

**School of Social Sciences
Economics Division
University of Southampton
Southampton SO17 1BJ, UK**

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**Employment Protection Legislation
and Job Stability: An European Cross
Country Analysis**

Sandrine Cazes & Mirco Tonin

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Employment Protection Legislation and job stability: An European cross country analysis

Sandrine Cazes¹ & Mirco Tonin², February 2009

1. Introduction

Globalization, information and communication technologies changes are increasingly intensifying competitive pressures and call for more responsive labour markets all over the world. Firms have to adjust frequently their operations and their labour force to meet fluctuations in demand and progress in economy. The need for more flexible labour markets has led to significant labour market reforms, which in Europe focused very much on employment laws and in particular those governing the “atypical” forms of employment (e.g. fixed-term, part-time, temporary work). Actually several reforms were introduced in Europe at the end of the 1980s and during the nineties to ease off rules for temporary contracts. While this could have contributed to increase labour market segmentation in some European countries, it certainly fed a general feeling of insecurity: labour markets are perceived as changing dramatically and said to face a secular change towards more and more short-term and flexible jobs. Since these jobs would not allow workers and employers to invest and benefit from the long-lasting employment relationships (training, trust, access to social benefits, etc.), a shift towards “end of work” would require a serious rethinking of social protection and labour market institutions and policies. It is thus important to objectively assess to which extent job stability has gone or is going to fade away; and to which extent labour markets of economically advanced countries have changed dramatically as it is often echoed by media. There have been numerous studies on job stability, most of them focusing on the United States and the United Kingdom where the issue has retained most attention. While a number of analysis have tried to compare job stability over time in one specific country, few have examined changes over time and across countries (except OECD, 1993 and 1997; ILO, 1996, 2003 and 2005).

This paper tries to shed some light on the actual changes that occurred in the labour markets dynamics of the European Union 25³ (EU-25) over the last decade using job tenure⁴ data. It then investigates the potential role of employment protection legislation (EPL)⁵ changes in

¹ Economic and Labour Market Analysis, ILO.

² Economics Division, University of Southampton.

³ Bulgaria and Romania could not be included due to data availability. Data for Austria were excluded because they were not always reliable nor fully comparable.

⁴ Defined as the length of time a worker has been continuously employed by the same employer.

⁵ EPL refers to regulatory provisions that relate to hiring and firing practice, particularly those governing unfair dismissals, termination of employment for economic reasons, severance payments, minimum periods,

explaining differences in the dynamics of job stability across countries but also across age groups in light of the dual-track reform strategy introduced in Europe during the same period: in most European countries, reforms were made typically at the margin (for new hires), while EPL for the incumbent workers remained unchanged. Thus, if the legislation does not apply uniformly to all workers, the effects of EPL reforms are expected to be disproportionately felt by new entrants, such as the young, women, and possibly immigrants.

The paper opens with a descriptive analysis of job stability measured through job tenure in the EU-25, and its evolution over the last years. The level and structure by age of this indicator is our main empirical material. Data used comes from Labour Force Surveys (EUROSTAT) up to 2006. The analysis shows no generalized decrease in job tenure but a trend towards shorter tenure of young workers (15-24) in most European countries. In a second step, the paper examines the possible explanations behind this trend, focusing on employment protection legislation. An econometric analysis is conducted to test the existence of a link between employment protection and job stability. In particular, we look at the impact of employment protection on average tenure and on the incidence of temporary employment. Finally, some policy recommendations are provided.

2. Assessing job stability: what do tenure data tell?

The length of time employed individuals have spent with their *current* employer, job tenure⁶, is a commonly used variable in studies of the labour market that examine labour market stability at the macro level. Indeed, another way of evaluating stability would consist in studying workers' individual transitions on the labour market, but this would be quite difficult and complex to get an overall and comparative analysis. In the following we are mainly interested in the question whether or not there has been a marked change in average tenure over time and across countries of the EU-25⁷, which would indicate more unstable positions.

2.1. Preliminary evidence for Europe

The high incidence of long-lasting employment relationships is one of the most remarkable features of labour markets in European countries. Recent studies have shown a clear preference for stability: 68 % of working Europeans still have the same employer as they had five years ago, while 57 % see themselves being with the same employer in five years' time (Dublin Foundation, 2007). Another remarkable feature is that firms tend to hoard labour during recessions, even if this behaviour involves the cost of paying a wage rate higher than labour productivity (Hamermesh, 1989). These two pieces of evidence suggest that both workers and firms attach a positive value to long-term employment relationships. Economic theory provides three main explanations for this observed pattern. The first refers to the existence of firm-specific human-capital, which creates an obvious incentive for both workers and firms to establish long run relationships. The value of a long-term relationship stems from

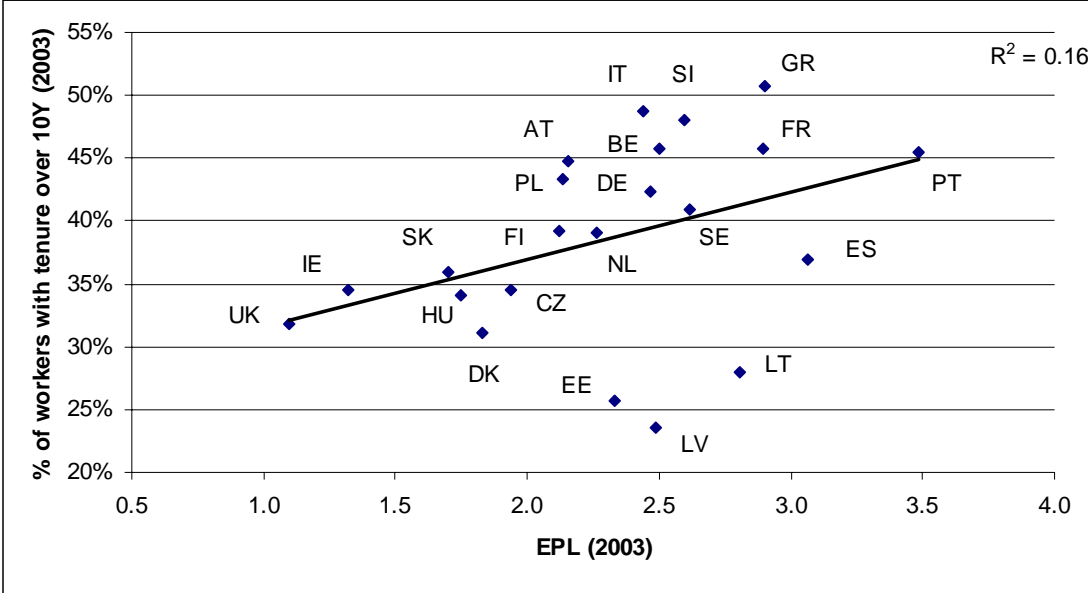
administrative authorization for dismissals, and prior consultations with trade union and/or labour administration representatives.

⁶ Actually the proper terminology should be "employment tenure" to capture the idea that continuity of tenure is not broken by job changes within the same enterprise (internal flexibility). But as "job tenure" is the most commonly used for this concept, this paper will refer to it.

⁷ See footnote 3

the fact that the quality of the match between the worker and the firm is revealed over time as tenure accumulates (Jovanovic, 1979)⁸. Another explanation — possibly complementary — refers to the institutional settings, and in particular employment protection legislation: economic models indicate that employment should be more stable and individual employment relationship more durable when legislation is more protective. We develop and explore below this argument. Looking at simple cross-countries evidence, we find indeed that tenure correlates with the degree of EPL (chart 1).

Chart 1 Average long-term tenure versus EPL(1)



(1) EPL indicator as measured by the OECD;
 Source: OECD; EUROSTAT and own calculations

A third explanation for job tenure relates to workers’ heterogeneity (Blumen et al., 1995). According to this theory, a change in job tenure would reflect a change in workers’ preference for mobility (in which case, mobility would be voluntary). Although workers differ in their attitude towards mobility, one may expect age to be a critical variable, since long-term relationships provide workers with an insurance against income fluctuations and enable them to build family and social relations through stable arrangements (dwelling, school attendance, etc.).

Table 1 presents the average tenure of the main EU countries based on EUROSTAT data. In 2006, EU (unweighted) average tenure for the 27 countries was 10.8 years, at the same level than 1999 (weighting countries by employment we also get the same average for 1999 and 2006 at 10.6 years). While cross-country differences are quite pronounced, the data indicate that the shortest tenure are to be found in the new EU members: the Baltic States stand out as countries with the lowest tenure (less than 8 years on average), below countries with very flexible labour markets such as Denmark, Ireland or the Netherlands (tenure below 10 years). The longest average tenures are found in Greece, Slovenia, Portugal, Italy and Belgium, closely followed by Luxembourg, France, Poland and Malta. While cross-country differences

⁸ For a detailed presentation see Auer, Cazes and Spiezia, 2001.

seem to be consistent over time, no general increase in instability seems to have taken place over the last years in Europe. Thus, figures for the most recent period (1999-2006) seem to confirm previous findings for the 1992-1999 period (Auer, Cazes, 2000; Auer, Cazes & Spiezia, 2001).

Table 1. Average job tenure (years)

Country	1999	2000	2004	2005	2006
Belgium	12.1	11.8	12.3	12.4	12.2
Denmark	8.8	8.5	9	9	8.6
Finland	10.4	10.4	10.8	10.8	10.6
France	11.6	11.4	12.1	12.1	11.8
Germany	10.7	10.7	11.3	11	11.1
Greece	13.4	13.5	13	13.2	13.1
Ireland	9.6	9.8	9.3	9	9.6
Italy	12.6	12.5	12.5	12.1	12.3
Luxembourg	11.3	11.7	11.7	11.8	11.7
Netherlands	9.9	9.5	11	11.4	10.7
Portugal	12.4	12.4	12.7	12.9	12.9
Spain	10.1	10.1	9.8	9.7	9.6
Sweden	12.1	11.8	11.6	11.1	10.9
United Kingdom	8.7	8.7	8.8	8.8	8.9
Cyprus	10.4	10.5	10.1	10.3	10.5
Malta	na	11	11.3	11	11.5
Czech Republic	9.4	9.7	9.7	9.9	10
Estonia	7.3	7.8	7.9	7.8	7.8
Hungary	9.2	9.5	9.7	9.7	9.8
Latvia	na	na	7.9	8	7.8
Lithuania	7.9	8.4	8.4	8.4	8.5
Poland	12.2	11.7	11.6	11.6	11.3
Slovakia	na	na	9.7	9.8	9.8
Slovenia	12.6	12.8	12.8	12.7	13.1
Average (weighted)	10.8	10.7	10.9	10.9	10.8
Average	10.6	10.6	10.6	10.6	10.6

Sources: Eurostat, LFS

However, this direct assessment of job stability has to be interpreted with great caution, because of two effects: composition and economic cycle. The composition effect stems from the fact that, as the average tenure is a weighted sum with respects to group of workers with different characteristics, changes in the weights can mask the actual variation in tenure within each group. Thus aggregate trends in job tenure may also reflect changes in the demographic composition of the labour force and in the economic cycle. Average tenure is indeed highly dependant on the age structure of the working population: workers are likely to be more mobile when they are young – either voluntary to accumulate different experiences and get promotions by changing jobs or involuntary because they may be the first group targeted for dismissals. As a result, a country with a relatively young population will display shorter average tenure than one with an ageing population. The same demographic phenomenon occurs over time: given that older workers have longer tenure on average, an ageing

population could be masking a shift towards less secure jobs. In order to take into account this potential bias, the variation in the average tenure was decomposed in two components for the most recent period (1999-2006)⁹. The first component reflects the variation in the average tenure due to change in the age distribution; the second component measures the variation in the non weighted average tenure, i.e. the variation in the average tenure that would have occurred if the age distribution had remained unchanged as in the starting date (here 1999, see box 1 below).

Box 1

Decomposition of average tenure

Average tenure for year x is given by: $AT_x = \sum_j s_{j,x} AT_{j,x}$, where: j is an index for age group (in our case 3 groups: 15-24, 25-44, 45+) and $AT_{j,x}$ is average tenure for age group j in year x, $s_{j,x}$ is the share of the population belonging to age group j in year x. The change in Average Tenure between year y and x can be written as:

$$\Delta AT = \sum_j s_{j,x} AT_{j,x} - \sum_j s_{j,y} AT_{j,y} = \sum_j (s_{j,x} AT_{j,x} - s_{j,y} AT_{j,y})$$

We can write the change in average tenure due to age group j as:

$$s_{j,x} AT_{j,x} - s_{j,y} AT_{j,y} = (s_{j,x} - s_{j,y}) AT_{j,y} + (AT_{j,x} - AT_{j,y}) s_{j,x} = \Delta s_j AT_{j,y} + \Delta AT_j s_{j,x}$$

Aggregating across j, we can decompose the change in Average Tenure as:

$$\Delta AT = \sum_j (\Delta s_j AT_{j,y} + \Delta AT_j s_{j,x}) = \sum_j \Delta s_j AT_{j,y} + \sum_j \Delta AT_j s_{j,x}$$

where:

- $\sum_j \Delta s_j AT_{j,y}$ represents the change in AT due to changes in the age distribution
- $\sum_j \Delta AT_j s_{j,x}$ represents the change in AT due to changes in average tenure within each age group

As shown in table 2, in the large majority of the countries considered¹⁰, the shift in the age distribution towards elderly workers has “mechanically” contributed to an increase in average tenure. Once the effect of age is taken away, it becomes apparent that eighteen over twenty two European countries in the sample show *some reduction* in average tenure. Only in Finland, Sweden and Poland the age distribution has changed as to reduce it. In the Netherlands for example, the increase in average tenure seems to a large extent due to population ageing. So, this decomposition exercise shows that in some countries, the apparent stability in tenure was the result of the counteracting process of ageing workforce. This suggests that it is very important to analyze average tenure by age group; while we focus on tenure profiles by age group, other characteristics such as industry or educational attainment

⁹ This is to follow-up and update previous research conducted along these lines for the (1992-1999) period (see Auer, Cazes and Spiezia, 2001).

¹⁰ This decomposition could be made only for 21 countries of the EU since data for Malta were only available from 2000, while those for Latvia and Slovakia from 2001 only. As getting the proper starting data is crucial in this type of analysis, we thus excluded these three countries. Data for Austria were excluded as in previous sections.

are likely to matter for tenure (see for example, Auer, Cazes, 2002 for disaggregation by sex, age, sector and education).

Table 2. Decomposition of the changes in average tenure (1999-2006)

Country	dAge	dAverageTenure	Total
Belgium	0.65	-0.58	0.06
Denmark	0.37	-0.57	-0.19
Finland	-0.21	-0.44	-0.65
France	0.43	-0.28	0.15
Germany	0.34	0.10	0.44
Greece	0.48	-0.75	-0.27
Ireland	0.64	-0.64	0.01
Italy	0.38	-0.73	-0.35
Luxembourg	0.84	-0.41	0.43
Netherlands	0.96	-0.15	0.81
Portugal	0.56	-0.07	0.49
Spain	0.28	-0.71	-0.43
Sweden	-0.01	-1.12	-1.13
United Kingdom	0.26	-0.11	0.15
Czech Republic	0.47	0.05	0.52
Estonia	0.07	0.39	0.47
Cyprus	0.36	-0.29	0.06
Lithuania	0.31	0.28	0.60
Hungary	0.80	-0.21	0.59
Poland	-0.09	-0.79	-0.88
Slovenia	0.74	-0.26	0.48

Source: EUROSTAT

2.2. Decomposition by age group

Table 3 reports the average tenure by age group in 1999 and 2006. In a majority of countries of the EU-25, tenure decreased for the age group 15-24, suggesting that job instability has increased for the new cohorts of entrants into the labour market, while it did not change in Finland, Luxembourg and Cyprus. However, it increased in Belgium, Ireland, Malta, the Netherlands, Spain, Slovenia and the United Kingdom¹¹. In some countries, — Denmark, Greece, Italy, Poland, Sweden and Slovakia— the reduction in tenure seems generalised to all age groups; in France, Germany, the United Kingdom, the Czech Republic, Estonia and Hungary, job tenure of mature (25-44) and elderly workers (45+) remained constant or even increased. These first findings suggest that in some countries and for some age groups there has been a decrease in tenure and that this decrease has been more pronounced for young workers (15-24). This evidence is however not sufficient to establish the existence of a trend towards shorter tenure because of the economic cycle effect: average tenure could be assumed

¹¹ Interestingly, the same pattern for the same countries was already detected in our previous research – with the exception of Portugal (see Auer, Cazes & Spiezia, 2001).

to decrease in recession periods, as more workers are laid off and general economic uncertainty induces firms to look for more flexibility of their labour force; conversely, one may expect average tenure to increase in upswings, when firms are more inclined to offer stable jobs.

However, the sign of the impact of the economic cycle on average tenure is more complex to capture: during the upward phase of the cycle, job tenure may actually either *decrease* — because of more voluntary mobility due to more professional opportunities; and because of the shorter duration of newly created jobs (comes with zero tenure)— or *increase*, because of the reduction of lay-offs in favourable economic context. In the case of economic downturn, not only voluntary quitting decrease (leading to tenure increases) and lay-offs increase (tenure decreases), but according to empirical evidence job destructions occurs mainly for jobs of shorter duration (leading as well to tenure increases). So the resulting effect will depend on the quit rate and the layoff rate: usually, the “shortening” effect of voluntary quits offsets the impact of layoffs thus generating a decline in tenure during economic upswings. The opposite is true in a recession period, during which average tenure increases.

Table 3. Average tenure by age groups (1999-2006)

Country	15-24		25-44		45+	
	1999	2006	1999	2006	1999	2006
Belgium	1.6	1.8	9.2	8.6	21.1	20.2
Denmark	1.6	1.5	6.2	5.8	15.5	14.5
Finland	1.1	1.1	7.6	6.9	17.1	17.0
France	1.5	1.4	8.9	8.1	18.8	19.3
Germany	2.4	2.3	8.1	8.3	17.3	17.3
Greece	2.6	2.5	9.2	8.8	23.0	21.5
Ireland	1.8	2.1	8.0	7.1	18.4	17.5
Italy	2.5	2.3	9.3	8.6	20.8	20.0
Luxembourg	2.3	2.3	8.9	8.6	19.5	18.8
Netherlands	1.9	2.3	7.9	7.7	17.6	17.2
Portugal	2.8	2.6	8.7	8.7	20.7	20.5
Spain	1.5	1.6	7.5	6.6	18.3	17.7
Sweden	1.9	1.3	8.4	7.1	18.4	17.4
United Kingdom	1.9	2.0	7.3	7.0	13.4	13.5
Czech Republic	2.7	2.2	7.6	7.7	14.3	14.4
Cyprus	1.7	1.7	7.6	7.5	17.8	17.2
Estonia	2.2	1.6	5.8	5.9	10.5	11.4
Hungary	2.8	2.2	8.0	7.5	14.0	14.3
Latvia	2.4 1)	1.7	7.2 1)	6.4	12.5 1)	11.3
Lithuania	2.3	1.9	6.1	6.9	12.7	12.4
Malta	2.8 2)	2.9	9.7 2)	10.2	18.6	18.2
Poland	2.2	2.0	9.0	8.4	19.4	18.3
Slovakia	2.9 1)	2.3	8.8 1)	8.0	16.3	14.7
Slovenia	2.0	2.2	9.8	9.6	21.4	20.9

1) 2001; 2) 2000
Source: EUROSTAT

For economically advanced countries, empirical evidence finds that labour turnover typically accelerates in periods of economic growth and decreases in downturns: the reduction of voluntary quits more than counterbalances the increase in dismissals, as described before (Boeri, 1996; ILO, 1996; 2001). Hence, largely for supply-side reasons, labour turnover tends to behave pro-cyclically, while average tenure tends to decline in economic upswings. The combination of the different labour market institutions in these countries seems to provide some social security supporting workers mobility. In Central and Eastern European countries, this pattern appears however to be reversed, with a decrease of turnover and an increase of tenure in periods of economic upswings (Cazes & Nesporova, 2003); this counter-cyclical behaviour of labour turnover identified during the transition decade of the 1990s was furthermore confirmed for the first half of the 2000s (Cazes & Nesporova, 2007). It may be partially explained by the fact that demand for labour remained constrained for a long time in addition to the weak labour market institutional and policy setting of these countries: the resulting perception of job insecurity generated reluctance from workers to quit their jobs voluntarily, even during economic recovery in view of the instability of newly created jobs and low safety nets if falling into unemployment¹² (low unemployment benefits and limited active labour market programmes).

In order to investigate whether there has been a tendency towards more instability we have tested the existence of a time trend by carrying out a panel regression analysis (across industries and over time), for each country and each age group¹³, taking into account the employment cycle effects for the whole period 1992-2006¹⁴. According to the estimates reported in table 4, a negative and statistically significant time trend was detected for some age groups in the European Union. First, job tenure of young workers (age group 15-24) *decreased* as an effect of time in all countries for which the trend variable was significant except for Spain, Slovenia and Malta over the 1992-2006 period. Mature workers (age group 25-44) experienced a similar trend in a majority of countries for which the trend variable was significant (Belgium, Denmark, Spain, France, Ireland, Italy, Hungary, Portugal, Slovakia, Sweden, Finland and the UK), while Belgium, Denmark, Germany, Ireland, Slovakia, Sweden and the United Kingdom registered also a decrease in the tenure of older workers (45+) for the same period. Hence in Belgium, Denmark, Ireland, Slovakia, Sweden and the United Kingdom, the decrease in tenure was generalized to the workers of *all* age groups. It is interesting to note that most of these countries are among those with very dynamic and flexible labour markets. A significant but positive time trend was instead found in four new EU members (Czech Republic, Latvia, Lithuania and Malta) as well as Germany for the (25-44). The picture for the elderly workers is more contrasted with an increase of tenure for this group in six of the EU-25 countries, but a decrease in seven countries.

¹² This finding was also supported by a strong correlation between economic cycle and labour market flows data, such as moves from employment to unemployment or inactivity for the majority of the CEE countries studied by Cazes and Nesporova, op. cit.

¹³ The estimated equation is: $Tenure_t = \sum_{j=1}^{17} d_j + BCr_t + BCb_t + t + \varepsilon_t$, where d is a set of sectoral dummies, BCr is the growth rate of employment when negative (Recession), and BCb is the growth rate of employment when positive (Boom), t is a linear time trend. The dependent variable, Tenure, is expressed in months.

¹⁴ Since here we want to test the existence of a time trend, we extend the time frame of the panel regression analysis to cover the whole period (1992-2006) to have enough observations.

Table 4. Trends in average tenure by age group (1992-2006)

Country	Age		
	15-24	25-44	45+
Belgium	-0.32	-0.62	-0.51
Denmark	-0.17	-1.23	-1.18
Finland	-0.11	-0.93	0.80
France	-0.27	-0.64	0.81
Germany	-0.32	0.43	-0.60
Greece	-0.06	-0.07	1.09
Ireland	-0.33	-1.60	-1.43
Italy	-0.40	-0.61	-0.25
Luxemburg	-0.45	0.14	-0.40
Netherlands	0.09	-0.22	0.03
Portugal	-0.25	-0.48	-0.07
Spain	0.29	-0.90	-0.09
Sweden	-0.87	-1.46	-0.67
United Kingdom	-0.31	-0.28	-0.19
Czech Republic	-0.42	0.84	1.04
Cyprus	0.30	-0.13	-0.02
Estonia	-0.62	0.62	0.54
Hungary	-0.97	-0.45	1.62
Latvia	0.27	2.80	3.16
Lithuania	-0.16	2.10	0.31
Malta	1.03	2.00	-0.37
Poland	-0.51	0.17	-0.43
Slovenia	0.59	0.17	0.32
Slovakia	-1.41	-1.20	-2.81

Coefficients in **bold** are significant at 5% level

See Note 13 for details on the regression

Number of observations varies between 77 and 252 depending on country and age

Estimation by FGLS corrected for heteroskedasticity and AR(1) error, weighted by employment

Source: EUROSTAT

To sum up, there was not a general and systematic trend towards declining job tenure over the period 1992-2006 in the European Union. This confirms our previous findings over the period 1992-1999. However, extending the analysis to the most recent years, we found that young workers seem more likely to have shorter job tenure in more and more countries of the EU — from eleven for the 1992-1999 period to fifteen for the 1992-2006 period; secondly, this trend seems also to affect the mature group as well, even if the pattern is more diversified, increasing in some countries and decreasing in others. These findings do not however imply a general increase in job instability and their interpretation requires further analysis in light of the different theoretical tracks we briefly reviewed before. We investigate below the role of EPL reforms on these patterns, since it is likely to affect the flexibility-stability nexus.

3. The Role of Employment Protection Legislation

3.1. Theoretical background

EPL refers to regulatory provisions that relate to hiring and firing practice, particularly those governing termination of employment, severance payments, advance notice and other procedural obligations. As pointed above, EPL is an obvious candidate for explaining changes in job stability across countries, but also across age groups, since changes in the legislation may not apply to *all workers*. Many EPL reforms are actually quite often asymmetric in that they change regulations only for a subset of the eligible population. This part concentrates on the main theoretical results concerning the effect of EPL on labour market adjustment – in particular job stability— and on the employment structure (shares of temporary versus “permanent” employment) as theory predicts that a given set of EPL provisions should affect the dynamic behaviour of employment and its composition rather than its average level¹⁵.

The primary task of EPL is to provide more job security to workers, both in their current jobs and in the case of redundancy. Advance notice informs workers of layoff plans and gives them time to search for new jobs. EPL in some countries obliges employers to offer internal redeployment if possible and to cooperate with the trade unions and public labour market institutions on re-employment of redundant workers, while providing financial compensation for hardship connected with layoffs. The aim of these provisions is to strengthen *longer-term attachment* of workers to their jobs and employers or, if their internal redeployment is not possible, to facilitate relatively smooth external re-employment and moderate income loss. Stable employment prospects are there to encourage workers to undergo retraining and skills upgrading and to encourage enterprises to invest in workers’ training, which could lead to higher labour productivity and internal flexibility of the workforce, beneficial for better market adjustment of enterprises¹⁶– see Piore (1986).

Most theoretical models indicate rather clearly that employment should be more stable and individual employment relationships more durable when EPL is stricter: given a constant cyclical wage pattern, higher firing costs stabilize employment in economic downturns but also deter employers from hiring in upturns: with high turnover costs, firms may become more cautious about adjusting their workforce with the effect of reducing labour turnover, i.e. movements from employment to unemployment and from unemployment back to employment. For partial equilibrium models see for instance Bentolila and Bertola, 1990; Bertola, 1992; Bentolila and Saint-Paul, 1992, among others. For general equilibrium matching models see for instance Blanchard and Portugal (1998).

Another channel through which EPL reforms may affect employment patterns relate to the fact that quite often changes are marginal and do not concern all workers: a different degree of strictness of regulation governing regular versus temporary employment (fixed-term contracts and contracts through temporary work agencies) is likely to impact the employment

¹⁵ For a more comprehensive review of the considerable research (both theoretical and empirical) produced on the effects of EPL on economic and aggregate labour demand, see for example OECD, 2005.

¹⁶ Job security of workers should also moderate their resistance against the introduction of new technologies and working practices, Alerkof, (1984);

structure. Clearly, more extensive employment protection mandates for permanent jobs increase incentives for firms to offer temporary jobs. This has the potential effect of distorting the optimal composition of employment between temporary and regular contracts. Moreover, those who are able to maintain a regular contract (often the “insiders”, i.e. workers in regular jobs enjoying high employment security through EPL) will enjoy an even higher level of job security, bringing about an increase in wage pressure (Bentolila and Dolado, 1994). In contrast those under temporary contracts (often the youths and other workers with little work experience or low skills) will bear the costs of adjustment (Saint Paul, 1996). Kahn (2007) found that EPL raises the relative incidence of temporary employment for workers with less experience and skills; these effects are often amplified in countries with higher levels of collective bargaining coverage. Changes in EPL regulation may thus consist in a dual-track reform strategy, involving reforms only at the margin, for new hires, while employment security entitlements of the incumbent workers remain unchanged. This would typically lead to increased labour market segmentation between the “insiders” and “outsiders”, and this, especially in countries where strict EPL for regular workers is combined with low levels of restrictions on fixed-term contracts. Lower firing costs for temporary jobs or higher firing costs for permanent jobs both reduce the likelihood that a temporary job will be converted into a permanent one (Cahuc and Postel-Vinay, 2002; Güell, 2003).

While such strategies have been used by some countries¹⁷ as an attempt to generate jobs that would not have been created, such policy may encourage firms to substitute permanent for temporary jobs and involve high turnover in fixed-term jobs. The resulting overall effect on labour markets outcomes unemployment is however not clear cut as it may even lead to higher unemployment than before, despite the new jobs created (Blanchard and Landier, 2002). Boeri and Garibaldi (2007) have showed that temporary jobs can explain the transitory “honeymoon effect” with positive employment growth in countries where workers are otherwise protected by strict EPL if they obtain a permanent contract; although this employment growth does not last forever, marginal labour marker reforms which allow for some flexibility due to temporary contracts are thus attractive to policy makers. Thus, while the effects of EPL on employment seem ambiguous, the main issue does not seem EPL per se but rather how it is structured. Another crucial element relates to how legislation is actually enforced: Bertola et al. (2000), for example, argue that given the increasing institutional complexity and the legislative vacuum surrounding the rights of workers under new types of contracts, national administrations and labour courts effectively determine the enforcement of employment protection legislation.

3.2. Econometric findings

In this section we empirically investigate the link between EPL and tenure through a cross-country analysis. We also look at the relationship between EPL and the incidence of temporary employment. We find that the loosening of employment protection for regular contracts is associated with a decline in average tenure for young people, while there is no significant association between the change in the share of young people with a temporary contract and changes in any of the three indicators of employment protection legislation (regular contracts, fixed contracts, collective dismissal). The analysis is restricted to the period 1999-2006 due to data availability. Also, Cyprus, Luxembourg, and Malta are

¹⁷ For example Spain which in the 1980s and the 1990s use temporary contracts in order to generate jobs, (Dolado et al. 2002)

excluded from the analysis as no employment protection indicator is available for these countries.

Employment protection and average tenure

Here we look at a measure of the rate of change in average tenure in the periods 1999-2002 and 2003-2006 for most EU member countries¹⁸ and correlate it to changes in EPL as measured by OECD. To take into account the impact of demographic trends and business cycle fluctuations¹⁹, we control in our baseline specification for changes in employment, expressed as the change in the number of employees belonging to each age group. A shrinking population implies longer average tenure, as tenure increases with age and older people make up a larger portion of population within each age group. Accounting for changes in employment controls for this. Moreover, to take into consideration changes in the age of entry into the labour force by young people and in job searching behaviour, we also control for changes in the activity rate, expressed as the change in the ratio of active people over the total population within each age group. A delay in labour market entry because of an increase in schooling implies shorter average tenure. Accounting for changes in activity rate controls for this. Notice that the number of employees and the activity rate are not necessarily collinear, as employment is measured in absolute terms, while activity is a ratio. The precise definition of these and other variables can be found in the data appendix. Also, notice that we also run regressions without any control as a robustness check.

The advantage of looking at changes instead of levels is that any time-invariant difference across countries cancels out. Thus, differences in the economic structure, or preferences, or institutional setting that remained fixed in the period under analysis do not need to be taken into account. Comparing four-year averages smoothes short-run fluctuations, due for instance to the business cycle, and also address the fact that employment protection indexes are calculated by the OECD infrequently, namely for the period under consideration in 1998 and 2003. The fact that we measure EPL at the beginning of the two four-year periods in which tenure is measured allows for some time lag in the effects of employment protection legislation on tenure. As a measure of the rate of change we use the difference between two periods divided by the average. Thus, the rate of change between 1999-2002 and 2003-2006 is given by:

$$\hat{X} = \frac{\Delta X}{\bar{X}}, \text{ where } \Delta X = X_{2003-2006} - X_{1999-2002} \text{ and } \bar{X} = (X_{2003-2006} + X_{1999-2002})/2.$$

This is somewhat different from the standard percentage change and has the advantage of making it possible to calculate the rate of change for a variable whose starting value is zero²⁰. The analysis is conducted on three age groups: 15-24, 25-44, and 45+, that will be labelled as young (Y), middle (M), and old (O). Some of the covariates vary across countries and age groups, for instance the activity rate or employment. Others, like employment protection

¹⁸ In particular, the analysis is done on EU-25 countries with the exclusion of Austria, Cyprus, Luxembourg, and Malta.

¹⁹ As we use four years averages, demographic trends should be much more prominent than business cycle fluctuations.

²⁰ Moreover, it is symmetric, in the meaning that the rate of change of a variable going from X_1 to X_2 is the same in absolute value to that of a variable going from X_2 to X_1 .

legislation indexes, vary only across countries. Thus, the equations that we estimate are in the following general form:

$$\hat{T}_{ij} = D_i + \beta'_i * D_i * \hat{X}_{ij} + \gamma'_i * D_i * \hat{Z}_j + \varepsilon_{ij},$$

where the age group is indexed by i (with $i = Y, M, O$) and the country by j . The superscript $\hat{\cdot}$ indicates the rate of change of the variable as specified above. Thus, \hat{T}_{ij} indicates the rate of change of average tenure for age group i in country j . D_i is an age group dummy, \hat{X}_{ij} is a vector of variables varying across countries and age groups, while \hat{Z}_j is a vector of variables varying across countries. ε is a disturbance term. In the estimation we allow for correlation of observations within country by clustering at country level.

Table 5. Descriptive Statistics

	Period	Average	Max		Min	
			Value	country	value	country
Activity Rate - Young	1999-2002	46	72	NL	36	BE
	2003-2006	43	72	NL	27	LT
Activity Rate - Middle	1999-2002	84	89	LT	75	IT
	2003-2006	85	89	SE	77	IT
Activity Rate - Old	1999-2002	41	69	SE	23	HU
	2003-2006	47	73	SE	30	SI
EPL RC	1998	2.485	4.333	PT	0.948	UK
	2003	2.402	4.167	PT	1.115	UK
EPL TC	1998	1.890	4.750	GR	0.250	IE, UK
	2003	1.807	3.625	FR	0.375	SK, UK
EPL CD	1998	3.389	4.875	IT, LT	0.000	LT
	2003	3.425	4.875	IT	2.125	CZ, FR
Kaitz Index	2002	39	50	IE	30	EE
	2006	39	51	IE	29	GR
Expenditure on Unemployment	1999-2002	8647	34868	DK	87	EE
	2003-2006	8265	31031	DK	181	EE
Tax Wedge	1999-2002	40	51	BE	18	IE
	2003-2006	39	49	BE	17	IE
Trade Union Density	1995	42	84	DK	9	FR
	2004	31	80	DK	8	FR

In the first specification (see Table 6) we regress tenure on employment, activity rate, and the three sub-indexes making up the EPL index. Summary statistics for these and others variables are presented in Table 5.

Table 6. Average Tenure and EPL - Baseline Specification

	N. of obs = 63		Prob > F = 0.0000		R-squared = 0.6668	
	Young		Middle		Old	
Tenure	Coefficient	t ratio	Coefficient	t ratio	Coefficient	t ratio
Dummy	0.05**	2.63	0.00	-0.22	-0.01	-0.80
Employment	-0.51**	-2.31	-0.19	-0.92	0.05	0.33
Activity rate	1.16***	4.47	-0.63	-0.75	-0.02	-0.14
EPL RC	0.46***	4.20	0.08	1.13	0.09	0.89
EPL TC	-0.02	-0.45	0.00	-0.15	0.01	0.36
EPL CD	0.00	-0.12	0.00	-0.29	-0.02	-1.50

Dependent variable: Tenure. Linear regression. Standard errors clustered by country.

*** Statistically significant at 1%; ** idem 5% level

As expected, for young people an increase in employment significantly decreases average tenure, as new entrants have by definition low tenure. For the other age categories the coefficient is insignificant. For these categories an increase in the number of employees is not only due to newly employed people, but also to the aging of the already employed, with an ambiguous impact on average tenure.

An increase in the activity rate increases average tenure for young people, while it is insignificant for the other age categories. The age of entry into the labour market is probably the main factor determining the participation rate for the 15-24 category, with permanence in education the most important determinant of age of entry (Ryan, 2001). Indeed, there is a strong negative correlation between the change in activity rates and the change in participation rates in education for the countries and in the periods under consideration. Another factor affecting the age of entry is, for instance, the presence and length of compulsory military service. A deferral of entry reduces the participation rate and at the same time reduces the average tenure, thus inducing a positive correlation with activity rate. Looking at the impact of employment protection, it is the sub-index for *regular* contracts that has a significant impact on young workers tenure. The sub-indexes for temporary contracts and for collective dismissal are not significant, as are all sub-indexes for the other age categories. The sign of the coefficient implies that a change in regulation that lowers protection for regular contracts is associated with a decline in average tenure for young people. The size of the coefficient in this baseline specification implies that a decline of the employment protection index for regular contract by 1% is associated with a decline in average tenure for young people by 0.46%. The relationship between tenure and the employment protection sub-index for permanent contracts is robust to different specifications. In Table 7 we present the regression without any other covariate, while in Table 8 we control for changes in several other aspects of labour market policy.

Table 7. Average Tenure and EPL – No Control Variables

	N. of obs = 63		Prob > F = 0.0152		R-squared = 0.1595	
	Young		Middle		Old	
	Coefficient	t ratio	Coefficient	t ratio	Coefficient	t ratio
Dummy	0.01	0.28	-0.02	-1.82	-0.01	-1.32
EPL RC	0.55**	2.65	0.06	1.39	0.14	1.81

Dependent variable: Tenure. Linear regression. Standard errors clustered by country.

*** Statistically significant at 1%;** idem 5% level

In table 8, in particular, we control for policy indicators regarding minimum wage, unemployment, and taxation, plus a measure of unionisation. The limited sample size prevents us from adding additional covariates. Notice, however, that slow-moving institutional indicators, e.g. the degree of coordination in wage bargaining, should not be included. The selection of the additional covariates has been dictated by data availability. The link between some of these variables, e.g. taxation, and tenure is not straightforward; they have been included nonetheless as a robustness check for the relationship between tenure and employment protection. Changes in the Kaitz index capture the impact of minimum wage policy. The Kaitz index is the ratio between minimum wage and average wage and is a standard measure of how binding the minimum wage is. This measure is calculated only for countries with a statutory minimum, i.e. all but five countries (Denmark, Finland, Germany, Italy, and Sweden) where sectoral minima are fixed through collective bargaining. A dummy variable called “No MW” controls for this. Moreover, for three countries (Belgium, France, and Greece) the data source is different and therefore a different variable, “Kaitz Index 2”, is introduced (see the data appendix for details). The change in policy for the unemployed is captured by changes in real per capita expenditures on both active and passive measures, while changes in the tax wedge (net take home pay over labour cost) capture the impact of tax policy. Finally, we control for trade union density. Of these additional covariates, the only one that is significant for young people is trade union density, with a positive coefficient implying that a decline in unionization is associated with a decline in average tenure for young people. Employment protection legislation for regular contracts remains highly significant. The coefficient is smaller, probably due to the fact that in the baseline regression the coefficient for EPL for regular contracts partly captures the impact of decreased unionization. The significant positive correlation between the changes in average tenure for young people and the changes in the EPL sub-index for regular contracts is also robust to specifications including only young people or expressing all variables in terms of their absolute change or expressing the EPL sub-indexes in terms of their absolute change and all the other variables in terms of percentage change (results not reported).

Table 8. Average Tenure and EPL – Additional Control Variables

	N. of obs. = 63		R-squared = 0.8504			
	Young		Middle		Old	
	Coefficient	t ratio	Coefficient	t ratio	Coefficient	t ratio
Dummy – Y	0.12***	4.30	0.01	0.64	-0.03	-0.96
Employment- Y	-0.56**	-2.25	-0.07	-0.37	0.07	0.34
Activity rate – Y	0.82***	4.29	-0.75	-1.19	0.04	0.32
EPL RC – Y	0.37***	4.02	0.09	0.74	0.11	0.85
EPL TC – Y	-0.04	-1.12	-0.01	-0.96	0.01	0.33
EPL CD – Y	0.02	0.59	-0.03	-2.59	-0.03	-1.37
Kaitz Index 1-Y	0.11	0.16	-0.59***	-4.16	-0.23	-1.30
Kaitz Index 2-Y	0.47	1.48	0.17	1.17	0.18	0.88
No MW – Y	-0.07	-1.64	-0.01	-0.30	0.03	0.83
Unempl.Pol.- Y	-0.04	-0.71	0.06**	2.51	0.03	0.45
Tax Wedge – Y	-0.49	-1.19	0.60**	2.50	0.42	1.13
Unionization- Y	0.26**	2.76	-0.01	-0.23	-0.03	-0.69

Dependent variable: Tenure. Linear regression. Standard errors clustered by country.
*** Statistically significant at 1%; ** idem 5% level; * idem 10% level

We found a positive correlation between the change in average tenure for young people and the change in the employment protection index for regular contracts. Yet, to establish that the decline in average tenure for young people is actually due to the loosening of employment protection regulation for regular contracts is more complex. The correlation may be due to the common dependence of tenure and EPL on some time-varying variable that has not been accounted for. There may also be a reverse causality link: the decline in tenure for young people (due for instance to the use of fixed term contracts) may actually be the cause of the decline in EPL for regular contracts, through, for instance, a reduced political support for protection for these types of contractual arrangements. However, the fact that the relationship between EPL and average tenure is significant only for young people reduces the likelihood of an omitted variable bias, as the time-varying omitted variable should affect EPL, an economy wide variable, and average tenure for young people, while at the same time not affecting average tenure for prime-age and mature workers. The fact that EPL is measured in 1998 and 2003 at the beginning of the two four-year periods (1999-2002 and 2003-2006) in which tenure is measured reduces the likelihood that the correlation is due to reverse causality.

How could it be the case that a reduction in employment protection for regular contracts affects average tenure for young people, while leaving other age categories substantially unaffected? One possible explanation is that because of their relative lack of experience and of firm-specific human capital, young people have lower “individual” bargaining power and therefore are more sensitive to institutional changes that increase labour market flexibility. The fact that young people are also the one significantly affected by the decrease in unionization (with lower unionization implying lower average tenure) suggests that indeed the “individualization” of the work relationship could affect them disproportionately.

Employment protection and temporary work

We applied the same methodology used in the previous section to analyze the link between employment protection and temporary work, more specifically temporary employees as a percentage of the total number of employees. The same time period and the same countries are analyzed, with the exception of Estonia, that is excluded in this analysis due to lack of data on the share of temporary workers, and Austria, that is included here but was not included in the section on average tenure. The age categories are somehow different, with prime age workers defined as those between 25-49, instead of 25-44 in the previous analysis, and mature workers as over 50, instead of over 45.

The rate of change in the share of temporary employees has been regressed on the rate of change of the three EPL sub-indexes for each age group, with and without additional policy controls, in a single regression and in separate regressions for each age group. Also, the absolute change instead of the rate of change has been used (results not reported). Across the different specifications, no EPL sub-index is ever significant for young people. Unionization instead has a significant impact on the share of temporary employees, with a decline in unionization associated with an increase in the share of young workers with a temporary contract. For workers over 50, there is some evidence that an increase in the protection indexes for regular contracts and collective dismissals is associated with a decrease in the share of temporary employees.

4. Policy recommendations

Our regression results indicate that the downward trend for average job tenure of young workers (15-24) in the EU-25 can be explained by the lower employment protection provided by law (EPL variable) and by trade unions (TU density variable). First, and in line with theoretical expectations, we found a direct effect of EPL for regular contract — which mostly capture dismissals costs and procedures — on average tenure of young workers, as indicated by the positive correlation between these two variables. On the other hand, we did not find any substitution effect due to the easing of EPL for temporary contract (which should have resulted in an increase of FT contracts or to deeper labour market segmentation): the EPL index for temporary contract is never significant in any of our specifications. Second, the trade unions, the other warrant for providing job security and protection against job loss, seem also related to job instability of young workers: more specifically, the trade union density variable was found statistically significant and positively correlated with average tenure for young workers. Hence, the general weakening of trade unions, as underlined by the dramatic decrease in our sample of average unionization from 42% in 1995 to 31% in 2004, seems to have particularly affected the most vulnerable workers group as reflected in the decline in average tenure of young workers.

The policy implications of our findings need to be thoroughly discussed and confirmed by additional research in that field. They are also submitted to the usual caveats, in particular the complexity of measuring EPL and the lack of time series for legislation. However, our results suggest quite strongly that young people are particularly exposed to more unstable situation in the labour market, and that this trend can be explained by a direct effect of narrowing protection by law and by unions. One may thus consider strengthening employment

protection through a better protection against the risk of job loss and dismissals (here captured by EPL regular); on the other hand, the legislation of temporary contract (that facilitate entry in the labour market) does not seem to affect job tenure. Moreover, since trade unions intervention matters for young people (contrary to the hypothesis that unions would care only about “insiders” but not about outsiders such as young people), one should “worry” about the impact of less powerful unions. In particular in light of the first result, one should be vigilant that a trend towards even more individualized employment relationship would not “over affect” young people. Hence, an even stronger policy intervention on the legislative side may be warranted.

References

- Akerlof, G. 1984. "An Economic Theorist's Book of Tales" (New York, Cambridge University Press).
- Auer, P.; Cazes, S. 2000. "The resilience of the long-term relationship: Evidence from the industrialized countries", *International Labour Review*, Vol. 139(4), 379-408.
- Auer, P., Cazes, S., Spiezia, V. 2001. "Stable or Unstable Jobs : Interpreting the Evidence in Industrialized Countries", Employment Paper Series, No. 26, ILO, Geneva.
- Bentolila, S.; Bertola, G. 1990. "Firing Costs and Labor Demand: How Bad is Eurosclerosis?", *Review of Economic Studies*, Vol. 54, 381-402.
- Bentolila, S.; Saint-Paul, G. 1992. "The Macroeconomic Impact of Flexible Labor Contracts, with an Application to Spain", *European Economic Review*, Vol. 36(5), 1013-1047.
- Bentolila, S.; Dolado, J. 1994. "Labour Flexibility and Wages: Lessons from Spain", *Economic Policy*, Vol. 18, 55-99.
- Bertola, G. 1992. "Labor Turnover Costs and Average Labor Demand", *Journal of Labor Economics*, Vol. 10(4), 389-411.
- Bertola, G.; Boeri T.; Cazes S. 2000. "Employment protection in industrialized countries: The case for new indicator", *International Labour Review*, Vol. 139(1), 57-72.
- Blanchard, O.; Landier, A. 2002. "The Perverse Effects of Partial Labor Market Reform: Fixed Duration Contracts in France?", *Economic Journal*, Vol. 112, 214-244.
- Blanchard, O.; Portugal, P. 1998. "What Hides behind an Unemployment Rate: Comparing Portuguese and U. S. Labor Markets", *American Economic Review*, Vol. 91(1), 187-207.
- Blumen, I.; Kogen, M.; McCarthy, Ph. 1995. "The industrial mobility of workers as a probability process", *Cornell studies in industrial and labor relations*, Vol. 6.
- Boeri, T. 1996. "Is job turnover countercyclical?", *Journal of Labor Economics*, Vol. 14(4), 603-625.
- .; Garibaldi, P. 2007. "Two tier reforms of employment protection : A honeymoon effect?", *Economic Journal*, Vol. 117, 357-85.
- Cahuc, P.; Postel-Vinay, F. 2002. "Temporary jobs, employment protection and labor market performance", *Labour Economics*, Vol. 9(1), 63-91.
- Cazes, S.; Nesporova, A. 2007. "Flexicurity, a relevant approach in Central and Eastern Europe", (ILO, Geneva).
- .; —. 2003. "Labour markets in transition: Balancing flexibility and security in Central and Eastern Europe", (ILO Geneva).
- Dolado, J.J.; Garcia-Serano, C.; Jimeno, J.F. 2002. "Drawing lessons from the boom of temporary jobs in Spain", *Economic Journal*, Vol. 112(480), 270-95.

- Dublin Foundation. 2007. “Mobility in Europe: The way forward”, European Foundation for the improvement of living and working conditions, Dublin.
- Güell, M. 2003. “Fixed-term contracts and unemployment: An efficiency wage analysis”, *Working Paper*, (Universitat Pompeu Fabra), July.
- Hamermesh, D.S. 1989. “Labor demand and the structure of adjustment costs”, *American Economic Review*, 79(4), 674-89.
- ILO, 1996. *World Employment Report 1996/97: National policies in a global context*. (Geneva).
- ILO, 2001
- ILO, 2003
- ILO, 2005
- Jovanovic, B. 1979. “Firm-specific capital and turnover”, *Journal of political economy*, 87(6), 1246-60.
- Kahn, M.L. 2007. “The impact of employment protection mandates on demographic temporary employment patterns: International microeconomic evidence”, *The Economic Journal*, Vol. 117(521), 333-356.
- OECD, 1997. *Employment Outlook*, (Paris).
- . 1993. *Employment Outlook*, (Paris).
- Piore, M. 1986. “Labor Market Flexibility”, (Berkeley, CA, University of California).
- Ryan, P. 2001. “The School-to-Work Transition: A Cross-National Perspective”, *Journal of Economic Literature*, 39(1), 34-92.
- Saint Paul, G. 1996. “Dual Labour Markets”, (Cambridge Massachusetts, The MIT Press).

Data appendix

In this appendix we provide the source and a description of the data used.

Tenure and employment: Eurostat LFS.

The tenure variable is derived from questions asking the Year/Month in which the person started working for the current employer or as self-employed. Average tenure for the periods 1999-2002 and 2003-2006 is considered, with the exception of Latvia and Slovakia for which the first period is limited to 2001-2002 due to data availability.

Activity rate: Eurostat.

It is defined as active persons as % of same age total population for the following age categories: 15-24, 25-54, 55-64. In the analysis, the age category 25-54 has been associated with the middle (M) age group, and the category 55-64 to the old (O) one. Averages for the periods 1999-2002 and 2003-2006 are considered.

EPL: OECD and own calculations.

The EPL index for 1998 and 2003 is considered. The EPL index is provided by OECD for member states. For Estonia 1998, Lithuania 1998 and Latvia 1998 and 2003 the index has been calculated by the authors according to OECD methodology based on information in Eamets and Masso (2004) and for Estonia 2003, Lithuania 2003 and Slovenia 1998 and 2003 the index has been calculated by the authors according to OECD methodology based on information derived from national legislation (see Tonin, 2005). For details about OECD methodology see OECD (2004).

Kaitz Index: Eurostat and own calculations based on OECD and Eurostat data.

Eurostat provides the minimum monthly wage as a percentage of average gross monthly earnings in industry and services for all countries with the exception of Denmark, Sweden, Italy, Germany, Austria, and Finland, where there is no statutory minimum wage, and Belgium, France, and Greece. For the last three countries Eurostat provides the monthly minimum wage, while the OECD Taxing Wages database provides the average gross wage earnings of adult, full-time workers in industry sectors C-K. The Kaitz index for these three countries is calculated by the authors by dividing these two quantities. The Kaitz index for 2002 and 2006 is considered, with the exception of Estonia, Latvia, and the Netherlands for which the index for 2002 and 2005 is considered due to data availability.

Expenditure on Unemployment: Eurostat and own calculations.

Eurostat provides expenditures on unemployment at constant prices (EUR 1995) per inhabitant, including both active (e.g. vocational training, placement services and job search assistance) and passive (e.g. unemployment benefits, redundancy compensation) measures. Eurostat also provides the unemployment rate over total working age population and the total working age population (15-64) over total population. The expenditure on unemployment per unemployed has then been calculated by the authors. Average expenditures in the period 1999-2002 and 2003-2005 have been considered, except for Estonia and Poland where the first period is limited to 2000-2002 due to data availability and for Portugal where the second period is 2003-2004.

Tax wedge: Eurostat.

This indicator is calculated by Eurostat as income tax on gross wage earnings plus the employee's and the employer's social security contributions, expressed as a percentage of the total labour costs of the earner, defined as gross earnings plus the employer's social security contributions plus payroll taxes (where applicable). It is calculated for single persons without

children earning 67% of the average wage. Before 2000 (for Ireland for the whole period) the average wage was that of an average production worker working full time in manufacturing. Since 2000 (for Slovenia and Estonia since 2005) it is the average wage in Industry and Services (NACE C-K). Averages for the periods 1999-2002 and 2003-2006 are considered.

Trade Union Density: European Commission.

Trade union density is calculated as number of gainfully employed trade unions members (thus excluding unemployed, students or retired) divided by the total wage earners population of the country. Data are from 1995 (1996 for France, 1998 for Latvia and Lithuania) and for 2004 (2003 for Czech Republic). See European Commission, Industrial relations report 2006, 2006, p.25 for further details.