EMPLOYMENT PROTECTION AND ITS IMPACT ON THE DYNAMICS OF EMPLOYMENT AND UNEMPLOYMENT

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Abstract:

This paper analyses the impact of employment protection legislation on the dynamics of employment, employees and unemployment rates in sixteen European countries over the period 1985-2019. Our results show that employment protection does not affect the changes in the unemployment rates. As regards the evolution of employment and employees, the results show that employment protection for permanent workers does not have a significant effect. As regards the effects of employment protection for temporary workers, it cannot be concluded that it has a significant effect, as the results differ depending on the specifications of the models tested.

1. Introduction

According to the New Consensus Macroeconomics (NCM), the rigidities introduced by labour market institutions are one of the main factors behind the poor employment and unemployment performance. The dynamics of employment and unemployment are explained by the interaction of economic shocks with existing labour market institutions. In the specific case of negative shocks, whether they are normal downturns in the business cycle or extraordinary shocks to aggregate demand or supply, it is argued that unproductive institutions increase the impact of shocks on unemployment, accentuating hysteresis effects through an increase in long-term unemployment (Blanchard and Wolfers, 2000). On the contrary, countries with efficient labour institutions, that is, with more flexible labour markets, would show the best results of employment and unemployment. The policy recommendations are obvious: to enjoy low and stable unemployment rates, labour markets should be reformed, making them more flexible, acting on those legal and institutional elements that generate a low flexibility in the wage-setting process and in the adjustment of the company workforces.

Fuelled by these arguments, and the recommendations made by international organizations, such as the European Commission, the International Monetary Fund and the Organization for Economic Cooperation and Development (OECD), many countries have approved, mainly in the last three decades, labour market reforms to make their labour markets more flexible. These reforms acted on what was presumed to be the main sources of rigidities in the labour market: the unemployment protection schemes, the collective bargaining and the employment protection legislation (Brancaccio et al., 2018; Ferreiro and Gomez, 2017; Gehrke, Lechthaler and Merkl, 2019; Kugler, 2019; McBride and Watson, 2019; Sarkar, 2013; Tridico and Pariboni, 2017). It was taken for granted that in the long-run these reforms would lead to lower and more stable unemployment rates.

Despite the spreading and intensity of these reforms, the evidence in terms of the impact on employment and unemployment of labour institutions is not conclusive (Avdagic and Salardi, 2013; Bertola, 2017; Kugler, 2019). For Post Keynesian economists, labour institutions are not a key determinant of the labour market results, and only an increase

in capital accumulation, fuelled by expansionary demand-side policies, would boost employment and reduce unemployment rates (Girardi et al., 2020; Hein, 2017; Jump and Stockhammer, 2019; Stockhammer et al., 2014). This recommendation is shared by mainstream economists, such as Ball (2009, 2014) and Blanchard and Summers (2017). They argue that the high unemployment rates in many European countries are explained by the hysteresis effects generated by restrictive demand-side policies; hence, a change in the relevant strategies of macroeconomic policies is necessary.

Furthermore, many studies argue that labour market institutions have positive effects on the labour market and economic activity, such as lower unemployment, higher employment, smoother fluctuations of economic activity, more egalitarian distribution of income, higher accumulation of human and physical capital, as well as more innovation (Brancaccio, et al., 2018; Ciminelli et al., 2018; Dosi et al., 2017, 2018; European Commission Directorate-General for Employment, Social Affairs and Inclusion, 2015; Flaschel et al., 2012; Kugler, 2019; Lavoie, 2017).

Mainstream studies have focused their analysis of the effects of labour institutions on the impact of employment protection legislation (EPL) on employment and unemployment. Based on the argument that a high employment protection has negative micro and macroeconomic effects, many countries have passed reforms to reduce that protection, making it easier and cheaper to dismiss permanent workers and facilitating the use of temporary contracts and agency workers (Piasna and Myant, 2017). The objective of this paper is to investigate whether EPL is a significant determinant of the dynamics of employment, employees and unemployment rates in Europe over the period 1985-2019. Thus, our contribution analyses whether the response of labour markets to economic fluctuations, in terms of the creation/destruction of total and salaried employment and the evolution of the unemployment rate, is affected by the level of employment protection.

In our study, we will test the New-Keynesian hypothesis of the existence of a negative effect of EPL on the evolution of employment and unemployment. The results of this analysis are important from the point of view of economic policy. If this effect exists and is significant, reforms making the labour market more flexible by reducing protection for temporary and permanent workers would be justified. If, on the contrary, this effect does not exist, the fall in employment protection would have no positive effect on the labour

market. As noted above, there is a growing literature highlighting the negative consequences of an excessive labour flexibility. It could be argued that these negative effects could be offset by higher employment growth or a fall in unemployment; but if these beneficial effects are not detected, the labour reforms implemented in the last decades that have reduced employment protection for workers could then be qualified as negative.

The paper is structured as follows. In section 2, we provide a short literature review of the impact of employment protection legislation on employment and unemployment rates. In section 3, we present the methodology followed in our empirical research. Section 4 presents and analyses the results of the empirical analysis. Our final section summarises and concludes.

2. Literature review

The employment protection legislation is 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 standard (full-time permanent contracts) and non-standard employment contracts (part-time, fixed-term, and temporary agency workers). The firing rules govern 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 hiring and dismissing (permanent) workers.

In the NCM, the EPL generates rigidities in the functioning of the labour market, leading to unemployment and, if firing costs or restrictions differ among groups of workers, to labour segmentation. To reduce the high unemployment rates, since the eighties, many countries have introduced labour reforms curbing firing costs and favouring the use of non-standard employment contracts. In many cases, the removal of restrictions on the use of temporary contracts was accompanied by the setting of lower compensations for the extinction of temporary contracts (in comparison with those for permanent contracts); thereby giving rise to a segmented labour market and a rising share of atypical employment contracts.

Despite the generalization of these reforms, there is no unambiguous empirical evidence on the impact of these measures on employment and unemployment (Bertola, 2017; Boeri, et al., 2015; Heimberger, 2021; Heyes and Lewis, 2015; OECD, 2018). In their seminal article, Blanchard and Wolfers (2000) argued that the implementation of measures increasing employment protection in the late seventies led to the rise in the structural unemployment in European economies. These measures would have implied a disincentive to hiring (and to capital accumulation and productivity growth) resulting in higher structural unemployment. These arguments were accepted by international organizations, which recommended reducing employment protection, mainly for permanent workers, to ensure lower and more stable unemployment rates (European Commission, 2012; OECD, 2006, 2012, 2017, 2018)[1].

However, many studies conclude that high employment protection has no negative impact on employment and unemployment (Adams et al., 2019; Avdagic, 2015; Avdagic and Salardi, 2013; Bertola, 2017; Boeri et al., 2015; Ferreiro and Gomez, 2020 and 2021; Flaschel et al., 2012; Heimberger, 2021; Heyes and Lewis, 2015; Myant and Brandhuber, 2013; Sarkar, 2013; Piasna and Myant, 2017). Consequently, labour market reforms implemented since the 1980s have not contributed to reducing high unemployment rates. Indeed, many contributions focus on the adverse economic consequences of these reforms, highlighting the negative effects on labour segmentation, unemployment scarring, income distribution, job quality, household consumption and borrowing, innovation, competitiveness, productivity growth, and poverty[2] (Arestis, Ferreiro and Gomez, 2020a; Brancaccio et al., 2018; Damiani et al., 2016; Gonalons-Pons and Gangl, 2021; Gutierrez-Barbarrusa, 2016; Heyes and Lewis, 2015; Kleinknecht, 2020; OECD, 2018; Rubery and Piasna, 2016; Tridico, 2017).

It must be noted that mainstream economists do not categorically claim that employment protection has a negative impact on labour market. Blanchard and Wolfers (2000) and Blanchard (2017) argued that it is *likely* that the higher employment protection registered

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[1] Recommendations to reduce employment protection have also been directed to emerging and developing economies (Duval and Loungani, 2021).
[2] The growing number of articles studying the effects of labour flexibility, in general, and EPL, in particular, on other areas, such as international trade and foreign direct investment flows, should be clearly noted. See Oliveira and Forte (2021) and Roy (2021) for recent examples.

in the seventies increased the natural unemployment rate. For the OECD (2018) employment protection for permanent workers "tends to have either no or a small negative effect on employment" (p. 124); and an *excessive* employment protection for these workers can have negative consequences on job quality, inclusiveness and productivity only if it comes with a lower protection for temporary workers. Other studies argue that the effects of the EPL differ among groups of workers, depending on gender, age, skills, or type of employment contract, being uncertain the effect on aggregate employment or unemploymen (Arestis, Ferreiro and Gomez, 2020b; Boeri et al., 2015; d'Agostino, Pieroni and Scarlato, 2018; Gal and Theising, 2015).

The doubts about the effects of EPL have increased with recent studies that focus on the period after the onset of the Global Financial Crisis. Anderton et al. (2012), Boeri and Jimeno (2016), and Sharma and Winkler (2018) argue that a high employment protection for permanent workers is associated with higher increases of unemployment in Europe in this period. By contrast, Stockhammer et al. (2014) conclude that EPL does not have a significant impact on unemployment rates in OECD countries. For Blanchard (2017), replicating the paper by Blanchard and Wolfers (2000), EPL is not a significant determinant of unemployment rates when the analysed period is extended to 2015. Ferreiro and Gomez (2021) show that, during the Great Recession, employment protection did not have a significant impact on employment growth, and that, regarding the evolution of unemployment rates, only the employment protection of permanent workers against individual dismissal has a significant impact on unemployment rates, with higher employment protection being associated with better results of unemployment growth. Lastly, Ferreiro and Gomez (2017) and Tridico (2013, 2017) show that, during the Great Recession, the European Union countries with high employment protection show the best labour market results.

Finally, some recent papers (Boeri and Jimeno, 2016; de Almeida and Balasundharam, 2018; Duval and Furceri, 2018; Duval et al., 2020; OECD, 2012, 2017) argue that the impact of employment protection depends on the phase of the business cycle; therefore, it has no impact on employment and unemployment in the long-run.

Our paper attempts to advance in the study of the effects of employment protection on labour market outcomes by carrying out an empirical analysis that can be considered as

novel. Unlike most existing empirical studies, our paper analyses not only the impact of EPL on the variation of unemployment rates but also on employment growth. Moreover, and this is another contribution of the paper, to our knowledge, our contribution is one of the few papers that analyse the impact of EPL both on employment and employees. Existing articles analyse the effects of EPL on employment or on employees separately. Given that papers focus on different groups of countries and different time periods, it is difficult to draw robust conclusions on whether employment protection has a similar impact on employment and employees. Given that we are analysing the growth of employment and employees by looking at the same set of countries and years, we can test in a robust way whether the impact of EPL on employment and unemployment is similar or not.

Another relevant contribution of our paper is the use of two different sources for data on employment and employees. All existing studies use a single data source, either labour force statistics (LFS) or national accounts (NA) data. This implies the assumption that the choice of one or the other source does not affect the validity of the results obtained. To our knowledge, our paper is the only one to analyse data from both sources. By proceeding in this way we can adequately test the robustness of the results obtained. If the sign or the degree of significance of the different explanatory variables were different depending on the source of data, this would raise serious doubts about the true effect of the employment protection legislation.

Another contribution of our paper comes from the use of GDP and gross fixed capital formation (GFCF) growth rates as variables related to economic growth. It should also be noted that we study not only a possible linear relationship between the dependent variables and employment protection, but also the existence of a non-linear relationship, as well as the existence of interaction effects between employment protection legislation and economic growth.

Finally, we would like to point out that almost all existing papers analyse short periods of time, using methods such as GMM models. To our knowledge, our paper is the first one that focuses on a very long period (35 years). The existence of a long panel avoids the problem suffered by most studies, which by focusing on a shorter period of time face the question of whether the results obtained are conditioned by the specific choice of the

dates analysed. On the other hand, the availability of long series allows us to use methods other than the usual GMM models to analyse dynamic models, as in our case.

3. Empirical methodology

3.1. Baseline specification

The objective of this paper is to analyse whether employment protection legislation is a significant determinant of the dynamics of employment, employees (salaried employment), and unemployment rates in European countries. Therefore, the employment and employees growth rates and the growth in percentage points of the unemployment rates are the explanatory variables of the empirical analyses we will carry out in the paper. The choice of the growth of the dependent variables rather than their level is based on the fact that, as explained above, New Keynesian models suggest that labour market outcomes are mainly explained by the interaction between economic growth and labour institutions, in our case EPL. That is, for a given rate of economic growth, the variation in employment-employees and unemployment rates will depend on the level of employment protection. Thus, given a certain (positive) growth rate of the economic activity, the lower the EPL indices, the higher the growth of employment and employees and the higher the decline in the unemployment rate, and vice versa.

As mentioned above, our paper tests the impact of EPL on (total) employment and employees growth, which, according to New Keynesian approaches, should be inverse, with EPL decreasing employment and employees growth rates. To our knowledge, all the existing papers only test the impact of EPL on one of the two variables. This implies implicitly recognising that if EPL significantly affects one variable (say, employment), the impact on the other variable (employees) should also be significant and its coefficient would have the same sign, an assumption justified by the high correlation between the two variables[3]. However, if the sign and size of the coefficients of the EPL indices were significantly different in the case of employment and employees growth, this discrepancy

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[3] In our sample, the correlation between the employment and employees growth rates is 0.829 (data from LFS) and 0.813 (data from national accounts).

would raise serious doubts about the robustness of the results, calling into question any conclusions about the true effect of EPL.

As mentioned, with regard to data on employment and employees we have two sources of data. The first comes from the national labour force statistics (LFS), while the second corresponds to data from national accounts (NA). Although the data are very similar and highly correlated[4], since they are not identical the results of the estimations may be different depending on the source of data for employment and employees. Therefore, we will test separately the determinants of the employment and employees growth rates measured by LFS and NA, which will allow us to assess the robustness of the results about the impact of the explanatory variables.

Growth rates for total employment and employees based on labour force statistics are taken from OECD total employment and employees' data. The only exception is employees' data for Switzerland, which are taken from the ICTWSS database (Visser 2019). The data for employment and employees from national accounts have been obtained at the AMECO database. In the case of unemployment rates, these are taken from the AMECO database, except for Germany, whose figures are taken from the OECD.

Our model assumes that labour market outcomes depend primarily on economic growth and employment protection. In this sense, according to the mainstream postulates, given a rate of economic growth, countries with more flexible labour markets, i.e. with lower employment protection legislation, would experience higher employment and employees' growth and a larger fall in unemployment. However, the literature suggests that labour market outcomes may be influenced by other factors of a demographic, economic and institutional nature. For this reason, our model will include control variables related to the working-age population growth (Pop), the trade openness (Trade), a set of variables related to labour institutions (LabInst), and, finally, some variables related to the structure and coordination of collective bargaining (CollBarg).

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[4] In our sample, the correlation between the growth rates of employment measured by LFS and NA is 0.857, and the correlation between the growth rates of employees measured by LFS and NA is 0.834.

$$Y_{i,t} = \beta_0 + \beta_1 Economicgrowth_{i,t} + \beta_2 EPL_{i,t} + \beta_3 Pop_{i,t} + \beta_4 Trade_{i,t} + \beta_5 LabInst_{i,t}$$
$$+ \beta_6 CollBarg_{i,t} + \epsilon_{i,t}$$

As regards explanatory variables, in our study we will use the Gross Domestic Product (GDP) and the Gross Fixed Capital Formation (GFCF) growth rates as explanatory variables related to the economic activity. Although most papers use GDP growth, Post Keynesian studies emphasize the role played by capital accumulation as the main driver of employment and unemployment. Given the high correlation between GDP and GFCF growth rates[5], these two variables cannot not be included in the same equation, which leads to test them separately. This opens the possibility that the results on the effects of EPL may be affected by the chosen variable related to economic growth. In order to control for this problem, for each dependent variable we will test two equations, which will differ in the variable used to measure the effect of economic growth: GDP or GFCF growth rate. By proceeding in this way, not only do we test the validity of the Post Keynesians studies, but we also test the robustness of the conclusions reached on the impact of EPL on employment, employees and unemployment. Thus, a robust impact of employment protection on labour market exists when the sign and the significance of the coefficients of the EPL indices is the same regardless of whether we use GDP or GFCF growth rate as explanatory variable. Real GDP and GFCF data are sourced from the AMECO database, except for Germany, whose data have been obtained from the OECD.

As mentioned above, the main objective of our work is to analyse the effect of employment protection on labour market results. To estimate these effects, we use the Employment Protection Legislation (EPL) strictness indicators elaborated by the OECD. OECD EPL indicators measure the strictness of employment protection for permanent and temporary contracts, constructing synthetic indicators based on the values attached to different items. Each indicator is measured on a 0-6 score, with higher values representing a stricter regulation and, consequently, a more rigid labour market. The score of each index is calculated based on the regulation in force on the 1st of January of each year.

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[5] In our sample, the correlation between the GDP and GFCF growth rates is 0.708.

Given the common methodology to elaborate the indexes, they allow comparing the employment protection legislation among countries and the evolution of the national EPL indexes, which are related to the legal reforms affecting the conditions to fire or hire a worker using any of the available employment contracts. Although, these indexes have problems to measure the true flexibility-rigidity of the labour markets, such as the inability to measure employment protection based on other norms than legal ones, and the failure to account for procedural requirements in assessing the difficulties and costs of carrying out individual and collective dismissals (Harcourt et al., 2021; Maleszyk, 2016; Myant and Brandhuer, 2016), their use in empirical analyses is widespread, thus allowing to compare results from different studies.

The OECD calculates several indexes: the EPRC index, which measures the protection of regular-permanent workers against individual and collective dismissals, and the EPT index, which measures the regulation of temporary forms of employment, mainly, fixed-term and temporary agency workers. Moreover, the EPRC index is split into two indexes: the EPR index, related to the protection of permanent workers against individual dismissal, and the EPC index, related to the specific additional requirements for collective dismissals of permanent workers. In our case, and in order to analyse a long time period, we will use versions 1 of the EPRC and EPT indices, which cover the period 1985-2019.

An analysis of the labour market performance based only on the changes in the economic activity and the labour market flexibility assumes that labour supply is constant. However, changes in labour supply, generated by demographic changes in population, migration flows, ageing processes, etc., may affect labour markets. To account for these problems related to the changes in the labour supply, we include in our estimations the change in the size of working age population as an explanatory variable. Variable $Pop_{i,t}$ shows the growth rate of population between 15 and 64 years in country i in the year t (data obtained at the AMECO database).

To control the potential influence of other variables on the evolution of employment and unemployment rates, we have included several variables that the literature highlights as possible determinants of labour market outcomes. The first variable is the trade openness of the countries analysed ($Trade_{i,t}$), measured as the percentage of GDP of the sum of

exports and imports of goods and services. This percentage has been calculated using data on exports and imports provided by the AMECO database (by the OECD for Germany).

In the case of expected population growth, the sign of the coefficient can be expected to be positive, so that labour supply growth translates into higher employment and a higher unemployment rate. As regards the sign of the coefficient of trade openness, several studies suggest the negative effects of the globalisation process on the labour market, so that the expected sign would be negative for employment and employees growth and positive for the unemployment rate, slowing down job creation and increasing the unemployment rate.

The remaining control variables correspond to variables related to labour market institutions. One of these variables is union density ($Union_{i,t}$), which measures the percentage of wage earners affiliated to a trade union. The data are from the OECD and AIAS, Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) Database (OECD and AIAS, 2021) (available at: https://www.oecd.org/employment/ictwss-database.htm). Another control variable is public expenditure on active labour market policies ($ALMP_{i,t}$), measured as a percentage of GDP. The data on this variable are from the OECD.

Finally, the last variables included in the models relate to collective bargaining, both in terms of the structure and centralisation of wage bargaining and of coordination in the wage-setting process. Thus, we include the variable *Coord* that measures the degree of coordination of the wage-setting process. This index, available in the OECD/AIAS ICTWSS database, takes a range of values from 1 (corresponding to a fragmented wage bargaining at the firm or plant level, with no coordination) to 5 (corresponding to the existence of binding norms arising from centralised bargaining between unions and employers' associations, or government-imposed wage growth guidelines).

Regarding the centralisation of wage bargaining, the OECD/AIAS ICTWSS Database provides several indexes. *Central* is a summary index that takes into account the incidence of and control over additional bargaining at enterprise level, the 'space' that central or sectoral agreements assign, delegate or allow for such additional bargaining to take place, and the degree to which agreements can be perforated through the use of 'opening

clauses'. *Central* ranges from 0 to 5, with higher values corresponding to a collective bargaining structure dominated by centralised collective bargaining or national sectoral agreements. *Level*, is an index that reflects the predominant level at which wage bargaining takes place (in terms of coverage of employees), and whose values ranges from 1 (predominantly at local or company level) to 5 (central or cross-industry level negotiated at lower levels). Another index is *Multilevel*, which reflects the combination of levels at which collective bargaining over wages takes place, and whose value ranges between 1 (enterprise level) and 7 (cross-sectoral, with centrally determined binding norms or ceilings to be respected by all further agreements). The high correlation between the three variables implies that they cannot all be included in the same equation. On the other hand, given that there may be a relationship between the degree of centralisation of collective bargaining and wage bargaining coordination, we have chosen to include *Multilevel* variable in our initial model, as it is the variable with the lowest correlation with *Coord* (see table 1).

In the case of variables related to labour market institutions, from an orthodox point of view, we would expect the sign to be negative for employment and wage employment growth and positive for labour growth, i.e. they would slow down job creation and have a negative effect on the unemployment rate.

Tabla 1. Correlation among explanatory variables

	Trade	ALMP	Central	Coord	EPRC	EPT	GDP	GFCF	Level	Multilevel	Pop	Union
Trade	1.000	0.069	0.039	0.357	-0.339	-0.376	0.227	0.250	0.121	0.040	0.208	0.012
ALMP	0.069	1.000	0.061	0.286	-0.049	0.002	0.013	-0.024	0.167	-0.004	-0.094	0.486
Central	0.039	0.061	1.000	0.485	0.105	0.323	0.105	-0.008	0.942	0.750	0.286	0.184
Coord	0.357	0.286	0.485	1.000	-0.141	-0.114	0.042	0.004	0.619	0.412	0.190	0.422
EPRC	-0.339	-0.049	0.105	-0.141	1.000	0.347	-0.144	-0.109	0.066	0.079	-0.221	-0.244
EPT	-0.376	0.002	0.323	-0.114	0.347	1.000	-0.105	-0.043	0.304	0.338	-0.091	-0.060
GDP	0.227	0.013	0.105	0.042	-0.144	-0.105	1.000	0.683	0.043	0.050	0.306	0.031
GFCF	0.250	-0.024	-0.008	0.004	-0.109	-0.043	0.683	1.000	-0.041	-0.024	0.186	0.001
Level	0.121	0.167	0.942	0.619	0.066	0.304	0.043	-0.041	1.000	0.740	0.233	0.250
Multilevel	0.040	-0.004	0.750	0.412	0.079	0.338	0.050	-0.024	0.740	1.000	0.130	0.290
Pop	0.208	-0.094	0.286	0.190	-0.221	-0.091	0.306	0.186	0.233	0.130	1.000	-0.050
Union	0.012	0.486	0.184	0.422	-0.244	-0.060	0.031	0.001	0.250	0.290	-0.050	1.000

As mentioned above, we have three dependent variables: the employment and employees growth rates and the growth in percentage points of unemployment rate. In the case of employment and employees growth, we will estimate two different models depending on the source of the data (labour force statistics and national accounts). As mentioned above, for each of the five explained variables we will estimate two different equations: in one of them the explanatory variable will be the GDP growth rate and in the other the GFCF growth rate.

The dynamics of labour market outcomes is characterised by inertia and high persistence of labour market outcomes. This leads to a potential problem of serial correlation that affects the consistency of the results. Indeed, in all the models studied, the existence of serial correlation has been detected.[6] To correct this problem, the one-period lagged of the explained variable has been included in all the equations as an explanatory variable, which allows us to correct this problem. In this way, we convert the models tested into dynamic models:

- $Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 Economic growth_{i,t} + \beta_3 EPRC_{i,t} + \beta_4 EPT_{i,t} + \beta_5 Pop_{i,t} + \beta_6 Trade_{i,t} + \beta_7 Union_{i,t} + \beta_8 ALMP_{i,t} + \beta_9 Coord_{i,t} + \beta_{10} Multilevel_{i,t} + \epsilon_{i,t}$

Most empirical studies on the effects of EPL on the labour market use GMM models to solve the problems of introducing the lagged dependent variable as an explanatory variable. GMM models are appropriate for short panels with of a large number of countries and a small number of time periods. However, for panels in which the number of years (T) is large, above 30, and the number of individuals (N) is significantly smaller than the number of periods, the estimation of dynamic models using fixed effects provides much more consistent results than alternative procedures, such as IV or GMM estimators, as the bias of the GMM estimators increases with the number of periods. This means that in long dynamic models, the use of fixed effects is a more appropriate procedure than the use of GMM models, which are more appropriate for short models (Baltagi, 2005 and 2007; Hsiao, 2014; Kennedy, 2008; Pesaran, 2015; Wooldridge, 2010). Therefore, given that we have a panel with a period (T) comprising of 35 years and a total of 16 countries (N), since we have a time series longer than 30 years, and the T/N ratio is higher than 2, our models will be estimated using fixed effects.

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[6] Relevant data are available upon request.

On the other hand, European economies are highly interrelated; thereby, they may be affected by common shocks. Therefore, in those cases where the cross-section dependence panel tests have confirmed the existence of cross-section dependence, we have applied SUR estimators to correct the contemporaneous correlation between cross-sections[7] (Kennedy, 2008).

A problem that may affect the validity of the results is the possible endogeneity of EPL (Roy, 2021). As already noted, EPL indices are not exempt from criticism in relation to the errors they may suffer from in their measurement and, therefore, in correctly reflecting the true degree of flexibility in hiring and firing. Furthermore, it is plausible that there is an inverse causal relationship between labour market outcomes and EPL indexes, as policymakers may reform hiring and firing conditions based on labour market performance. Therefore, following Wooldridge (2010 and 2013), we have tested the possible endogeneity of EPRC and EFT indices using two instrumental variables. The first is the compensation of employees as a percentage of GDP (data obtained from the OECD), and the second is the *Type* index from the OECD/AIAS ICTWSS Database, which measures the type of coordination of wage setting. The test that we have carried out show that these instruments are related to the EPL indicators and that they are exogenous, as they do not influence employment and unemployment growth[8]. The tests carried out allow us to conclude that the EPRC index is exogenous in all the estimations. In the case of the EPT index, we only detect an endogeneity problem in the estimations of unemployment growth. This result would imply that European countries have made the labour market more flexible in order to alleviate their unemployment problems, and to do so they have mainly chosen to act on temporary hiring by facilitating the use of temporary contracts and agency workers. This hypothesis is consistent and compatible with the growing segmentation and dualisation of a large part of European labour markets (Eichhorst and Marx, 2021). In fact, in our sample of countries and years, between 1895 and 2019 the average value of the EPRC index between 1985 fell from 2.56 to 2.23, while the average value of the EPT index fell from 2.825 to 1.724, pointing to the increased intensity of reforms that have facilitated temporary hiring.

Therefore, in the case of unemployment growth estimations, in addition to the OLS models, we will estimate the equations using an instrumental variable (IV) approach based on a Two-Stage Least Square (TSLS) specification with fixed effects. In this case, we will use the variables

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[7] Relevant data are available upon request.
[8] Data available upon request.

Compensation of Employees and Type as instruments for the EPT index. The choice of this procedure, as discussed above, is based on the existence of a large panel with a very long time series[9].

3.2. Robustness checks

Our baseline models assume a linear relationship between the EPL indicators and the growth of employment and employees and the unemployment rate. However, as noted above, existing studies point to the existence of non-linear effects between EPL and employment and unemployment growth. By including a quadratic relationship between employment protection and labour market outcomes, we test the hypothesis that there is an increasing or decreasing marginal relationship between these variables, and that there is a threshold at which the effects of EPL on employment and unemployment increase or decrease, as the case may be. Therefore, we will test the following equation:

$$Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 Economicgrowth_{i,t} + \beta_3 EPRC_{i,t} + \beta_4 EPRC_{i,t}^2 + \beta_5 EPT_{i,t} + \beta_6 EPT_{i,t}^2$$
$$+ \beta_7 Pop_{i,t} + \beta_8 Trade_{i,t} + \beta_9 Union_{i,t} + \beta_{10} ALMP_{i,t} + \beta_{11} Coord_{i,t}$$
$$+ \beta_{12} Multilevel_{i,t} + \epsilon_{i,t}$$

Moreover, given that some empirical studies indicate that the effects of employment protection would depend on the economic context or the phase of the cycle in which the economy finds itself, we will also test the existence of interaction effects between employment protection and economic growth. The existence of these effects would show that the impact of employment protection on labour market is different depending on the rate of economic growth, and, by extension, on the phase of the business cycle in which the economy finds itself. Thus, the equation to be estimated is:

$$Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 Economicgrowth_{i,t} + \beta_3 EPRC_{i,t} + \beta_4 Economicgrowth_{i,t} * EPRC_{i,t}$$
$$+ \beta_5 EPT_{i,t} + \beta_6 Economicgrowth_{i,t} * EPT_{i,t} + \beta_7 EPop_{i,t} + \beta_8 Tradeomic_{i,t}$$
$$+ \beta_9 Union_{i,t} + \beta_{10} ALMP_{i,t} + \beta_{11} Coord_{i,t} + \beta_{12} Multilevel_{i,t} + \epsilon_{i,t}$$

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[9] The existence of long time series raises the possible non-stationarity of the variables, which would entail the use of other methods (cointegration methods and error correction models) to analyse the short-and long-term relationships between the variables in the model. The tests carried out, however, show that the series of employment and employees growth rates and the growth of unemployment rates are stationary Data available upon request.

4. Data

In this contribution, we seek to analyse the impact of employment protection on the dynamics of employment, employees and unemployment rates. To analyse this impact over the longest possible period of time, we will use versions 1 of the EPRC and EPT indexes. Given the availability of data, we analyse the determinants of the labour market performance in 16 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom) between the years 1985 and 2019 (35 years). Given that not all the variables are available in all countries for the total number of years analysed, we have an unbalanced panel.

Table 2. Summary statistics

	Mean	Median	Maximum	Minimum	Std Dev	Obs
ΔEmployment LFS	0.912	0.934	13.505	-8.864	2.114	560
ΔEmployment NA	0.867	0.991	8.152	-7.843	1.752	553
ΔEmployees LFS	1.137	1.138	29.573	-13.374	2.697	560
ΔEmployees NA	1.031	1.163	7.274	-8.006	1.905	546
ΔUnemployment rate	-0.034	-0.100	6.600	-3.300	1.144	560
ΔGDP	2.164	2.203	25.176	-10.149	2.564	560
ΔGFCF	2.680	2.801	74.869	-25.371	7.641	560
EPRC	2.387	2.408	5.000	1.103	0.823	560
EPT	2.084	1.625	5.250	0.250	1.252	560
ΔPop15-64	0.403	0.355	3.302	-1.326	0.566	560
Trade openness	80.227	69.766	252.342	34.334	35.973	560
Union density	38.965	33.800	86.600	8.500	21.458	521
ALMP	0.808	0.740	2.700	0.060	0.451	533
Coord	3.289	4.000	5.000	1.000	1.056	560
Multilevel	2.995	2.000	6.000	1.000	1.417	560

Table 2 shows the main descriptive statistics of the variables imcluded in our analysis. Total employment and employees have grown at an average annual rate close to 1%, while the unemployment rate has remained practically unchanged. Economic activity has grown at an average annual rate of 2.2% and productive investment has grown at a slightly higher rate of 2.7%, although in this case with a greater dispersion.

As regards wage bargaining, the coordination of the wage-setting process (*Coord*) is characterised by the existence of non-binding norms and guidelines issued by the government

and/or the employers' associations and trade unions. Finally, the degree of centralisation of collective bargaining (*Multilevel*) is characterised by an intermediate structure in which bargaining by sector or industry predominates.

Table 2 provides a snapshot of the values of the variables included in our analysis, but do not provide information on the temporal dynamics of these variables, specifically on the existence of trends or breaks in their evolution that may lead to significant differences at different points in time during the period analysed. With this objective in mind, in figure 1 we have plotted the time evolution of the average value for the 16 countries studied of the variables included in our models.

Figure 1. Evolution of the average
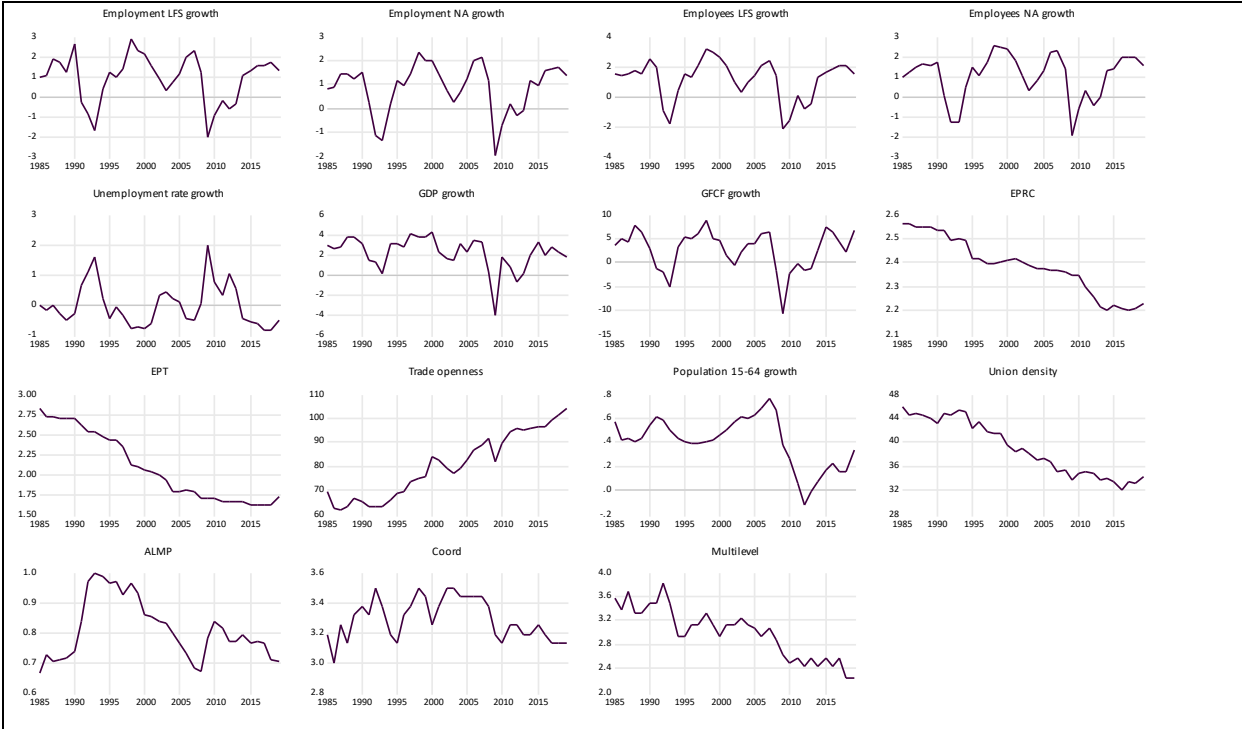
The three dependent variables fluctuate in a stable, cyclical way, around the average rates for the period. A similar result is detected in the GDP and GFCF growth rates. However, in the rest of the explanatory variables we detect the existence of marked trends. Thus, in the case of the working-age population, from 2008 onwards, coinciding with the outbreak of the global financial crisis, the growth rate of the working-age population plummeted. Trade openness, on the other hand, is characterised by a continuously increasing path, evidence of the acceleration in the process of economic globalisation.

As regards the variables related to labour market institutions, a marked downward trend can be observed in all of them. In the case of employment protection legislation, the decline in the EPRC and EPT indexes show the general tendency in European countries to reduce employment protection for salaried workers, and the commitment to make the use of temporary contracts and agency workers more flexible as a tool to stimulate job creation and lower unemployment rates.

The data also show that union membership among employees is decreasing. As regards spending on active labour market policies, since 1993, when they reached their peak (1% of GDP), public spending on these items has been decreasing, standing at 0.7% of GDP in 2018. Finally, with regard to collective bargaining, the degree of coordination of the wage-setting process is progressively decreasing along with a move towards greater decentralisation of collective bargaining, with a greater role for company-level agreements.

From the New Keynesian perspective, the decline in employment protection should have translated into an acceleration in job creation and a reduction in unemployment rates, a process favoured by the process of greater flexibility in wage bargaining processes and the loss of workers' bargaining power associated with lower trade union density. However, Figure 1 shows, the growth in employment, employees and unemployment rates have remained quite stable in the long term.

4. Results

4.1. Baseline specifications

According to the New Keynesian approach, in all the equations tested, the coefficients of the EPRC and EPT indicators should be significant, with a negative sign in the estimations of the determinants of employment and employees growth rates, and with a positive sign in the case of the growth of the unemployment rate. This implies that employment protection legislation has a negative impact on employment, employees and unemployment rates. Therefore, those labour reforms that have approved measures to reduce employment protection should have contributed to accelerate the process of job creation and the reduction of unemployment rates.

Table 3 shows the results of the equations testing the determinants of the evolution of the unemployment rate. The data show the high inertia of the change in the unemployment rate, given the positive value of the lagged change in the unemployment rate. As expected, economic growth, whether measured by GDP or productive investment growth rates, has a significant inverse effect on the evolution of the unemployment rate, contributing to its reduction.

Table 3. Determinants of the growth of unemployment rate

	LS		IV TSLS	
	(1)	(2)	(3)	(4)
C	-0.003	-0.252	0.377	-0.083
	(0.175)	(0.182)	(0.643)	(0.370)
Unemployment(-1)	0.462***	0.469***	0.460***	0.472***
	(0.063)	(0.063)	(0.063)	(0.064)
GDP growth	-0.170***		-0.181***	
	(0.024)		(0.034)	
GFCF growth		-0.047***		-0.047***
		(0.008)		(0.008)
EPRC	0.068	0.070	0.123	0.030
	(0.051)	(0.050)	(0.121)	(0.137)
EPT	-0.024	0.026	-0.253	0.034
	(0.031)	(0.033)	(0.405)	(0.040)
Population 15-64	0.314***	0.229**	0.333***	0.211**
	(0.097)	(0.095)	(0.105)	(0.10)
Trade openness	0.001	0.001	-0.001	0.001
	(0.001)	(0.001)	(0.003)	(0.002)
Union density	0.001	0.002	-0.001	0.001
	(0.002)	(0.002)	(0.003)	(0.003)
ALMP	0.064	0.002	0.156	0.014
	(0.080)	(0.080)	(0.182)	(0.091)
Coord	-0.070	-0.053	-0.118	-0.048
	(0.053)	(0.054)	(0.091)	(0.056)
Multilevel	0.057*	0.023	0.145	0.030
	(0.030)	(0.031)	(0.150)	(0.034)
Country fixed effect	No	No	No	No
Year fixed effect	Yes	Yes	Yes	Yes
Prob J-Statistics			0.646	0.130
R^2	0.677	0.672	0.647	0.671
Obs	484	484	482	482

Robust standard errors in parenthesis
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

As far as the impact of EPL is concerned, the results of our analysis clearly show that employment protection for permanent and temporary workers does not have a significant impact on the growth of the unemployment rate. These results can be considered robust and

conclusive, as they are not affected by the use of the GDP or productive investment growth rates as explanatory variables, or by the type of model (OLS with fixed effects or IV-TSLS).

As regards control variables, the effect of the working-age population on the dynamics of the unemployment rate is significant and inverse, so that working-age population growth increases the unemployment rate. Regarding trade openness, it is not a determinant of the dynamics of the unemployment rate. These effects can be considered robust as they are not affected by the different model specifications or the choice of the GDP or the GFCF growth rates as a proxy for economic growth.

The same results are obtained for the other institutional labour market variables. Only in Multilevel, the variable related to the degree of centralisation of collective bargaining, a significant effect has been detected. However, this effect only occurs in the equation estimated by OLS that includes GDP growth as the explanatory variable, and, therefore, this effect can not be considered as robust.

Therefore, we can conclude that the evolution of the unemployment rate in European countries during the last four decades is explained by two elements: population growth and economic growth, and that labour market reforms aimed at making the labour market more flexible, reducing employment protection and favouring less centralised and coordinated collective bargaining, have not had any significant effect on the unemployment rate. Therefore, the reforms approved to reduce the employment protection for permanent and temporary workers would have not contributed to reduce unemployment rates in Europe.

This result calls into question the widespread use of labour reforms as the centrepiece of the strategies to reduce European unemployment rates, which have focused on favouring temporary hiring in order to stimulate job creation and reduce unemployment rates, and lends support to those who argue that the only effective and viable strategy to reduce unemployment rates in Europe is through the implementation of economic policy measures that favour economic growth and productive investment.

Table 4 analyses the determinants of the employment growth rate.[10] As expected, employment growth is directly related to economic growth, whether the latter is measured by GDP growth or investment growth. As in the case of the unemployment rate, the growth of the working age population also positively affects employment growth. These results can be considered as robust, given that they are independent of the different specifications of the models tested, that is, they are not affected by the choice of the explanatory variables related to economic growth (GDP of GFCF growth) or the source of data on employment (labour force statistics or national accounts).

Table 4. Determinants of employment growth rate

	Employment LFS		Employment National Accounts	
	(1)	(2)	(3)	(4)
C	-0.171	0.344	2.657**	2.957***
	(0.330)	(0.352)	(1.070)	(1.065)
Employment(-1)	0.284***	0.293***	0.427***	0.448***
	(0.051)	(0.054)	(0.058)	(0.059)
GDP growth	0.358***		0.299***	
	(0.051)		(0.045)	
GFCF growth		0.089***		0.081***
		(0.016)		(0.013)
EPRC	-0.045	-0.046	-0.439	-0.433
	(0.093)	(0.096)	(0.307)	(0.301)
EPT	0.112**	0.009	-0.049	-0.113
	(0.056)	(0.060)	(0.093)	(0.097)
Population 15-64	0.443**	0.636***	0.380**	0.425**
	(0.172)	(0.180)	(0.186)	(0.192)
Trade openness	-0.004	-0.003	-0.011	-0.013*
	(0.003)	(0.003)	(0.007)	(0.007)
Union density	-0.008**	-0.010**	-0.020*	-0.017
	(0.004)	(0.004)	(0.012)	(0.011)
ALMP	-0.290**	-0.162	0.082	0.220
	(0.167)	(0.172)	(0.198)	(0.203)
Coord	0.273***	0.224**	0.221	0.253
	(0.100)	(0.107)	(0.168)	(0.170)
Multilevel	-0.104*	-0.038	-0.331***	-0.317***
	(0.061)	(0.067)	(0.089)	(0.091)
Netherlands 1987	12.639***	12.375***		
	(1.641)	(1.747)		
Country fixed effect	No	No	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
R^2	0.663	0.642	0.729	0.723
Obs	484	484	477	477

Robust standard errors in parenthesis
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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[10] Among the determinants of employment we have included a dummy variable to incorporate the effect of a change in the Dutch employment series in 1987 based on LFS due to purely statistical factors.

Regarding employment protection, the coefficient of the EPRC index is not significant in any of the equations. This result implies that protection for permanent employment does not explain the dynamics of employment, and that, therefore, poor job creation data cannot be blamed on high protection for permanent employment. By extension, it also implies that the generalized reforms that have reduced employment protection for permanent workers in Europe have not contributed to accelerating employment growth, contrary to the expectations of their promoters.

In the case of the EPT index, it is only significant, having a positive sign, when we use LFS data and GDP growth is used as an explanatory variable. This result implies that a higher employment protection for temporary workers is associated to larger employment creation, just the opposite result to that advocated by New Keynesian economists. However, in the other three equations, its coefficient is not significant. Moreover, when we test the evolution of employment measured in national accounts, there is change in the sign of the coefficient of the EPT index.

In sum, we can state that employment protection is not a significant determinant of the evolution of employment. Contrary to mainstream postulates, poor employment creation is not explained by a high employment protection for permanent or temporary workers. Therefore, the reforms approved to reduce the employment protection for permanent and temporary workers would have not contributed to accelerate the processs of employment creation. As in the case of unemployment, a faster pace of job creation would imply higher economic growth, hence the need for measures to stimulate economic activity and productive investment.

As far as the other control variables are concerned, the results are not consistent or their effect is very small. Regarding trade openness, this variable cannot considered as a significant determinant of the growth of employment. The reason is that it is only significant in one equation (equation 4), which includes GFCF growth as explanatory variable and uses NA data of employment. Focusing on ALMP, its coefficient is only significant in one equation. In the case of the wage bargaining coordination, it is not significant when employment is measured using national accounts data. In the case of the centralisation of collective bargaining, doubts about the robustness of the results arise due to marked differences in the value of the coefficient in the equations testing employment growth that use LFS or national accounts data, and from the fact that in equation 2, the coefficient is not significant, so that, although it could be argued

that a greater degree of centralisation in wage bargaining would be associated with higher employment growth, it would nevertheless be very risky to quantify the true size of this effect. Finally, although it could be argued that trade union density contributes to a reduction in job creation, the coefficients are very small, so that the degree of economic relevance of this variable is very low.

Table 5. Determinants of employees' growth rate

	Employees LFS		Employees National Accounts	
	(1)	(2)	(3)	(4)
C	4.102**	4.362**	3.180***	3.406***
	(1.787)	(1.765)	(1.117)	(1.091)
Employees (-1)	0.153*	0.161***	0.501***	0.531***
	(0.082)	(0.040)	(0.055)	(0.055)
GDP growth	0.448***		0.313***	
	(0.134)		(0.047)	
GFCF growth		0.108***		0.083***
		(0.018)		(0.013)
EPRC	-0.896**	-0.895**	-0.416	-0.406
	(0.334)	(0.452)	(0.342)	(0.332)
EPT	-0.165	-0.248*	-0.130	-0.194*
	(0.221)	(0.139)	(0.100)	(0.104)
Population 15-64	0.984***	1.110***	0.263	0.297
	(0.289)	(0.271)	(0.189)	(0.197)
Trade openness	-0.005	-0.005	-0.011	-0.013*
	(0.006)	(0.010)	(0.007)	(0.007)
Union density	0.043*	0.040**	-0.019	-0.015
	(0.023)	(0.009)	(0.013)	(0.013)
ALMP	-0.475	-0.314	0.022	0.157
	(0.334)	(0.318)	(0.206)	(0.206)
Coord	0.132	0.186	0.082	0.129
	(0.242)	(0.235)	(0.174))	(0.175)
Multilevel	-0.053	-0.033	-0.292***	-0.287***
	(0.178)	(0.132)	(0.089)	(0.093)
Netherlands 1987	10.860***	10.742***		
	(0.457)	(1.975)		
Germany 1991	27.307***	28.478***		
	(0.476)	(1.817)		
Switzerland 2010	-14.036***	-14.003***		
	(0.439)	(1.347)		
Country fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
R^2	0.758	0.739	0.772	0.765
Obs	484	484	470	470

Robust standard errors in parenthesis
*** p < 0.01, ** p < 0.05, * p < 0.1

Finally, we have analysed the impact of employment protection legislation on employees growth rate[11] (see table 5). As expected, regardless we focus on GDP or GFCF growth, economic growth has a significant direct effect on employees' growth. The results of the impact of employment protection are far from robust and conclusive. If we look at employment protection for permanent workers, when we analyse LFS-based employees data, this protection has a significant negative effect on employees creation, such that the higher the employment protection for permanent workers, the lower the employees growth rate. However, this significant effect disappears when we look at employees data based on national accounts. If we focus on employment protection for temporary workers, we detect a significant negative effect when productive investment growth is included as an explanatory variable, but this effect disappears in the equations using the GDP growth rate as an explanatory variable. All in all, these results do not allow us to state categorically that employment protection (negatively) affects wage employment creation, as the results are different depending on the variable for economic growth (GDP or GFCF growth rate) and the source of employees data (LFS or national accounts). In summary, our results allow us to conclude that it cannot be stated that higher or lower employment protection is associated with a higher or lower employees' growth rate. Likewise, it cannot be argued that reforms that have reduced employment protection for permanent and temporary workers help to accelerate the process of employees' creation.

As regards the control variables, trade openness is not a significant determinant of the evolution of employees, because its coefficient is only significant when we use employees data based on national accounts and GFCF growth is used as explanatory variable. Contrary to what happens in the case of employment and unemployment, the effect of working-age population growth is not conclusive: it has a significant impact on employees' growth when we use the data on employees based on LFS, but the impact is no longer significant if we use employees data from national accounts.

In the case of the wage bargaining coordination index and the expenditure on active labour market policies, these variables do not have a significant impact on employees' growth. In the case of union density, the results are again inconclusive. Union density only has a direct significant effect on employees' creation if we use data from labour force statistics. Moreover,

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[11] Among the determinants of employees' growth based on labour force statistics we have included three dummies to incorporate the effect of a change in Netherlands in 1987 and in Switzerland in 2010 due to purely statistical factors, and to capture the effect on the German employees series in 1991 as a result of the reunification process.

it is striking that when we use LFS data, union density accelerates employees but slows down employment growth. As for the effect of collective bargaining centralisation (Multilevel), it only has a significant negative effect when we use national accounts data, but the effect is no longer significant with LFS data. All in all, we can see that the effects of labour institutions on wage employment creation are influenced by the origin of employees data.

4.2. Robustness checks

The above results allow us to state that employment protection does not explain the growth of of employment, employees and the unemployment rate. The growth of these variables is mainly explained by economic growth and demographic factors linked to the evolution of the working-age population. Employment growth rate would be directly related to economic growth and the growth of the working-age population, while employees' growth rate would depend directly on economic growth. On the other hand, the growth of the unemployment rate would be directly related to the increase in the working-age population and inversely related to economic growth.

These conclusions are derived from estimations based on a linear relationship between EPL and the growth of employment, employees and unemployment. However, as noted above, a number of theoretical and empirical studies suggest that negative effects of EPL on labour market outcomes are generated when employment protection is excessive. Moreover, it is also possible that the effects are affected by the business cycle, so that the effects of EPL may differ depending on the growth rate of the economy. Therefore, we will now show the results obtained when estimating the models by testing, first, for the existence of a non-linear quadratic relationship between the EPL indices and the dynamics of employment, employees and unemployment rate, and, second, for the existence of interaction effects between GDP and GFCF growth rates and EPL indices.

Table 6. Impact of employment protection legislation on growth of unemployment rate: non-linear relationship and interaction effects with economic growth

	(1)	(2)	(3)	(4)
C	0.177	-0.180	-1.344	-0.388
	(0.328)	(0.196)	(1.388)	(0.725)
Unemployment(-1)	0.461***	0.451***	0.459***	0.451***
	(0.064)	(0.061)	(0.064)	(0.060)
GDP growth	-0.169***	-0.104**		
	(0.025)	(0.044)		
GFCF growth			-0.048***	-0.004
			(0.008)	(0.015)
EPRC	-0.094	0.102	0.567	0.442*
	(0.248)	(0.066)	(0.848)	(0.263)
EPRC^2	-0.031		-0.024	
	(0.047)		(0.120)	
EPRC*GDP		-0.011		
		(0.021)		
EPRC*GFCF				-0.013*
				(0.007)
EPT	-0.016	0.069	0.660***	0.127**
	(0.118)	(0.048)	(0.227)	(0.061)
EPT^2	-0.000		-0.105***	
	(0.025)		(0.039)	
EPT*GDP		-0.038**		
		(0.017)		
EPT*GFCF				-0.016***
				(0.005)
Population 15-64	0.309***	0.307***	0.158	0.203
	(0.097)	(0.098)	(0.131)	(0.127)
Trade openness	0.001	0.001	0.001	-0.001
	(0.001)	(0.001)	(0.004)	(0.004)
Union density	0.001	0.001	-0.015	-0.013
	(0.002)	(0.002)	(0.010)	(0.008)
ALMP	0.067	0.067	-0.084	-0.090
	(0.081)	(0.080)	(0.150)	(0.143)
Coord	-0.058	-0.073	-0.051	-0.116
	(0.057)	(0.052)	(0.104)	(0.098)
Multilevel	0.054*	0.054*	0.074	0.078
	(0.030)	(0.030)	(0.056)	(0.057)
Country fixed effect	No	No	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
R^2	0.679	0.687	0.689	0.708

Robust standard errors in parenthesis
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6 shows the results of the estimations of the effects of EPL on the growth of the unemployment rate, testing the existence of non-linear effects and interaction effects between

employment protection and economic growth[12]. Regarding protection for permanent workers, the results corroborate the previous analysis. On the one hand, we can rule out the existence of a non-linear relationship between the EPRC index and the growth of unemployment rates. On the other hand, interaction effects are only detected with GFCF growth rate (equation 4), but not when the interaction with GDP growth rate is tested. It should also be borne in mind that in this model, GFCF growth by itself does not have a significant effect on the change in unemployment rate, and that, in any case, the coefficients corresponding to the EPRC index and its interaction with GFCF growth are not significant at the usual 5% probability level. For this reason, we can conclude that we can consistently reject that employment protection for permanent workers affects the growth of the unemployment rate.

If we focus on employment protection for temporary workers, the results show a non-linear relationship, with a decreasing marginal effect, between EPT and the change in the unemployment rate when we use investment growth as explanatory variable. Thus, if GFCF growth rate is below 7.99%, EPT increases the unemployment rate, but if productive investment grows at a higher rate, EPT contributes to a fall in the unemployment rate. This implies that the effects of temporary employment protection on the unemployment rate depend on the rate of increase of investment. However, when we use the GDP growth rate, we do not detect a non-linear effect of EPT on the evolution of unemployment rates. Therefore, we cannot conclusively state that there is a non-linear quadratic relationship between the EPT index and the change in unemployment rates.

Regarding the interaction effects between EPT and economic growth, equation 2 shows that although the interaction effect with GDP growth is significant, EPT index alone is not significant. The negative sign of the interaction coefficient implies that the higher the employment protection for temporary workers, the greater the effect of GDP growth in reducing the unemployment rate. However, there are serious doubts about the robustness of this result. The reason is that when we analyse the interaction between GFCF growth and EPT (equation 4), GFCF growth is no longer significant.

Table 7 shows the results of the estimations testing the existence of a non-linear relationship between EPL and of interaction effects between EPL and the rate of economic growth, with

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[12] For reasons of space, in this section we do not comment on the results for the remaining explanatory and control variables.

respect to the employment growth rate. The results rule out the existence of a non-linear relationship between EPL and employment growth, a result that is robust given that it is registered in all models irrespective of the economic growth proxy variable and the source of the employment data. This finding invalidates the argument that an excessive level of employment protection holds back job creation, while leaving no justification for advocating labour reforms that reduce employment protection in economies with high levels of employment protection (or higher levels of protection than in other neighbouring countries).

Table 7. Impact of employment protection legislation on employment growth rate: non-linear relationship and interaction effects with economic growth

	Employment LFS				Employment National Accounts			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	-0.166 (0.607)	0.500 (0.644)	0.237 (0.384)	0.451 (0.375)	2.067 (1.766)	3.037* (1.781)	2.666** (1.046)	2.485** (1.050)
Employment(-1)	0.283*** (0.051)	0.291*** (0.054)	0.266*** (0.049)	0.272*** (0.053)	0.427*** (0.059)	0.448*** (0.060)	0.415*** (0.057)	0.433*** (0.057)
GDP growth	0.356*** (0.051)		0.205** (0.093)	()	0.300*** (0.046)		0.175** (0.083)	
GFCF growth		0.089*** (0.016)		0.034 (0.032)		0.081 (0.013)		0.028 (0.025)
EPRC	0.025 (0.450)	-0.022 (0.473)	-0.116 (0.113)	-0.064 (0.098)	-0.034 (1.041)	-0.414 (1.031)	-0.551* (0.298)	-0.508* (0.276)
EPRC^2	-0.011 (0.079)	0.001 (0.084)			-0.067 (0.164)	-0.004 (0.158)		
EPRC*GDP			0.024 (0.037)				0.038 (0.032)	
EPRC*GFCF				0.013 (0.014)				0.019** (0.010)
EPT	-0.023 (0.256)	-0.290 (0.264)	-0.107 (0.085)	-0.072 (0.070)	-0.021 (0.449)	-0.366 (0.449)	-0.122 (0.100)	-0.128 (0.100)
EPT^2	0.030 (0.054)	0.069 (0.056)			-0.004 (0.082)	0.047 (0.083)		
EPT*GDP			0.091*** (0.029)				0.048** (0.024)	
EPT*GFCF				0.025*** (0.009)				0.014** (0.007)
Population 15-64	0.442*** (0.170)	0.625*** (0.178)	0.481*** (0.169)	0.664*** (0.174)	0.374** (0.189)	0.433** (0.197)	0.379** (0.185)	0.426** (0.189)
Trade openness	-0.004 (0.003)	-0.004 (0.004)	-0.004 (0.003)	-0.002 (0.003)	-0.011 (0.007)	-0.013* (0.007)	-0.012 (0.007)	-0.010 (0.007)
Union density	-0.008** (0.004)	-0.010** (-0.004)	-0.009** (-0.004)	-0.010*** (0.004)	-0.020 (0.014)	-0.014 (0.014)	-0.016 (0.011)	-0.013 (0.011)
ALMP	-0.287* (0.170)	-0.154 (0.175)	-0.298* (0.169)	-0.165 (0.171)	0.073 (0.201)	0.227 (0.204)	0.074 (0.192)	0.244 (0.195)
Coord	0.283** (0.115)	0.258** (0.121)	0.283*** (0.100)	0.219** (0.105)	0.223 (0.169)	0.252 (0.171)	0.313* (0.163)	0.321* (0.164)
Multilevel	-0.109* (0.060)	-0.053 (0.066)	-0.095 (0.062)	-0.031 (0.068)	-0.329*** (0.088)	-0.321*** (0.091)	-0.365*** (0.089)	-0.332*** (0.091)
Netherlands 1987	12.656*** (1.640)	12.433*** (1.748)	12.633*** (1.598)	12.420*** (1.731)				
Country fixed effect	No	No	No	No	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.663	0.643	0.678	0.656	0.729	0.723	0.737	0.735

Robust standard errors in parenthesis
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

As far as the existence of interaction effects is concerned, these effects have been detected in the case of employment protection for temporary workers. This effect is positive, such that the higher the GDP or investment growth and the higher the temporary employment protection, the higher the employment growth rate. However, again, there are doubts about the robustness of this result. The reason is that when we use GFCF growth as explanatory variable, investment growth alone has no impact on job creation, which is the case for GDP growth. Moreover, EPT index alone has no effect on employment, whether we use GDP or investment growth as the explanatory variable.

With respect to employment protection for permanent workers, the interaction effect only exists between the EPRC index and the investment growth when we use national accounts data, but is not detected when we use GDP growth as an explanatory variable or LFS data; so that we cannot consistently state that the EPRC has a negative effect on employment growth. In any case, this interaction translates into a decreasing marginal effect, such that the higher the investment growth and the higher the protection for temporary employment, the smaller the negative impact of EPRC on employment growth. In fact, the coefficient values show that when the interaction value exceeds 26.2, employment protection for permanent workers would have a positive overall effect on employment creation.

In sum, the robustness tests that have been carried out reinforce the conclusions drawn in our previous analysis, and we can therefore conclude that employment protection for temporary and permanent workers do not have a negative impact on employment creation. This implies that we can also conclude that the reforms implemented to reduce employment protection have not had the expected effect of accelerating the process of job creation, and may, if anything, have contributed to slowing it down.

Table 8. Impact of employment protection legislation on employees' growth rate: non-linear relationship and interaction effects with economic growth

	Employees LFS				Employees National Accounts			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	4.156	5.451*	3.780*	3.321*	3.078	4.052**	3.201***	2.913***
	(2.600)	(2.990)	(1.802)	(1.692)	(1.891)	(1.871)	(1.081)	(1.051)
Employees(-1)	0.154*	0.163***	0.139*	0.142***	0.501***	0.531***	0.488***	0.518***
	(0.082)	(0.040)	(0.073)	(0.039)	(0.055)	(0.055)	(0.053)	(0.051)
GDP growth	0.443***		0.266**		0.314***		0.168**	
	(0.139)		(0.118)		(0.048)		(0.085)	
GFCF growth		0.106***		0.018		0.083***		0.015
		(0.018)		(0.036)	()	(0.013)	()	(0.025)
EPRC	-0.828	-1.427	-0.911**	-0.996**	-0.375	-0.799	-0.540	-0.508*
	(0.966)	(1.646)	(0.393)	(0.406)	(1.125)	(1.099)	(0.330)	(0.298)
EPRC^2	-0.013	0.084			-0.007	0.065		
	(0.119)	(0.256)			(0.173)	(0.163)		
EPRC*GDP			-0.005				0.040	
			(0.062)				(0.031)	
EPRC*GFCF				0.025				0.027***
				(0.016)				(0.010)
EPT	-0.554	-1.068	-0.443	-0.306**	-0.030	-0.385	-0.225**	-0.208**
	(0.828)	(0.674)	(0.283)	(0.137)	(0.464)	(0.464)	(0.106)	(0.105)
EPT^2	0.073	0.152			-0.018	0.034		
	(0.138)	(0.125)			(0.084)	(0.085)		
EPT*GDP			0.157**				0.060**	
			(0.071)				(0.025)	
EPT*GFCF				0.035***				0.014*
				(0.137)				(0.007)
Population 15-64	0.996***	1.141***	0.961***	1.091***	0.260	0.307	0.265	0.297
	(0.308)	(0.272)	(0.265)	(0.259)	(0.194)	(0.201)	(0.188)	(0.191)
Trade openness	-0.004	-0.003	-0.007	0.002	-0.011	-0.013*	-0.012	-0.009
	(0.007)	(0.010)	(0.006)	(0.010)	(0.007)	(0.007)	(0.007)	(0.007)
Union density	-0.038	-0.031	-0.032*	-0.031	-0.020	-0.013	-0.014	-0.011
	(0.024)	(0.022)	(0.018)	(0.019)	(0.015)	(0.015)	(0.012)	(0.012)
ALMP	-0.469	-0.289	-0.508	-0.273	0.018	0.171	0.010	0.190
	(0.318)	(0.321)	(0.313)	(0.309)	(0.208)	(0.207)	(0.202)	(0.200)
Coord	0.129	0.175	0.309	0.316	0.083	0.125	0.187	0.203
	(0.244)	(0.235)	(0.216)	(0.224)	(0.175)	(0.176)	(0.166)	(0.167)
Multilevel	-0.057	-0.046	-0.101	-0.054	-0.291***	-0.291***	-0.331***	-0.306***
	(0.177)	(0.131)	(0.172)	(0.130)	(0.089)	(0.093)	(0.089)	(0.093)
Netherlands 1987	10.932***	10.859***	11.002	11.060***				
	(0.389)	(2.021)	(0.415)	(2.007)				
Germany 1991	27.389***	28.615***	26.256	28.016				
	(0.602)	(1.758)	(0.471)	(1.773)				
Switzerland 2010	-14.062***	-14.054***	-14.087***	-14.152***				
	(0.419)	(1.325)	(0.445)	(1.291)				
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.758	0.741	0.774	0.756	0.772	0.765	0.782	0.780

Robust standard errors in parenthesis
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8 shows the results of the estimations testing the existence of non-linear and interaction effects of EPL on employees' growth. The data show that there is no non-linear relationship between employment protection and employees' growth. This result is found for both EPRC and EPT indices, irrespective of whether labour force statistics of national accounts data are used or whether GDP or GFCF growth is used as an explanatory variable. However, we do

detect the existence of interaction effects, although the results are not conclusive because they differ depending on the use of GDP or GFCF growth rates and the source of employees' data. In the case of employment protection for permanent workers, when we use GDP growth we do not detect the interaction effect. In fact, the coefficient of the EPRC index is when we use LFS data for employees, but is is not significant with national accounts data. When we use GFCF growth in the estimations (equation 4), the interaction effect does not exist with LFS data. EPRC index has a negative impact on employees' growth, but investment growth is not significant, which raises doubts about the validity of the results. Using national accounts data (equation 8), although the EPRC negatively affects employees' growth, this effect is smaller the higher investment growth is: when investment growth rate is above 18.9%, employment protection for permanent workers has a positive impact on employees growth. However, given that investment growth alone does not influence employees growth, and taking into account that the interaction effect is not detectable with LFS data, we can conclude that it cannot be said that employment protection for permanent workers has a negative impact on employees' growth.

In the case of the employment protection for temporary workers, the results depend on the model, although it must be noted that in all cases there is a significant interaction effect with economic growth that accelerates employees' growth. The problem, however, arises when quantifying the total effect of EPT, since the results are not homogenous. Thus, when we use GDP growth as the explanatory variable and LFS data (equation 3), EPT alone does not affect employees' growth, but the interaction effect is significant and positive, so that the effect of GDP growth on employees' growth is larger the higher the EPT index is. However, when using national accounts data (equation 7) the results are different: EPT slows down the employees' growth but this negative effect is smaller the higher the investment growth. Thus, the total effect of employment protection for temporary workers on employees' growth is positive if investment grows at a rate higher than 3.72% per year. It must be noted that this is a result that occurs in 43% of the observations in our sample, which supports the view that the effects of (temporary) employment protection depend on the specific economic situation.

However, when we use investment growth as an explanatory variable the results are different. Whether we use LFS (equation 4) or NA data (equation 8), investment growth is not significant, the individual effect of EPT is significant and negative, and the interaction effect between EPT and investment growth is significant and positive. This implies that the higher the investment growth, the smaller the total negative effect of EPT. In other words, the final effect of

employment protection for temporary workers on employees depends on the process of productive capital accumulation. Thus, according to the estimations, if we use LFS data EPT contributes to increase employees if investment grows at a rate higher than 8.7%; but if we use national accounts data, EPT increases employees if investment grows at a rate higher than 14.3% per year.

In summary, the robustness test data allow us to rule out the New-Keynesian hypothesis of a negative effect of employment protection on employeees. If anything, but with serious reservations, it could be argued that the effects of employment protection on employees depend on economic growth, since with a high rate of economic growth and productive investment, employment protection would have a positive effect on employees growth.

5. Summary and conclusions

The results of our study show conclusively that, contrary to New Keynesian economics, employment protection does not affect the dynamics of the evolution of the unemployment rate, with economic growth being the main determinant (together with the growth of the working-age population) of the variation in the unemployment rate. Therefore, we can conclude that labour reforms that have reduced employment protection for permanent and temporary workers have not contributed to reducing European unemployment rates.

As regards the effects on employment, EPL does not affect total employment growth. As regards employees, it cannot be argued that the EPL negatively affects employees' growth, as the results are not robust, as they depend on the use of GDP growth or investment as an explanatory variable or the source of employment data (labour force ststiticis or national accounts).

As for the models testing non-linear relationships and interaction effects, the results are not robust and conclusive. At most, but with reservations, the only proposition that can be affirmed is that the higher the growth of GDP/GFCF and the higher the protection for temporary workers, the greater the decline in the unemployment rate. As far as employment and employees growth is concerned, the results also do not allow us to claim that EPL affects employment growth.

Again, with reservations, we can only say that the higher the EPT, the greater the effect of economic growth on employment and employees.

These results imply not only that the main determinant of labour market outcomes is economic growth, but also that we cannot judge the effectiveness of labour market reforms that have made the hiring and firing of workers more flexible through their effects on employment and unemployment, since the results of our analysis indicate that they would have had no effect. Therefore, the valuation of these reforms would be determined by the existence of other direct and indirect effects on both the labour market and economic activity. As indicated in this contribution, the existing studies increasingly point to the existence of adverse micro- and macro-economic effects, so that we could assess these labour reforms negatively.

In the same way that we can conclude that measures to reduce EPL have not improved labour market performance, we can argue that measures to increase labour market protection, in order to reduce the negative effects induced by excessive labour flexibility, would not have negative effects on the labour market.

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