FI	1.01	-1.25	-0.24	1.95	3.51	5.46	3.03	2.19	5.22
FR	-1.09	8.18	7.09	-0.24	3.08	2.84	-1.32	11.25	9.93
GR	0.94	5.79	6.73	0.90	7.85	8.75	1.75	13.72	15.48
HU	0.16	0.37	0.53	-1.87	0.11	-1.76	-1.63	0.40	-1.23
IE	-3.65	-2.26	-5.91	-0.89	17.73	16.84	-4.58	15.51	10.93
IT	-3.38	3.39	0.00	-0.70	8.74	8.03	-4.04	12.08	8.04
LT	3.61	-1.26	2.35	0.79	-14.98	-14.19	4.43	-16.28	-11.84
LU	-2.68	3.80	1.12	-1.21	-6.83	-8.04	-3.80	-3.12	-6.92
LV	4.15	-1.39	2.76	-0.35	4.58	4.23	3.88	3.10	6.98
NL	-5.09	6.77	1.68	-6.95	7.07	0.13	-11.57	13.38	1.80
PL	-14.62	3.98	-10.64	1.44	4.46	5.90	-13.12	8.38	-4.74
PT	-0.49	7.57	7.08	1.89	5.61	7.50	1.30	13.29	14.58
RO	-0.66	-9.39	-10.04	-0.07	0.54	0.47	-0.73	-8.84	-9.57
SE	-0.70	-1.57	-2.27	1.41	-5.19	-3.79	0.56	-6.61	-6.06
SI	-4.93	1.48	-3.45	1.70	1.46	3.16	-3.31	3.03	-0.29
SK	-6.32	-7.18	-12.71	-1.77	8.67	6.90	-8.50	1.29	-5.81
UK	0.30	1.36	1.65	-0.08	7.36	7.28	0.22	8.71	8.93

Notes: The crisis period takes into account changes which occurred between 2007 and 2008 because the crisis started in 2008 in the large majority of countries.
See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Table 3. Results of regression analysis of individual tenure before and during the crisis (in months)

	Base coefficient	Change during crisis
Reference category (intercept and crisis dummy)	159.82***	-5.65***
Age group		
15–24 years	-111.03***	1.57***
25–34 years	-82.37***	1.16***
35–54 years	ref	ref
55+ years	78.83***	2.91***
Gender		
Male	ref	ref
Female	-3.11***	1.79***
Skill level		
Low-skilled: ISCED 0–2	1.62***	-2.46***
Medium-skilled: ISCED 3–4	ref	ref
High-skilled: ISCED 5–6	-20.47***	0.19***
Economic sector		
A – Agriculture, forestry and fishing	1.73***	0.1**
B – Mining and quarrying	34.41***	-0.73***
C – Manufacturing	ref	ref
D – Electricity, gas and water supply	31.8***	-18.44***
E – Construction	-25.47***	1.79***
F – Wholesale and retail trade; vehicle repair	-13.63***	2.18***
G – Hotels and restaurants	-19.75***	0.88***
H – Transport, storage and communications	5.06***	-9.88***
I – Financial intermediation	17.2***	-2.81***
J – Real estate, renting and business activities	-28.06***	1.34***
K – Public administration and defence	22.37***	4.07***
L – Education	16.75***	-4.9***
M – Health and social work	-3.59***	-1.14***
N – Other community, social and personal service activities	-10.41***	0.14***
O – Activities of households as employers	-14.77***	-5.68***
P – Activities of extraterritorial organisations	-3.42***	4.55***
Occupation		
Armed forces occupations	33.94***	3.64***
Managers, senior officials and legislators	19.24***	1.86***
Professionals	21.84***	0.75***
Technicians and associate professionals	19.02***	3.13***
Clerks	13.74***	3.42***
Service and sales workers	ref	ref
Skilled agricultural, fishery, and forestry workers	-9.58***	9.09***
Craft and related trades workers	9.99***	1.76***
Plant and machine operators, and assemblers	-6.51***	1.88***
Elementary occupations	-21.93***	3.41***
Country		
AT	ref	ref
BE	5.66***	1.1***
BG	-49.2***	11.23***
CY	-13.6***	5.89***
CZ	-28.88***	2.63***
DE	-13.21***	3.69***
DK	-36.55***	-0.73***
EE	-45.27***	5.23***
ES	-9.66***	9.39***
FI	-17.53***	5.99***
FR	6.34***	1.27***
GR	-0.07**	4.4***
HU	-25.48***	0.99***
IE	-16.49***	8.51***
IT	-0.97***	6.87***

Table 3, continued.

	Base coefficient	Change during crisis
Country		
LT	-39.55***	-10.76***
LU	4.15***	-3.47***
LV	-42.98***	7.89***
NL	-13.95***	5.36***
PL	-21.82***	0.4***
PT	9.2***	0.33***
RO	-29.3***	-0.36***
SE	-11.84***	-0.89***
SI	11.79***	8.65***
SK	-16.24***	-1.2***
UK	-37.01***	10.01***
Other Controls		
Place of birth (ref.: National; others: Born in another EU country, Born outside EU)		
Type of employment (ref.: Full-time employment; others: Part-time employment)		
Company size (ref.: 20-49 workers; others: 1-10, 11-19, 20-49, 50+, more than 10 but not sure)		
Work Pattern (ref: No shift-work, others: Shift-work)		
R^2	0.33	
Number of observations	1,945,604,584	

Notes: Estimated coefficients are reported. The reference group (REF) is the following combination of characteristics: age 35-54 years, male, medium skilled, full-time employed, no shift work, medium firm size (20-49 workers), occupation: service and sales workers, economic sector: manufacturing, country: Austria. Note that the reference individual has a mean tenure of 159.82 months in the pre-crisis period and a corresponding mean tenure of 154.16 months during the crisis. Significance levels are as follows: *** p<0.01, ** p<0.05, * p<0.10.
See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Appendix

Table A1. Summary of sample before and during the crisis (in %)

	Pre-crisis	Crisis
Age group		
15–24 years	11.4	10.3
25–34 years	26.1	24.7
35–54 years	52.2	52.1
55+ years	10.4	12.9
Gender		
Male	53.2	52.0
Female	46.8	48.0
Skill level		
Low-skilled: ISCED 0–2	21.0	18.1
Medium-skilled: ISCED 3–4	52.8	51.9
High-skilled: ISCED 5–6	26.2	29.9
Economic sector		
A – Agriculture, forestry and fishing	1.9	1.5
B – Mining and quarrying	0.5	0.5
C – Manufacturing	20.7	18.0
D – Electricity, gas and water supply	1.1	1.7
E – Construction	7.1	6.8
F – Wholesale and retail trade; vehicle repair	13.7	13.8
G – Hotels and restaurants	3.7	4.1
H – Transport, storage and communications	6.6	8.0
I – Financial intermediation	3.4	3.4
J – Real estate, renting and business activities	8.5	8.7
K – Public administration and defence	8.6	8.6
L – Education	8.3	8.6
M – Health and social work	10.5	11.5
N – Other community, social and personal service activities	4.2	3.5
O – Activities of households as employers	1.2	1.4
P – Activities of extraterritorial organisations	0.1	0.1
Occupation		
Armed forces occupations	0.6	0.7
Managers, senior officials and legislators	5.7	5.5
Professionals	13.9	16.3
Technicians and associate professionals	17.4	17.4
Clerks	13.2	12.2
Service and sales workers	14.3	16.0
Skilled agricultural, fishery, and forestry workers	1.0	0.9
Craft and related trades workers	14.1	12.4
Plant and machine operators, and assemblers	9.7	8.6
Elementary occupations	10.1	10.0
Country		
AT	1.9	2.0
BE	2.1	2.1
BG	1.5	1.5
CY	0.2	0.2
CZ	2.3	2.3
DE	18.6	19.2
DK	1.5	1.4
EE	0.3	0.3
ES	8.7	8.5
FI	1.2	1.2
FR	12.7	12.7
GR	1.6	1.5
HU	2.0	1.9
IE	0.9	0.9
IT	9.5	9.5

Table A1, continued.

	Base coefficient	Change during crisis
LT	0.7	0.7
LU	0.1	0.1
LV	0.5	0.5
NL	4.1	4.0
PL	6.1	6.7
PT	2.2	2.1
RO	3.4	3.4
SE	2.3	2.3
SI	0.5	0.5
SK	1.1	1.1
UK	14.3	13.7
Place of birth		
National	93.4	91.5
Born in other EU28 country	2.1	2.8
Born outside of EU28	4.6	5.7
Work in part-time		
No	82.7	80.9
Yes	17.3	19.1
Firm size		
1-10 persons	22.8	22.9
11-19 persons	10.8	11.4
20-49 persons	16.2	16.2
50 and more	44.4	44.3
More than 10, but does not know exactly	5.9	5.3
Work in shiftwork		
No	82.6	82.8
Yes	17.4	17.2

Notes: See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Table A2. Results of regression analysis of individual tenure before and during the crisis, other controls (in months)

	Base coefficient	Change during crisis
Place of birth		
National	ref	ref
Born in other EU28 country	-24.16***	-3.38***
Born outside of EU28	-30.74***	-0.31***
Work in part-time		
No	ref	ref
Yes	-23.67***	0.55***
Firm size		
1-10 persons	-10.97***	-0.55***
11-19 persons	-4.44***	-0.22***
20-49 persons	ref	ref
50 and more	17.26***	-1.58***
More than 10, but does not know exactly	-8.20***	-1.45***
Work in shiftwork		
No	ref	ref
Yes	5.42***	0.01
R^2	0.33	
Number of observations	1,945,604,584	

Notes: Estimated coefficients are reported. The reference group (REF) is the following combination of characteristics: age 35-54 years, male, medium skilled, full-time employed, no shift work, medium firm size (20-49 workers), occupation: service and sales workers, economic sector: manufacturing, country: Austria. Note that the reference individual has a mean tenure of 159.82 months in the pre-crisis period and a corresponding mean tenure of 154.16 months during the crisis. Significance levels are as follows: *** p<0.01, ** p<0.05, * p<0.10.
See Figure 2 for the country codes.
Source: EU-LFS, own calculations.

Table A3. Importance of estimated components for the explanatory power of the model, (in % of the predicted variance)

	Base coefficient	Change during crisis
Age group	66.78	0.02
Gender	0.05	0.01
Skill group	1.78	0.01
Nationality	1.29	0.00
Worker	69.90	0.05
Industry	5.23	0.21
Occupation	4.79	0.06
Part-time	1.65	0.00
Firmsize	2.22	0.01
Shiftwork	0.10	0.00
Job	13.99	0.29
Country	8.29	0.26
Crisis	0.18	

Notes: The importance of each estimated component corresponds to the share of the model's predicted variance explained by the component. The shares are a function of sample variances and estimated effects. They are additive. The computation uses the results of the benchmark regression (Table 3). In particular, the predictive importance of a variable is equal to $\hat{\beta}_i^2 Var(X_i)/Var(\hat{Y})$.
Source: EU-LFS, own calculations.