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**EMPLOYMENT PROTECTION, EMPLOYMENT AND UNEMPLOYMENT  
RATES IN EUROPEAN UNION COUNTRIES DURING THE GREAT  
RECESSION**

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# **Employment Protection, Employment and Unemployment Rates in European Union Countries During the Great Recession**

Jesus Ferreiro<sup>1</sup> and Carmen Gómez<sup>2</sup>

## **Abstract**

For mainstream economics, rigidities in the labour market are the primary determinants of high and persistent long-term unemployment rates, leading to the need to reform labour market institutions and make them more flexible. Flexible labour markets would not only help to smooth normal business cycle fluctuations (implying a small impact of these fluctuations on employment and unemployment) but also to reduce the negative impacts on labour market of structural shocks. If we focus on the labour market performances in the European Union during the Great Recession, we can easily detect the existence of significant differences in the impact of this common structural shock on the domestic labour markets. For mainstream economics, the countries with the best results in terms of unemployment and employment would have been those that had a more flexible labour market at the beginning of the crisis and/or those having implemented reforms to increase this flexibility.

The aim of this paper is to determine the validity of this argument, that is, whether labour reforms making the labour market more flexible effectively ensure macroeconomic stability by reducing the impact on the labour market of economic shocks. Using panel data techniques, we investigate whether, as mainstream studies argue, the evolution of employment and unemployment in the EU labour markets is explained, and to what extent, by the levels and changes registered in the indicators of employment protection legislation.

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Conversely, we examine whether, as heterodox and post-Keynesian studies suggest, this evolution is explained by the changes registered in economic activity (i.e., GDP growth).

**Key words:** employment, unemployment, Great Recession, employment protection

**JEL codes:** C23, E24, J21, J64, J88

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## **1. Introduction**

Since Friedman (1968) established the existence of a natural unemployment rate, economists have devoted special attention to the role of labour market institutions as determinants of employment and unemployment. For Friedman, this natural rate would be a long-term equilibrium rate determined by structural elements, among others, the imperfections of the labour market that prevent the rapid adjustment of salaries in response to changes in the labour demand and supply. Without changes in these structural elements, the natural unemployment rate will remain stable in the long term, and the current unemployment rate will temporarily deviate from the equilibrium rate as a result of demand shocks.

This approach implied a radical departure from the theoretical and policy-related Keynesian approaches. From a monetarist viewpoint, demand-side policies do not have long-term effects on the unemployment rate. Moreover, the natural rate can mean any unemployment rate, since the former depends on the higher or lower flexibility of the labour market. Thus, the higher the rigidity of the labour market is, the higher the natural unemployment rate is, and vice versa.

The natural rate was later adopted by the New Keynesian economics under the concept of the NAIRU. Despite the differences in the economic meaning and the microfoundations of both concepts (Snowdon and Vane 2005), in both approaches, the imperfections of the labour market that give rise to rigidities in the nominal and real wages and to sluggish adjustments to economic shocks determine the long-term unemployment rate. Therefore, the higher the rigidities are, the higher the NAIRU is.

Although for many New Keynesian economists, the aggregate demand can have long-term effects on the NAIRU through the existence of hysteresis effects (Ball 2009; Blanchard and Summers 2006), in this approach, the rigidities generated by the labour market institutions would be a key determinant of high and persistent unemployment. Thus, it is argued that the dynamics of unemployment would be explained by the interaction of adverse shocks with adverse labour market institutions. These bad institutions would increase the impact of shocks on current unemployment,

accentuating hysteresis effects primarily through an increase in long-term unemployment (Blanchard and Wolfers 2000). In this sense, the size of the hysteresis effects would be directly related to a strong employment protection (Anderton et al. 2012).

From this perspective, the resilience of the labour market, that is, that aggregate shocks generate a small impact on employment and unemployment, would directly depend on the labour market institutions in force (OECD, 2017). In the presence of an adverse shock, the lower impact on unemployment would take place in the more flexible labour markets.

The policy recommendations of this approach are clear. To warrant economic stability, a structural change in the labour market must take place, making it more flexible. This change would allow one to reach lower and more stable rates of unemployment in the short and long term. This change implies the reform of those labour market institutions that generate a low flexibility in the wage-setting process and in the adjustment of the firms' workforces.

As a result of these theoretical approaches, and fuelled by other global structural processes, such as the economic and financial globalization or the financialisation process, many economies have substantially reformed their labour markets, making them more flexible by acting on unemployment protection schemes, collective bargaining or employment protection legislation (Ferreiro and Gomez 2017; Ferreiro and Serrano 2013; Tridico and Pariboni 2017).

However, despite the widespread labour market reforms in most developed economies since the 1980s, empirical studies are not conclusive and have not been able to demonstrate that the labour market institutions are responsible for high unemployment, that a higher flexibility of these institutions contributes to reducing unemployment, or which institutions have a positive or a negative impact on labour market results (Baker, Glyn, Howell and Schmitt 2005; Avdagic and Salardi 2013; Bertola 2015).

In this sense, non-mainstream approaches, though accepting that labour market institutions can influence labour market results, question the belief that the rigidities of the labour market are the main determinants of employment and unemployment. These approaches argue that demand-side policies are the main determinants of employment and unemployment in both the short and the long term. Thus, for post-Keynesian economists, the changes in aggregate demand, mainly in productive investment, are the main determinants of the level and change of the unemployment rate. Labour institutions would not be a key determinant of the labour market results (Howell 2011;

Stockhammer 2011); therefore, only an increase in capital accumulation will reduce the high rates of unemployment. Thus, a structural change in the current strategy of economic policy must be adopted, with fiscal and monetary measures stimulating productive investment, in order to achieve a sustained decline of the current high unemployment rates.

This recommendation is also shared by some mainstream economists, such as Ball (2009, 2014) or Blanchard and Summers (2017). For these economists, the permanent high rates of unemployment suffered by many European countries would be explained by the hysteresis effects generated by the implementation of restrictive demand-side policies, which would have increased structural unemployment; hence, the need of a radical change in the strategies of monetary and fiscal policies.

It must be noted that other studies argue that labour market institutions, including employment protection, do have a positive impact on the labour market and on economic activity; contributing to reducing unemployment; reducing the fluctuations of economic activity, income distribution and employment; fostering the accumulation of human and physical capital; or promoting innovative activities (Dosi et al. 2017; European Commission Directorate-General for Employment, Social Affairs and Inclusion 2015; Ferreiro and Serrano 2013; Ferreiro and Gomez 2015; Flaschel et al. 2012, Lavoie 2017).

The paper is structured as follows. The next section offers a short summary of the literature that analyses the impact of employment protection on the results of the labour market. The following section presents the data and the model used in our empirical study. After that section, the results of our study are presented, and the last section presents the study's conclusions.

## **2. Employment protection and labour market performance**

In New Keynesian economics, the equilibrium unemployment rate depends on the rigidities generated by labour market institutions, hence the need to reform these institutions to improve the results of employment and unemployment in the short and the long term. One of these institutions has to do with the legal measures governing the hiring and dismissal of workers, usually known as employment protection legislation (EPL). EPL would be the legal constraints that affect the capacity of employers to hire or fire workers and to hire workers using the different types of employment contracts in the existing catalogue of employment contracts.

In this approach, the existence of firing costs or legal limits pertaining to the use of certain employment contracts would imply rigidities in the working of the labour market, leading to unemployment and to segmentation between different groups of workers (dual labour markets) as far as these firing costs or restrictions differently affect certain groups of workers. Clear, higher firing costs and stricter regulations related to the dismissal of workers and the hiring of temporary workers would deteriorate labour market performance.

Thus, since the eighties many countries have approved measures to increase the flexibility of their labour markets with the purpose of reducing the high unemployment generated by the oil crises of the seventies. Most countries approved labour reforms that curbed firing costs and reduced the restrictions on the use of non-standard employment contracts, thus promoting the use of temporary and part-time contracts. In many cases, the removal of restrictions on the use of temporary contracts accompanied the setting of lower compensations for the extinction of this kind of contract (in comparison with those for permanent contracts), giving rise to a segmented labour market with a rising share of atypical employment contracts.

Despite the generalization of these reforms, there is no unambiguous empirical evidence supporting the effectiveness of these measures to increase employment and reduce high unemployment rates.

For Blanchard and Wolfers (2000), the rise in the structural unemployment that European economies have suffered since the late seventies is explained by the implementation of measures protecting employment that were approved to palliate the adverse consequences of these unemployment crises. The argument is that although this higher protection could have reduced the adverse impact of downturns on unemployment in the short term, in the long term, they implied a disincentive to hiring (and also to capital accumulation and productivity growth) resulting in higher unemployment (CIPD 2015). These arguments were accepted by international organizations, which recommended reducing employment protection, primarily in the case of permanent workers, to ensure lower and more stable unemployment rates (European Commission 2012; OECD 2012 and 2017)

Although many studies since Blanchard and Wolfers (sic) have concluded that strong employment protection has a negative impact on unemployment (Flaig and Rottmann 2013), the empirical evidence is far from conclusive (Bertola 2017a; Boeri, Cahuc and Zylberberg 2015; Heyes and Lewis 2015; Myant and Brandhuber 2013). A number of theoretical and empirical studies conclude

that a strong employment protection has no negative impact on unemployment (Avdagic 2015; Avdagic and Salardi 2013; Bertola 2017a; Flaschel et al. 2012) and, consequently, the labour market reforms implemented since the 1980s would not have contributed to reducing high unemployment rates. Thus, it is argued that the higher flexibility of the labour markets would have generated many adverse micro- and macroeconomic consequences, including higher labour segmentation, higher inequality of income distribution, lower household consumption, higher household borrowing, disincentives to innovation, lower competitiveness, lower productivity growth, and higher poverty (Damiani, Pompei and Ricci 2016, Ferreiro and Serrano 2013; Gutierrez-Barbarrusa 2016; Heyes and Lewis 2015; Rubery and Piasna 2016).

In this sense, since the onset of the financial crisis in 2008, some European countries have approved measures to reduce excessive labour segmentation, thus increasing the employment protection of temporary workers. However, this stronger protection for temporary workers in many cases has come in tandem with a smaller protection for permanent workers (Ferreiro and Gomez 2017).

In fact, it is surprising that some mainstream economists do not claim that a lower employment protection reduces the unemployment rate but rather that it is likely that the stronger employment protection registered in the seventies has increased the natural unemployment rate (Blanchard 2017). This ambiguity could be explained by the fact that, as some studies point out, the EPL would impact certain groups of workers, depending on factor such as gender, age, skills, type of employment contract, etc., and, therefore, the effect on aggregate employment or unemployment would be uncertain (Boeri, Cahuc and Zylberberg 2015; Gal and Theising 2015). In this sense, although Blanchard and Wolfers (2000) conclude that EPL would increase long-term unemployment, they also accept that the impact on equilibrium unemployment would be ambiguous.

### **3. Employment and unemployment rates in the European Union countries during the Great Recession**

The bursting of the global financial crisis and the subsequent Great Recession had a huge negative impact on the labour markets of European countries. As table 1 shows, in 13 out of the 21 countries analysed in our paper, employment in 2012 was lower than in 2007, with an employment decline amounting 19% in Greece and above 14% in Ireland and Spain. Regarding unemployment rates, they rose in all the countries, with the exception of Austria and Germany, ranging from 0.1 percentage points in Belgium to 16.6 percentage points in Spain.

Table 1. Growth of GDP, employment and unemployment rates between 2008 and 2012

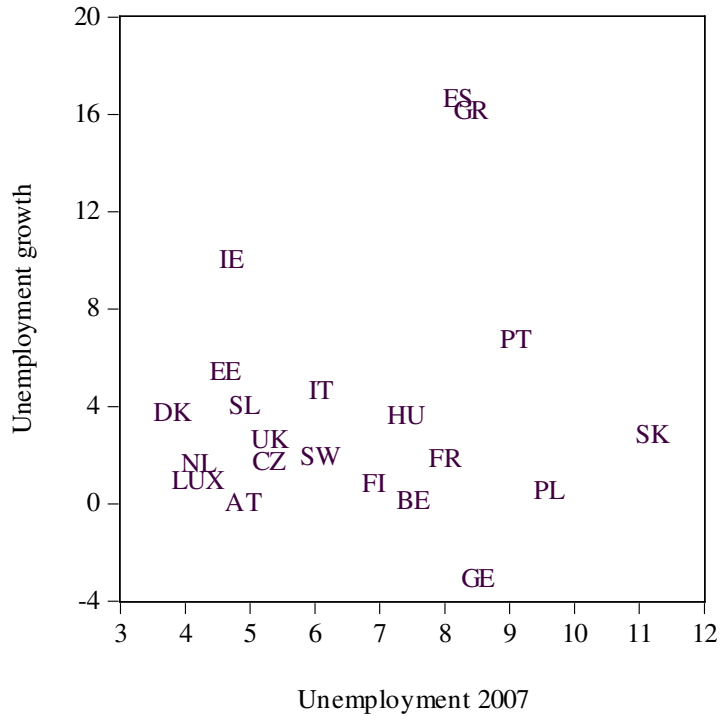
	GDP growth (%)	Employment growth (%)	Unemployment rate growth (p.p.)
Belgium (BE)	3.1	3.0	0.1
Czech Republic (CZ)	0.9	-1.0	1.7
Denmark (DK)	-2.1	-5.0	3.7
Germany (GE)	3.4	2.5	-3.1
Estonia (EE)	-7.4	-6.5	5.4
Ireland (IE)	-3.9	-14.7	10.0
Greece (GR)	-24.1	-18.8	16.1
Spain (ES)	-6.3	-14.5	16.6
France (FR)	1.4	0.4	1.8
Italy (IT)	-7.1	-1.6	4.6
Luxembourg (LUX)	1.2	15.3	0.9
Hungary (HU)	-5.0	-2.0	3.6
Netherlands (NL)	-0.2	-2.1	1.6
Austria (AT)	3.0	3.9	0.0
Poland (PL)	18.5	2.3	0.5
Portugal (PT)	-6.7	-10.5	6.7
Slovenia (SL)	-5.5	-5.3	4.0
Slovakia (SK)	9.7	-1.4	2.8
Finland (FI)	-3.8	-1.1	0.8
Sweden (SW)	2.3	1.3	1.9
United Kingdom (UK)	-0.4	0.1	2.6

Source: Our calculations based on Eurostat

It could be thought that the countries with the worse employment results during the Great Recession were those with the highest unemployment rates recorded before the crisis. However, figure 1 rejects this hypothesis, showing that a direct relation between the unemployment recorded in 2007 and the increase in unemployment rates since 2008 cannot be observed.

This result implies that the labour market performance in European labour markets since the onset of the global financial crisis is not only explained by the previous performance of the labour markets but by other factors, among others, the implementation of supply-side and demand-side policies, or the institutional design of the national labour markets and a higher or lower labour flexibility.

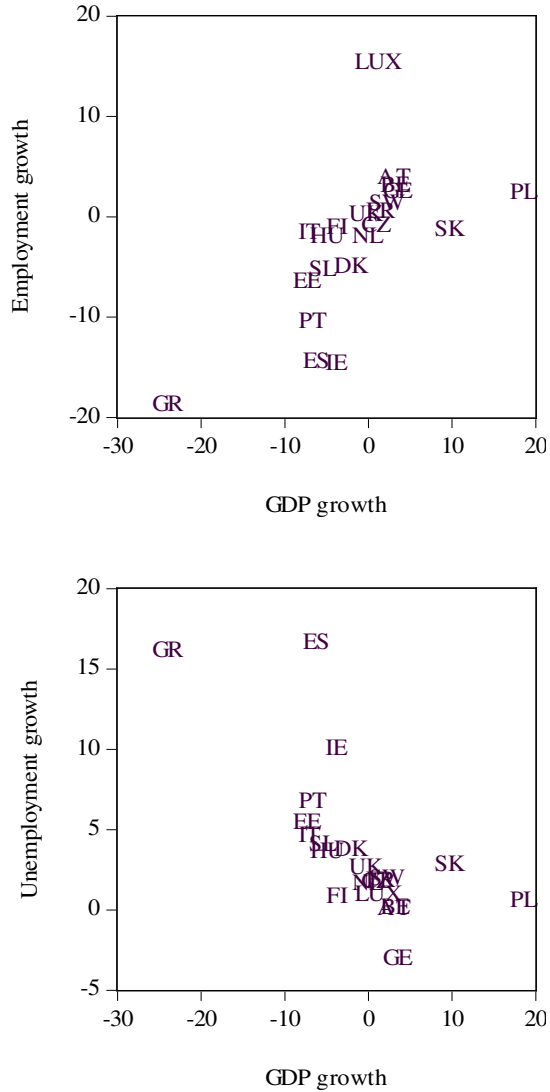
Figure 1. Unemployment rate in 2007 and growth of unemployment rate between 2008 and 2012.



Source: Our calculations based on Eurostat

Figure 2 reports the changes recorded between 2008 and 2012 of real GDP (as a percentage of the GDP in 2007), of total employment (as a percentage of employment recorded in 2007), and unemployment rates (measured as the difference in percentage points between the unemployment rates in 2007 and 2012). It is clear that the countries with the best labour-market performance are those with the best economic activity performance. However, there are some countries that can be considered outliers, like Luxembourg (in the evolution of employment) or Spain (in the case of the unemployment). The existence of these outliers can affect the relationship between GDP growth and the change in employment and unemployment, both in terms of sign and intensity. This finding justifies the need to take into account, in our empirical analysis, the potential influence of extreme values.

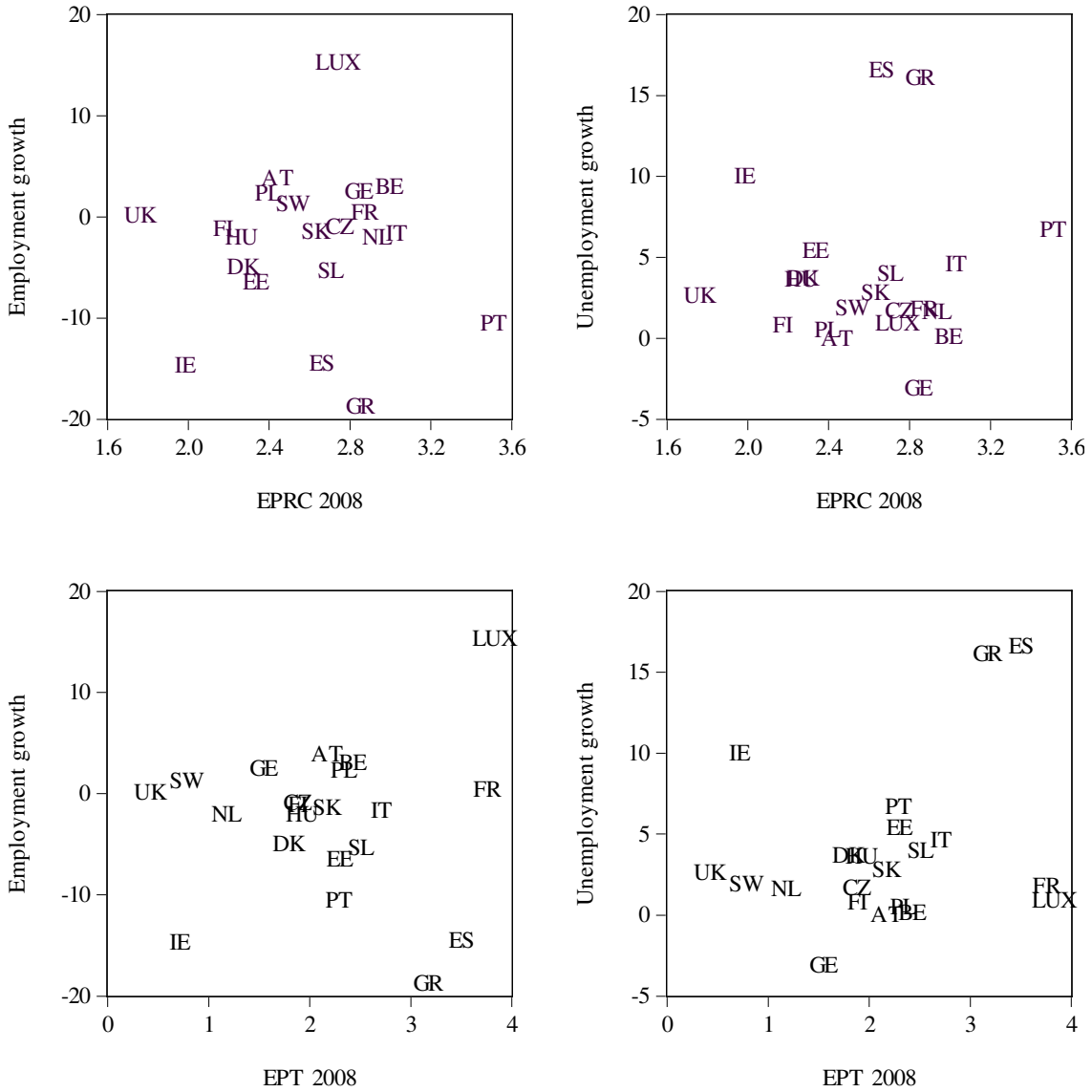
Figure 2. Growth of real GDP, employment and unemployment rate in the years 2008 to 2012



Source: Our calculations based on Eurostat

Furthermore, as table 1 and figure 2 show, countries with similar changes in the GDP record significant differences in the evolution of employment and unemployment rates, implying that the labour market performances have been affected by other elements rather than the impact of the Greta Recession of economic activity.

Figure 3. Growth of employment and unemployment rate in the years 2008 to 2012 and EPL indexes in 2008



Thus, as mentioned in the previous sections, the results of the labour markets can also be affected by labour market institutions, namely, by higher or lower labour flexibility. Figure 3 shows the relationship between the evolution of employment and unemployment from 2008 to 2012, and the level of employment protection recorded prior to the beginning of the crisis. Figure 3 uses two employment protection legislation (EPL) indexes elaborated by the OECD<sup>3</sup>, one related to the employment protection of permanent workers against individual and collective dismissals (EPRC index), and the other related to the regulation of temporary employment contracts (EPT index). We cannot detect a clear relation and, therefore, cannot claim that the levels of employment protection in force before the crisis are associated to better or worse performance of employment and unemployment during the Great Recession.

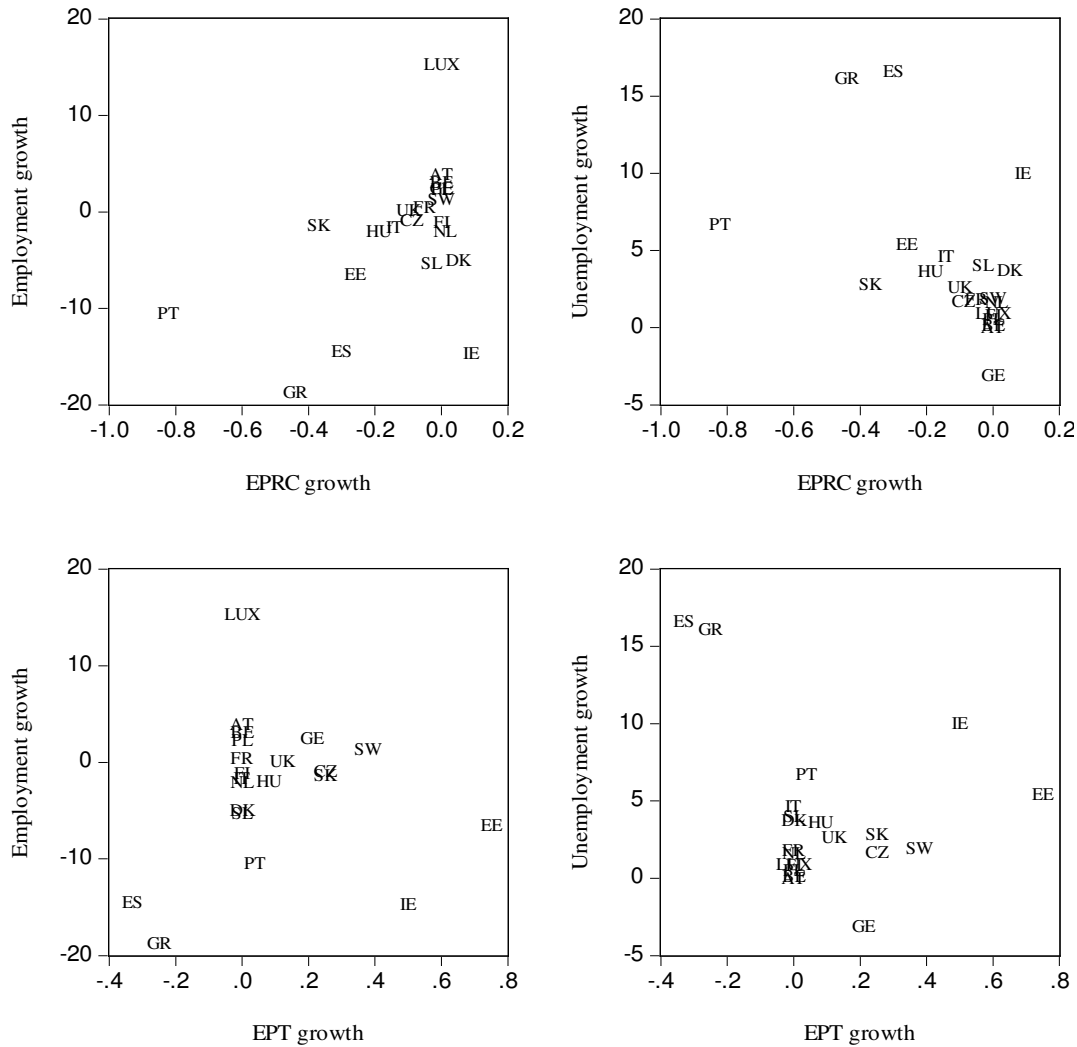
A similar conclusion is obtained when we connect the evolution of employment and unemployment rates with the measures approved to change the employment protection of permanent and temporary workers (see Figure 4), where these measures are proxied by the changes in the EPRC and EPT indexes, and where a reform reducing the protection of employment is identified with a negative change in the value of these indexes.

Again, we cannot reach a firm conclusion regarding the data of Figure 4. To a considerable extent, this result is obtained because EPL indexes have remained unchanged in many countries. The EPRC index has remained constant in seven countries (Austria, Belgium, Finland, Germany, Luxembourg, Poland and Sweden), and the EPT index has remained unchanged in ten countries (Austria, Belgium, Denmark, Finland, France, Italy, Luxembourg, Netherlands, Poland, and Slovakia). Nonetheless, it is possible that at a certain year a change in one of these indexes may have occurred, and that in later years the index may have changed in the opposite direction. In other words, a reform in the employment protection approved in a certain year may have been reversed in later years.

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<sup>3</sup> These indexes will be explained in the next section.

Figure 4. Growth of employment, unemployment rates and EPL indexes in the years 2008 to 2012

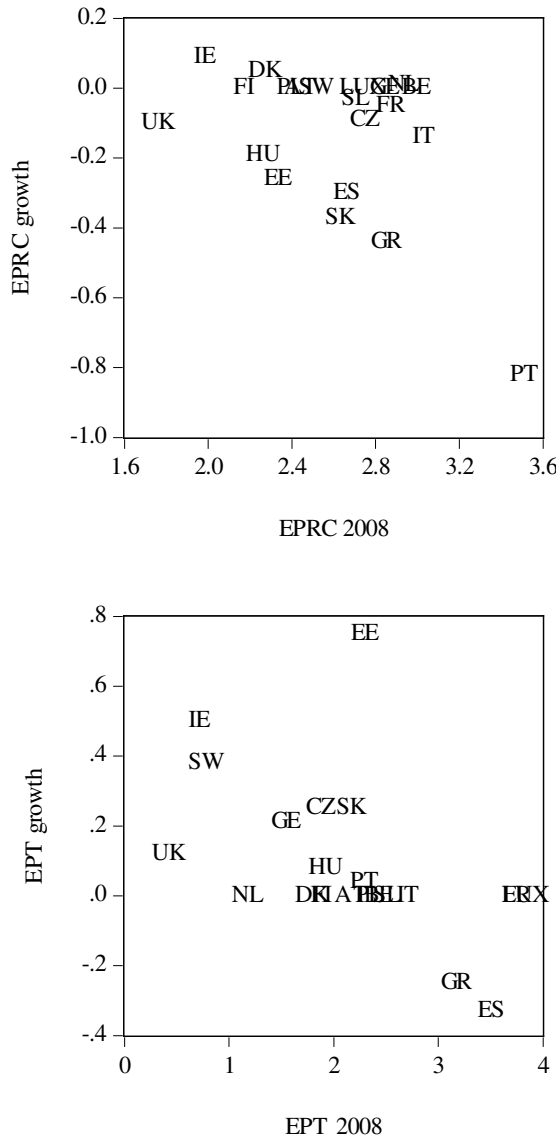


Although this topic is not the focus of our paper, we can reflect on the reasons for the dynamics of the EPL indexes. Several authors claim the endogenous nature of the measures to make the labour market more flexible, suggesting an inverse causation: countries with the worst results in employment and unemployment would be more favourable to reducing the employment protection of workers (CIPD, 2015; Bertola, 2017b, Duval, Furceri and Miethé 2018). Nonetheless, no conclusive results can be inferred from the data of Figure 4.

In addition, it could be argued that the changes in the employment protection approved since 2008 are related to the levels of employment protection recorded prior to the crisis. Thus, it those

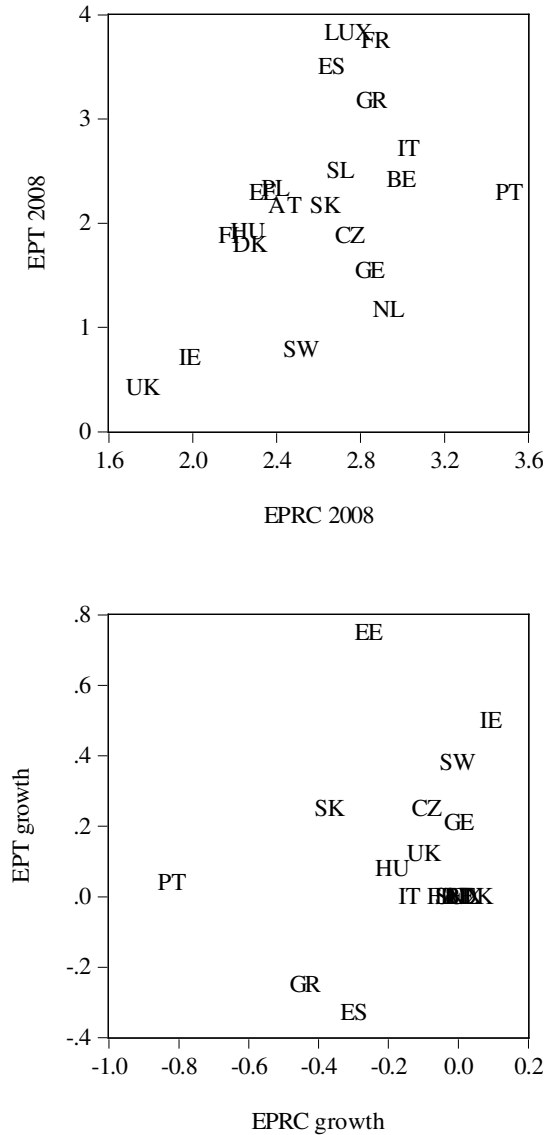
countries with the higher employment protection before the crisis would have been be more favourable to reducing this protection.

Figure 5. EPL indexes in 2008 and changes in the EPL indexes between 2008 and 2012



The data in Figure 5 do not allow us to reach a conclusive result. It cannot be claimed that the countries with the highest EPL indexes in 2008 (those with a higher labour rigidity) were those having implemented the more intense measures to reduce the employment protection of permanent or temporary workers, among other reasons, due to the existence of outliers. Moreover, some of the countries with the highest employment protection for permanent or temporary workers before the crisis have not modified that protection.

Figure 6. Relation between the levels and the changes of the EPRC and ELT indexes



Lastly, Figure 6 shows the existence of a direct relationship between the levels and the changes in the employment protection of permanent and temporary workers. As the top figure shows, prior to the crisis a stronger protection of permanent workers was associated with a stricter regulation of the use of temporary employment contracts, and vice versa.

Regarding the changes in both indexes, the results are ambiguous. The reason is that only two countries, Greece and Spain, have approved measures reducing the employment protection of temporary workers. In any case, it seems that there has been a tendency during the crisis to increase the employment protection of both kinds of workers, mainly in the case of temporary workers.

In any case, these conclusions are based on a descriptive and partial analysis. As mentioned in previous sections, most empirical and theoretical analysis argue that, regardless the dimension and direction of the effects, labour markets performance would be determined by the interaction of the economic growth and the labour institutions, hence the necessity of a multivariate empirical analysis about the determinants of the growth of employment and unemployment rates.

### **3. Model and data**

The purpose of our paper is to analyse the impact of employment protection on employment and unemployment results. With this aim in mind, we will analyse the dynamics of these variables in European Union countries since the onset of the global financial crisis in 2008, testing whether the changes in employment and unemployment rates are affected by GDP growth and the levels and changes in employment protection legislation (EPL).

A number of recent studies have analysed the impact of EPL on the labour market performances since the year 2008. Boeri and Jimeno (2016) argue that the European countries with the largest increase in unemployment have been those with a higher labour flexibility and a high degree of dualism. Sharma and Winkler (2018) conclude that a stronger employment protection of permanent workers has had a negative impact on aggregate employment in European countries, primarily in the case of temporary, young and low-skilled workers. Similarly, for Anderton et al. (2012) the higher structural unemployment during the crisis in Europe would be explained by the strong employment protection of permanent workers. Conversely, Stockhammer, Guschanski and Köhler (2014) conclude that EPL has not had a significant impact on unemployment rates in OECD countries. In the same way, Blanchard (2017), replicating the paper by Blanchard and Wolfers (2000), shows that EPL stops being a significant determinant of unemployment when the period analysed is extended to the year 2015. Lastly, Ferreiro and Gomez (2017) argue that in European Union countries, the better performance of the labour markets during the crisis, in terms of employment and unemployment occurred in countries with stronger employment protection. Our paper, therefore, tries to make a contribution to the study of the differences in the performance of European labour markets during the crisis and to the study of the impact of EPL in employment and unemployment.

The models tested in the paper use the GDP growth rate and employment protection legislation (EPL) as explanatory variables of the change in employment and unemployment rates. EPL is used as a proxy of the rigidities in the labour market, in particular of the legal regulations affecting the hiring and firing of regular-permanent and temporary workers. Thus, we will regress the following two equations: in equation 1 the dependent variable is the employment growth rate, and in equation 2 the dependent variable is the variation in the unemployment rate:

$$\text{Eq. 1:} \quad \Delta L_{i,t} = \beta_0 + GDP_{i,t} + \sum_j \gamma_j EPL_{j,i,t} + \sum_j \delta_j \Delta EPL_{j,i,t} + \epsilon_{i,t}$$

$$\text{Eq. 2:} \quad \Delta U_{i,t} = \beta_0 + GDP_{i,t} + \sum_j \gamma_j EPL_{j,i,t} + \sum_j \delta_j \Delta EPL_{j,i,t} + \epsilon_{i,t}$$

$\Delta L_{i,t}$  and  $\Delta U_{i,t}$  represent, respectively, the employment growth rate and the change in percentage points of the unemployment rate in country  $i$  during year  $t$ . Data on employment and unemployment have been obtained using the Labour Force Survey of Eurostat.

$GDP_{i,t}$  measures the GDP real growth rate in country  $i$  during year  $t$ . The source to calculate this variable is the information on real GDP provided by Eurostat.

To estimate the effects on employment and unemployment rate changes of the protection of permanent and temporary workers, we have used the Employment Protection Legislation (EPL) strictness indexes elaborated by the OECD.

The employment protection legislation would be formed by the set of rules that in each country governs the hiring and firing of employees. The hiring rules are the conditions for the use of the different standard (that is, full-time permanent contracts) and non-standard employment contracts (e.g., part-time, fixed-term, and temporary agency workers), while the firing rules are the rules of individual and collective dismissals of workers with standard permanent contracts. This legislation aims to provide workers with certain levels of protection and security in their jobs by specifying the requirements that employers must observe and respect in dismissing (permanent) workers (European Commission Directorate-General for Employment, Social Affairs and Inclusion 2015).

The OECD EPL indexes try to measure the strictness of employment protection for permanent and temporary contracts, constructing a synthetic indicator based on the values attached to 21 different items. The EPL indexes are classified into three main areas: (i) protection of regular workers against individual dismissal; (ii) regulation of temporary forms of employment (fixed-term and temporary

agency workers); and (iii) additional, specific requirements for collective dismissals. Each indicator is measured on a 0 to 6 score, where higher values represent a stricter regulation.

These indexes have several advantages. First, given that the methodology employed in the elaboration of the indexes is the same for all the countries, they allow making a comparison among countries of the strictness in the employment protection legislation. In this sense, it could be interpreted that the countries with the highest scores (the stricter provisions on individual and collective dismissals) would be those with the highest rigidities in the labour market, and vice versa. Second, the changes in the labour law would imply a change in the value of the indexes. Thus, a labour law reform relaxing the regulatory provisions on individual and collective dismissals, in other words, a measure making the labour market more flexible, would imply a fall in the score, and vice versa. The deeper the relaxation of these provisions is, the higher the score falls are, and vice versa.

The use of these indexes to measure the true flexibility-rigidity of the labour markets, however, is not free of problems, given the nature of the indexes, the way they are elaborated and their inability to measure effective employment protection based on legal norms alone (Myant and Brandhuer 2016). Nonetheless, their use in empirical analyses is widespread and, given that the methodology of elaboration is the same for all countries, they are useful tools to compare and use data for different countries.

The OECD calculates two basic indexes: one index measures the protection of regular-permanent workers against individual and collective dismissals, while the other measures the regulation of temporary forms of employment (fixed-term contracts and temporary work agency employment). The first index is split in two indexes: one related to the protection of permanent workers against individual dismissal and the other related to the specific additional requirements for collective dismissals of permanent workers.

Therefore, we will use four indexes of employment protection:

- EPRC: protection of permanent workers against individual and collective dismissals
- EPR: protection of permanent workers against individual dismissals
- EPC: specific requirements for collective dismissals of permanent workers
- EPT: regulation of temporary employment contracts

The variable  $EPL_{i,j,t}$  shows for each country  $i$  the value of the four  $j$  EPL indexes at the beginning of year  $t$ . The variable  $\Delta EPL_{j,i,t}$  shows for each year  $t$  the change registered in country  $i$  of the four EPL indexes.

The scores of each index are calculated based on the regulation in force on the 1st of January of each year. Therefore, the score of an index for year  $t$  reflects the employment protection legislation in force on the 1st of January of year  $t$ , and, therefore, incorporates the changes in the legislation approved before the 31st of December of year  $t-1$ . The last available indexes are for the year 2013. The indexes of 2013 incorporate the changes in the employment protection legislation during the year 2012. Therefore, we will analyse the changes in employment and unemployment rates registered between the years 2008 and 2012.

Our paper does not test whether a higher or lower labour flexibility, or the reforms to increase or reduce this flexibility, are associated with the level of employment or with the unemployment rate. Since dependent variables are measured in terms of changes (not levels), what we are testing is whether the changes recorded in the employment and the unemployment rates are affected by the economic growth and the levels and changes in the EPL indexes. From an orthodox perspective, the worse employment and unemployment performances will take place with the lower rates of GDP growth, the higher levels of employment protection, and when measures are approved to increase the rigidities in the hiring-firing of permanent and temporary workers.

Table 2. Descriptive statistics

	Mean	Median	Maximum	Minimum	Standard Deviation
Employment growth (%)	-0.56	-0.25	6.44	-9.34	2.58
Unemployment rate growth (p.p.)	0.78	0.40	8.00	-4.40	1.79
GDP growth	-0.27	0.65	7.60	-14.72	3.67
EPRC	2.57	2.63	3.51	1.76	0.38
$\Delta$ EPRC	-0.03	0.00	1.14	-0.47	0.09
EPT	2.17	2.17	3.83	0.42	0.90
$\Delta$ EPT	0.02	0.00	0.75	-0.33	0.12
EPR	2.33	2.28	4.17	1.31	0.55
$\Delta$ EPR	-0.04	0.00	0.19	-0.82	0.14
EPC	3.17	3.25	5.13	1.65	0.79
$\Delta$ EPC	0.00	0.00	1.13	-0.38	0.13

Source: Our calculations based on Eurostat and OECD

Table 2 shows the main descriptive statistics of the explanatory and the dependent variables used in the analysis. Since we have data for 21 countries for a 5-years period, we have 105 annual observations. It must be noted that the mean value of the changes in the EPL indexes is close to zero, and, in fact, the median value of these changes is zero. These data implies that the number of changes in the EPL indexes is very low. This result is, nonetheless, expected, because the changes in the EPL indexes gather the approval of labour reforms affecting the conditions of the dismissal of permanent workers and the conditions of use of temporary employment contracts. Thus, the number of observations that register a change in the EPL indexes is reduced: 22 observations in the EPRC index, 21 in the EPR index, 6 in the EPC index, and 18 in the EPT index.

In any case, the most striking fact is the high number of countries where the EPR indexes have remained unchanged: Austria, Finland, Germany, Luxembourg, Poland and Sweden. The EPC index has not registered changes in 15 countries (Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Luxembourg, Poland, Portugal, Slovenia, Sweden, and the United Kingdom) and the EPT index has not changed in 10 countries (Austria, Belgium, Denmark, Finland, France, Italy, Luxembourg, Netherlands, Poland, and Slovenia). All in all, this implies that in four countries (Austria, Finland, Luxembourg, and Poland) all the EPL indexes have remained unchanged.

The low number of observations with changes in the employment protection indexes implies that the role played by these changes as determinants of the changes in the employment and the unemployment rates is, at most, minor or secondary (a conclusion confirmed by the empirical analysis, as we will see later). This does not mean that the employment protection does not have a significant (economic and/or statistical) on the labour market performance. This effect could come from the level of the employment protection, in the sense that the changes in the employment and the unemployment rates would be affected by the higher or lower employment protection of permanent and/or temporary workers.

Figure 7. Employment growth and employment protection indexes

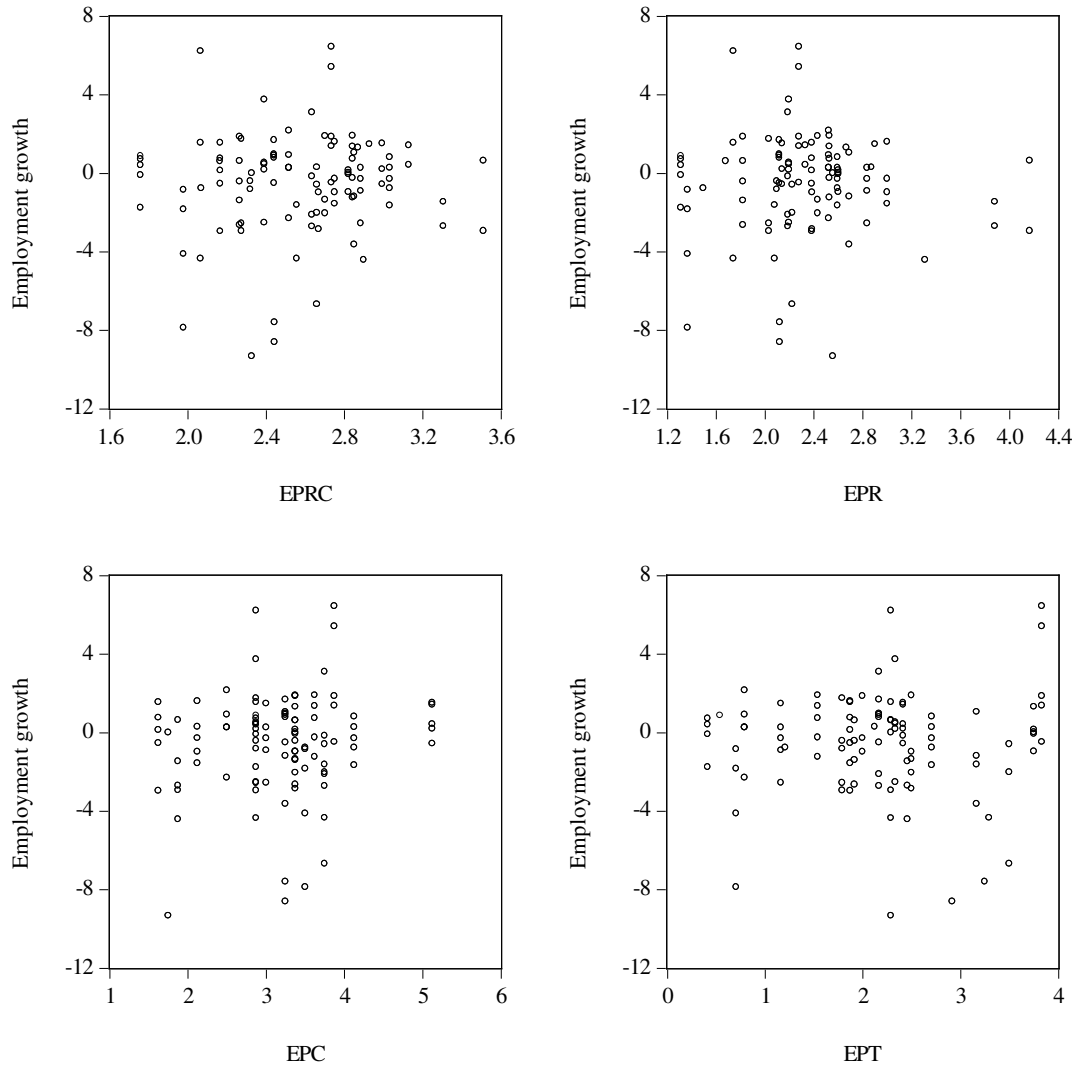
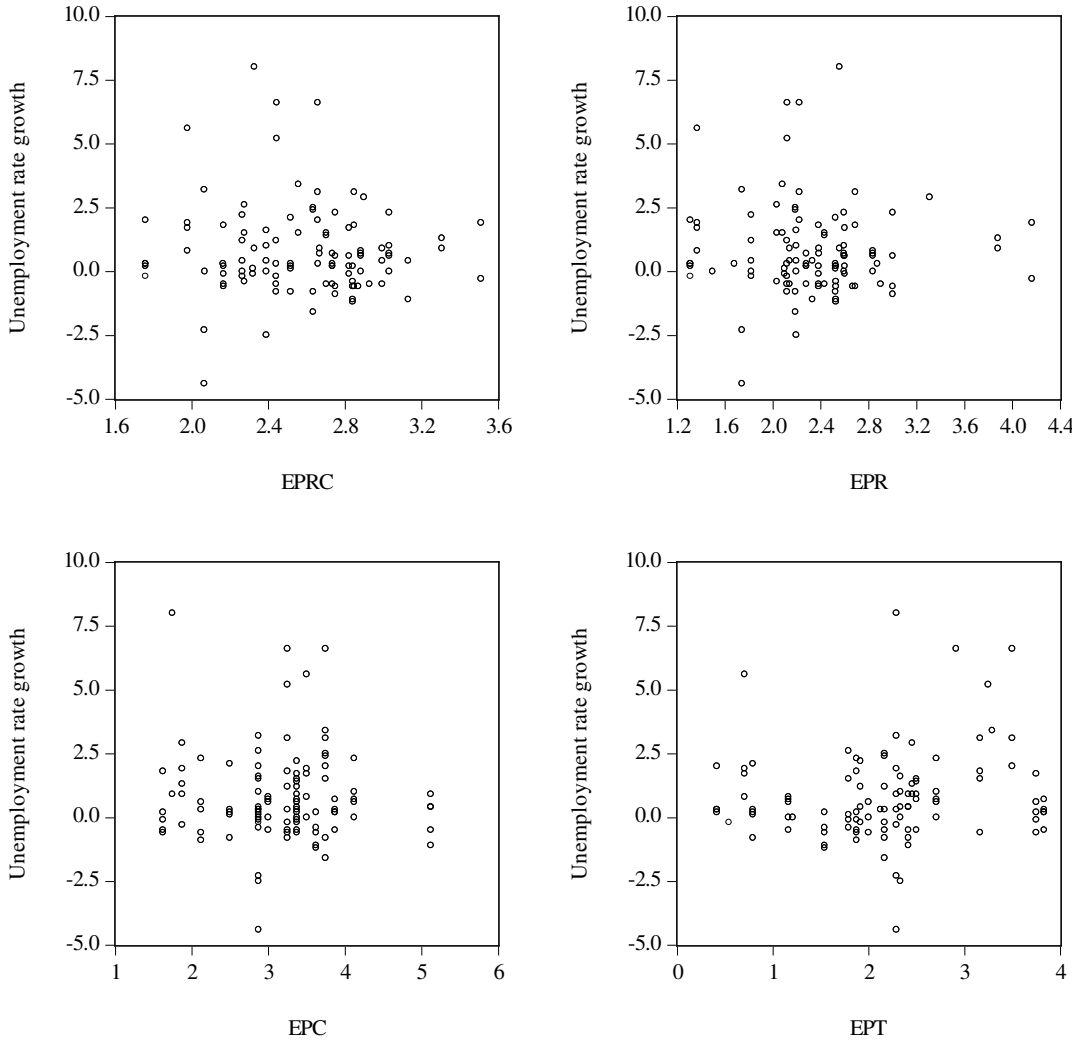


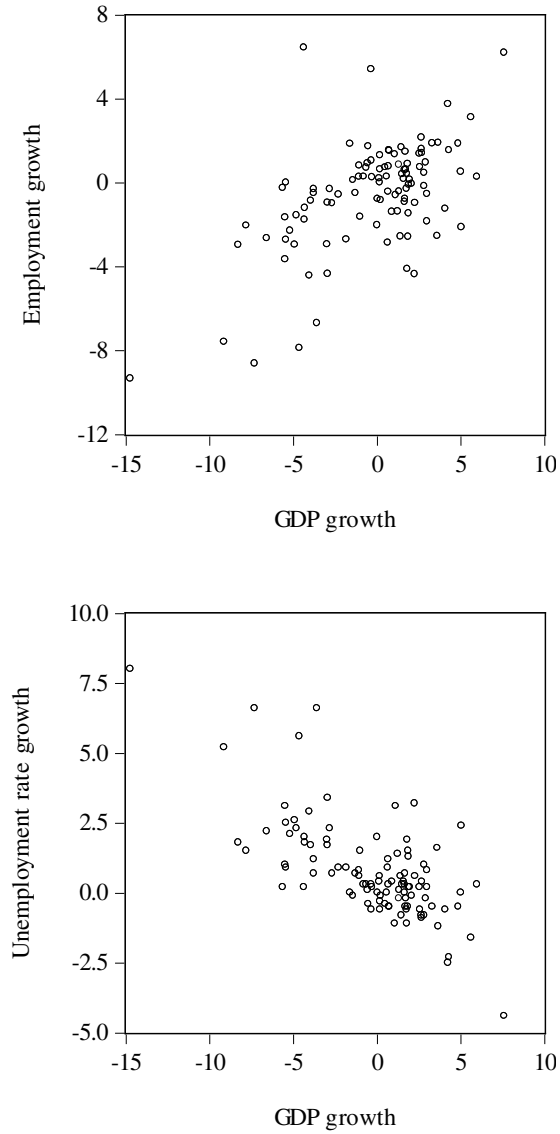
Figure 7 shows the relation between the levels of the EPL indexes and the employment growth rate in the 105 observations of our analysis. We cannot detect at a glance a clear-cut relation between the employment growth rate and the levels of the employment protection of permanent and temporary workers. A similar conclusion is obtained when we analyse the relation between the levels of the EPL indexes and the variation in the unemployment rates (see figure 8).

Figure 8. Unemployment rate growth and employment protection indexes



On the contrary, the relation is very clear in the case of the economic growth and the growth of employment and unemployment, as figure 9 shows: thus a higher GDP growth rate is associated to a higher employment creation and to a more intense decline in the unemployment race, and vice versa.

Figure 9. Employment growth, unemployment rate growth and GDP growth



It is clear that these conclusions are in line with the conclusions reached in the previous section, that implied, firstly, that the evolution of the employment and unemployment were clearly associated to the economic dynamics, and, secondly, that a clear-cut impact of employment protection on employment and unemployment was far from being unambiguous

#### 4. Estimation

As mentioned in the previous section, we have a balanced panel formed by 21 countries and 5 years (2008 to 2012), with 105 observations in total.

Equations have been tested using a panel data model with random effects. The use of random effects is recommend in cases, such as this one, with a small number of years in relation to the number of cross-sections. Moreover, given that in some countries some EPL indexes remain unchanged during the five years, implying that their change is zero, this forces us to use the random effects model. Lastly, given that we want to check the robustness of the obtained results using dummies to collect the impact of extreme values or outliers, the random effects model is the most appropriate one for our estimation (Kennedy 2008, Wooldridge 2010). In any case, the results of the Hausman test proves the validity of the random effects model<sup>4</sup>.

Table 3. Matrix of correlation of EPL indexes

	EPRC	EPRC growth	EPR	EPR growth	EPC	EPC growth	EPT	EPT growth
EPRC	1.00							
EPRC growth	-0.21	1.00						
EPR	0.83	-0.27	1.00					
EPR growth	-0.16	0.92	-0.27	1.00				
EPC	0.25	0.12	-0.34	0.2	1.00			
EPC growth	-0.09	-0.01	0.03	-0.4	-0.22	1.00		
EPT	0.48	-0.15	0.28	-0.11	0.31	-0.07	1.00	
EPT growth	-0.13	0.16	-0.09	0.13	-0.07	0.05	-0.22	1.00

One possible problem of the analysis would be the existence of multicollinearity resulting of the inclusion in the equations of different EPL indexes (in levels and/or changes). As table 3 shows, this would be a problem only if we included in the same equation the EPRC, the EPC and the EPR index, given the high correlation existing due to the way in which the EPRC index is elaborated. In the case of the other indexes, the correlation is low, what implies that the validity of the results would not be affected by the existence of multicollinearity.

<sup>4</sup> Data available upon request.

Furthermore, the correlation between the levels of the EPL indexes and their growth is low: -0.21 in the case of the EPRC index, -0.27 in the EPR index, -0.22 in the EPC, and -0.22 in the EPT index. Therefore, to include in the same equation an index measured in levels and in changes would not be a problem.

As mentioned, the period analysed comprises the years 2008 to 2012, with all the countries belonging to the European Union. Since we are analysing a set of economies highly interrelated in an environment defined by the burst of the global financial crisis and the subsequent Great Recession, this leads us to believe that these economies have been simultaneously affected by these shocks. Thus, the Lagrange multiplier (LM) test reports the existence of cross-section effects. Consequently, our estimation includes cross-section effects. Moreover, the panel cross-section dependence tests, mainly the Pesaran CD test, which is appropriate in cases where the number of periods is low, show the existence of cross-section dependence<sup>5</sup>. Therefore, we have applied SUR estimators to correct the contemporaneous correlation between cross-sections.

To check the robustness of our results, we have estimated the equations including two dummies that represent the more extreme values. These outliers have been selected by analysing the residuals of the different estimations, choosing the highest and lowest residuals. With this procedure, we wish to check whether the results obtained are affected by the existence of extreme values in which the evolution of employment and unemployment would be affected by other elements.

Table 4 reports the results of the different estimations of the determinants of the growth rate of employment. It must be emphasized that EPL indexes are not a (statistically) significant determinant of the employment growth in the European Union countries during the Great Recession. This result affects not only to the levels of the employment protection but also to the changes in the corresponding indexes. Only the GDP growth rate is a significant determinant of employment growth rate, and thus a GDP growth rate of 1 percent leads to an employment growth rate of 0.4 percent.

The fact that the employment protection indexes do not generate a significant impact on employment growth has two main implications. First, it proves that a better (or worse) result in term of employment is not associated to a more flexible or more rigid labour market: that is, the differences in the flexibility of the national labour markets (the differences in the value of the EPLK

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<sup>5</sup> Data available upon request.

indexes) do not explain the differences in the employment results. Second, that the labour market reforms enhancing (or tightening) the flexibility of the labour market do not have a significant impact on employment.

It is also important to notice that this result is robust to the specifications of the model. That is, it is independent of the different indexes included in the model. Moreover, it is also robust to the inclusion of dummies reflecting the existence of extreme values or outliers that could bias the results obtained in the regressions: as even columns (2, 4, 6, 8, 10, 12 and 14) show, the results do not change when we include in the estimations the dummies corresponding to the extreme values of the residuals of the estimations, namely, Greece in 2012 and Luxembourg in 2009

To check the validity of these conclusions, we have also analysed the confidence intervals (90%, 95% and 99%) of the coefficients of the independent variables<sup>6</sup> (Greenland et al., 2016, Kennedy, 2008). In all cases, the results confirm the conclusions obtained based on the study of the p-values.

This conclusion is in line with those papers, as we seen above, that argue that in the long-term the effects on employment of employment protection are non-existent. Nonetheless, for some recent papers (Boeri and Jimeno, 2016; de Almeida and Balasundharam, 2018; Duval and Furceri, 2018; Duval, Furceri and Jalles, 2017, OECD, 2012 and 2017) the impact of employment protection depends on the phase of the business cycle and, therefore, in the long term the effects on employment and unemployment would be non-existent. However, these studies argue that a decline in employment protection during a recession would accelerate the process of employment destruction.

Our results, however, do not support this conclusion despite the fact that the mean of the GDP growth rate in the 105 observations was -0.27 percent, implying a state of recession. Indeed, in 43 observations (41 percent of total observations) the GDP growth rate was negative. In sum, during the Great Recession, the employment performance in the European Union Countries is not explained by the higher or lower flexibility in the hiring or firing of temporary and permanent worker

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<sup>6</sup> Due to space constraints, we do not include the data of the coefficient confidence interval. Data are available upon request.

Table 4. Determinants of the growth rate of employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Constant	-0.455 (0.430)	-0.481 (0.363)	-2.607 (0.174)	-2.078 (0.188)	-1.004 (0.303)	-0.760 (0.358)	-2.633 (0.155)	-2.150 (0.182)	-1.774 (0.202)	-1.437 (0.209)	-2.680 (0.182)	-2.082 (0.216)	-1.774 (0.202)	-1.437 (0.209)
GDP	0.385 (0.001)	0.398 (0.000)	0.373 (0.002)	0.383 (0.001)	0.381 (0.001)	0.391 (0.001)	0.369 (0.002)	0.378 (0.002)	0.355 (0.003)	0.365 (0.003)	0.346 (0.004)	0.359 (0.002)	0.355 (0.003)	0.365 (0.002)
EPRC			0.870 (0.180)	0.655 (0.178)			0.761 (0.185)	0.648 (0.278)						
EPR									0.401 (0.298)	0.351 (0.385)	0.553 (0.201)	0.455 (0.298)	0.401 (0.298)	0.351 (0.385)
EPC											0.239 (0.300)	0.173 (0.380)		
EPT					0.245 (0.345)	0.122 (0.470)	0.133 (0.552)	0.033 (0.884)	0.211 (0.432)	0.100 (0.648)	0.110 (0.647)	0.027 (0.886)	0.211 (0.432)	0.100 (0.646)
ΔEPRC			3.476 (0.164)	3.480 (0.111)			3.331 (0.208)	3.291 (0.149)						
ΔEPR									2.614 (0.164)	2.558 (0.129)	2.325 (0.220)	2.351 (0.153)	2.614 (0.164)	2.558 (0.129)
ΔEPC											-0.556 (0.792)	-0.388 (0.844)		
ΔEPT					0.913 (0.725)	0.813 (0.756)	0.653 (0.804)	0.577 (0.826)	-0.692 (0.790)	0.643 (0.805)	0.764 (0.775)	0.705 (0.792)	0.692 (0.790)	0.643 (0.805)
Gr 2012		-5.132 (0.010)		-5.155 (0.010)		-5.204 (0.009)		-5.173 (0.010)		-5.283 (0.011)		-5.265 (0.011)		-5.283 (0.011)
Lux 2009		8.229 (0.002)		8.055 (0.002)		7.940 (0.004)		7.864 (0.004)		7.707 (0.004)		7.703 (0.005)		7.707 (0.004)
Obs	105	105	105	105	105	105	105	105	105	105	105	105	105	105
R <sup>2</sup>	0.322	0.468	0.345	0.487	0.327	0.466	0.345	0.483	0.345	0.4841	0.348	0.483	0.345	0.481

p-values in parentheses

GR: Greece; Lux: Luxembourg

Table 5. Determinants of growth of unemployment rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Constant	0.693 (0.039)	0.681 (0.010)	1.722 (0.212)	1.992 (0.073)	0.453 (0.393)	0.587 (0.175)	1.943 (0.142)	2.289 (0.036)	1.269 (0.348)	1.666 (0.172)	1.619 (0.232)	2.085 (0.098)	1.355 (0.099)	1.524 (0.024)
GDP	-0.330 (0.000)	-0.309 (0.000)	-0.329 (0.000)	-0.303 (0.000)	-0.323 (0.000)	-0.298 (0.000)	-0.322 (0.000)	-0.291 (0.000)	-0.314 (0.000)	-0.287 (0.000)	-0.304 (0.000)	-0.269 (0.000)	-0.317 (0.000)	-0.286 (0.000)
EPRC			-0.407 (0.405)	-0.526 (0.191)			-0.700 (0.167)	-0.797 (0.041)						
EPR									-0.333 (0.316)	-0.410 (0.159)	-0.510 (0.131)	-0.584 (0.048)	-0.466 (0.105)	-0.486 (0.021)
EPC									0.054 (0.735)	-0.022 (0.884)	-0.081 (0.617)	-0.146 (0.336)		
EPT					0.117 (0.385)	0.056 (0.683)	0.254 (0.042)	0.203 (0.053)			0.239 (0.044)	0.197 (0.105)	0.186 (0.145)	0.122 (0.321)
$\Delta$ EPRC			-0.713 (0.705)	-1.657 (0.371)			-0.529 (0.783)	-1.294 (0.502)						
$\Delta$ EPR									-0.776 (0.566)	-1.298 (0.330)	-0.523 (0.699)	-0.911 (0.507)	-1.027 (0.448)	-1.505 (0.247)
$\Delta$ EPC									1.183 (0.447)	0.872 (0.517)	1.426 (0.344)	1.231 (0.317)		
$\Delta$ EPT					-0.700 (0.713)	-1.103 (0.491)	-0.691 (0.716)	-1.045 (0.494)			-0.803 (0.669)	-1.261 (0.380)	-0.633 (0.735)	-1.009 (0.496)
Ee 2011		-2.789 (0.186)		-3.000 (0.117)		-3.018 (0.155)		-3.341 (0.084)		-3.121 (0.064)		-3.510 (0.029)		-3.243 (0.064)
Sp 2009		4.675 (0.008)		4.922 (0.006)		4.496 (0.005)		4.565 (0.003)		4.783 (0.008)		4.421 (0.006)		4.577 (0.003)
Obs	105	105	105	105	105	105	105	105	105	105	105	105	105	105
R <sup>2</sup>	0.482	0.570	0.488	0.586	0.487	0.574	0.500	0.597	0.501	0.594	0.513	0.605	0.503	0.599

p-values in parentheses

Ee: Estonia; Sp: Spain

In our opinion, our findings have relevant policy and analytical implications. As Myand and Brandhuber (2016) argue, a great deal of the policy agenda of the recommendations made by international organizations such as the OECD, the IMF or the European Commission encouraging the implementation of reforms that increase the flexibility of labour markets have been based on empirical studies that have used the OECD's EPL indexes. Furthermore, Flaig and Rotmann (2013), using panel data models, argue that the magnitude of the effects of labour market institutions on labour results differ markedly among countries. This points to the need to make empirical analyses on a national basis that would allow one to reach more precise conclusions regarding the consequences of labour flexibility and the impact of labour reforms approved in each country.

Table 5 reports the results of the estimations of the determinants of the growth of unemployment rate<sup>7</sup>. In all the cases, the GDP growth rate has a significant impact on unemployment rate. A GDP growth rate of 1 percent implies a decline in the unemployment rate amounting to 0.3 percentage points. However, the results of the EPL indexes are ambiguous.

If we examine the coefficients of equations 7 and 8, we can see the strictness in the use of temporary contracts, proxied by the value of the EPT index, is associated to increases in the unemployment rates.

The mean value of the EPT index is 2.17. This value implies an increase in unemployment rate ranging between 0.49 and 0.59 percentage points. If we consider that the mean growth of the unemployment rate was 0.78 percentage points, this result implies that, to a large extent, the growth recorded in the unemployment rate was explained by the low flexibility in the use of temporary employment contracts.

The results change when we include in the equation the dummies for the extreme values (Estonia in the year 2011 and Spain in 2009). The level of the EPT index remain statistically significant, with the same sign and with a similar value. However, the coefficient of the EPRC index, corresponding to the protection of permanent workers against individual and collective dismissals, is now statistically significant and with a negative sign, what means that a higher protection of permanent workers against dismissal is associated to a lower increase (or higher decline) of the unemployment

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<sup>7</sup> Like in the case of the analysis of the determinant of the employment growth, to check the validity of these conclusions, we have also analysed the confidence intervals (90%, 95% and 99%) of the coefficients of the independent variables. Again, in all cases, the results confirm the conclusions obtained based on the study of the p-values.

rate. The value of the coefficient of this index is really high (-0.80). Since the mean value of the EPRC index is 2.57, it implies a decline in the unemployment rate amounting to 2.1 percentage points. A higher protection for the permanent workers of 1 standard deviation (0.38) implies an improvement in the unemployment rate equivalent to 0.3 percentage points.

However, this conclusion is reached when the model includes the index corresponding to the protection of permanent workers against individual and collective dismissals. Equations 9 and 10 show the individual impact of the indexes of the protection of permanent workers against individual dismissals (EPR) and against collective dismissals (EPC). The results obtained show that neither the level of the changes of both indexes are statistically significant, a result similar to that obtained when we include the EPT index as explanatory variable (see equations 5 and 6).

When we analyse separately the indexes of protection of permanent workers against individual dismissals (EPR) and specific requirements for collective dismissals of permanent workers (EPC), jointly with the regulation of the use of temporary contracts (EPT) (equations 11 and 12), the results differ from those obtained in equations 7 and 8. According to equation 11, the protection of temporary workers is associated to higher growth in the unemployment rate. However, when the equation include the dummies for the extreme values (equation 12), we cannot confirm that the strictness in the use of temporary contracts has a significant impact on unemployment rate growth. Thus, the p-value of the coefficient of the EPT index is above 0.1; moreover the 90% confidence interval of this coefficient is (-0.003, 0.398). The level and the change of the index of the specific requirements for collective dismissals of permanent workers (EPC) are not significant.

On the contrary, the level of protection of permanent workers against individual dismissals is also statistically significant: the p-value of the coefficient of the variable EPR is 0.048 and the 95% confidence interval of this coefficient is (-1.162, -0.007). The sign of the coefficient is negative, implying that this protection contributes to reduce the unemployment rate. It must be noted that the value of the coefficient is quite high (-0.58). This implies that a higher value of the index EPR equivalent to one standard deviation (0.55) implies a decline in the unemployment rate of 0.32 percentage points.

Nonetheless, the redundant tests carried out show that the EPC indexes (level and changes) are redundant. Therefore, equations 13 and 14 include as independent variables, in addition to GDP

growth, the levels and changes of the indexes of protection of permanent workers against individual dismissals (EPR) and of the regulation of temporary contracts (EPT).

The results of equation 13 do not allow to argue that the levels of the regulation of temporary contracts and the protection of permanent workers against individual dismissals have a statistically significant impact on the changes in unemployment rates. In the case of the EPT index, the p-value of its coefficient is 0.144, and the 90% confidence interval is (-0.024, 0.397). This results, however, is not so clear in the case of the EPR index, whose p-value is 0.106, and the 90% confidence interval is (-0.941, 0.008).

In fact, when the dummies for extreme values are included in the model (equation 14), it is even more clear that the regulation of temporary employment contracts is not statistically significant: the p-value of the EPT index is now 0.32 and the 90% confidence interval is (-0.082, 0.327). However, the level of the employment protection of regular-permanent workers against individual dismissal is now clearly significant, with a p-value of 0.021, and a 95% confidence interval of (-0.898, -0.074). The sign of the coefficient is negative and high, confirming the previous result that the protection against dismissal of permanent worker contributes to reduce the unemployment rate: a higher value of the index EPR equivalent to one standard deviation (0.55) implies a decline in the unemployment rate of 0.26 percentage points.

This result is opposite to what is recommended by institutions such as the OECD (2017), who argues that a high employment protection amplifies the response of unemployment to adverse demand shocks. For the OECD (2012 and 2017), an institutional setting that favours the use of temporary workers, through strict employment protection provisions for regular workers and a loose regulation of the use of temporary workers, would increase the response of unemployment to output shocks. Our findings show that this response did not take place during the Great Recession and, that on the contrary, a stronger protection for permanent workers has had a positive impact on the unemployment rates in European countries.

## 5. Conclusions

Our paper proves the importance of economic growth as key determinant element of the evolution of employment and unemployment in EU countries during the Great Recession; hence, the need to implement measures to accelerate economic growth and accordingly accelerate the creation of employment and the decline of the unemployment rate.

Regarding the different indexes of labour flexibility and their impact on the employment growth rate, our results show that a higher or lower labour flexibility is not associated with a better or worse employment performance, as shown by the lack of significance of the coefficients of the EPL indexes, both if they are measured in levels or in changes. The latter implies that the measures to flexibilize the use of (hiring or firing) of permanent and temporary workers do not have a significant impact on employment creation. It is important to emphasize the robustness of this result, since it is not affected by the inclusion or exclusion in the equations of the different EPL indexes or the inclusion of dummies reflecting the existence of outliers.

Regarding the evolution of the unemployment rate, the labour reforms that change the value of the EPL indexes, that is, the reforms that make the labour market more or less flexible, do not have a significant impact on the change in unemployment rate. Conversely, a higher protection of permanent workers has a positive effect on the change in the unemployment rate: However, although in some cases stricter restrictions on the use of temporary employment contracts is associated with a higher unemployment growth rate, this result depends of the choice of the EPL indexes included in the regressions. Once again, these results are robust to the inclusion of dummies for outliers.

Our results show that the widespread recommendation to make the labour markets more flexible as key instruments to obtain better results of employment and unemployment lacks empirical support. In the case of the employment, the differences in the flexibility or rigidity of the European labour markets cannot be associated to a better or worse evolution of the employment. In the case of the unemployment, conversely, it could be argued that during the Great Recession a more strict employment regulation of permanent workers has implied a better performance of the unemployment rate.

This conclusion does not imply the rejection in all cases of implementing measures that increase labour flexibility, as we cannot conclude with certainty that these measures have a positive or a negative impact on the labour market. To this end, we would need a case-by-case analysis using time series analyses for the different countries object of study.

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