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ABSTRACT

Employment Performance and Institutions: New Answers to an Old Question*

This paper provides new evidence on the linkages between a large array of institutional arrangements (on product, labour and financial markets) and employment performance. Our analysis includes unemployment, inactivity and jobless rates, thus allowing us to control for possible substitution effects across situations of non-employment and to check whether institutional rigidities affecting unemployment impact inactivity along the same line. To cope with common problems related to the inclusion of time-invariant institutional variables in fixed effects models, we present results of regressions based on three different estimators: PCSE, GLS and FEVD, the last one being a new procedure specifically designed to treat slowly changing variables. We build time series data to account for annual evolution of employment protection legislation (EPL), and use new data for unemployment insurance net replacement rates. Moreover, we check for interdependencies across product and labour markets legislation by investigating the marginal impact of selected institutional variables. Among other results, we find evidence of a positive effect of EPL on employment performance as well as of a substitutability relationship across product and labour markets regulation policies.

JEL Classification: E24, J21

Keywords: unemployment, inactivity, institutions, time-invariant variables

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1 Introduction

This paper aims to take a new look at the 'old' problem of European unemployment, by analyzing the institutional and macroeconomic determinants of joblessness and its components, i.e. unemployment and inactivity, for 18 OECD countries over the 1980-2004 period.

According to a standard view, the persistence of a high level of unemployment in continental Europe can be explained by the institutional arrangements at work in those countries. The underlying idea is that the strength of institutional imperfections in European labour markets hinders the proper functioning of these markets, making them 'inflexible'. The subsequent policy recommendations are to remove obstacles to flexibility: decrease unemployment benefits, weaken job protection legislation, increase mobility of labour, improve product market competition (IMF, 2003 and OECD, 1997).[1]

The standard view has undergone some criticisms in a few recent contributions (Baker *et al.*, 2005 and Freeman, 2005). Empirical results provided in those contributions indicate that the relationship between institutional arrangements and employment performance is indeed more complex than the orthodox policy recommendations seemed to imply. This can be illustrated by distinguishing three different sets of contributions within the economic literature.

A first body of the literature is devoted to studying the impact of labour market institutions on the unemployment rate. The main focus of this literature has shifted over time from the 'corporatism' view of the 1980s (Calmfors and Driffill, 1988) to the 'markets regulation' view of the 1990s (Nickell, 1997 and Siebert, 1997). While the 'corporatism' view emphasized the positive impact of specific institutional arrangements - such as the degree of coordination in wage bargaining -, the more recent contributions on 'markets regulation' posit that the strength of labour market imperfections is directly responsible of the recurrence and persistence of European unemployment crises. Blanchard and Wolfers [2000] provide empirical evidence suggesting that institutional arrangements produce adverse impact on employment mainly in interaction with macroeconomic shocks. However, a few theoretical papers have argued that removing rigidities and implementing flexible labour markets may indeed be quite complicated because the various imperfections are complementary to each other (Coe and Snower, 1997; Orszag and Snower, 1999; Saint Paul, 2003).

A second body of the literature deals with the influence of institutional arrangements beyond the labour market. Recent papers have pointed out the existence of interactions between product and labour markets institutions (Amable and Gatti, 2006; Blanchard, 2005; Blanchard and Giavazzi, 2003; Koeniger and Vindigni, 2003) as well as between labour and financial markets imperfections (Wasmer and Weil, 2004; Acemoglu, 2001).[2] Some of these studies challenge the standard view by pointing out that deregulation may in some cases yield perverse effects on employment. Amable and Gatti [2004] develop a dynamic efficiency wage framework where deregulation in product and labour markets boosts labour turnover and reduces job security; this mechanism pushes the incentive compatible real wage schedule upwards and may generate aggregate employment losses. Only a few empirical work try to account for these interdependencies: Boeri *et al.* [2000] and Nicoletti *et al.* [2000] investigate the effects of product market regulation; Nicoletti and Scarpetta [2002] study the joint effects of labour and product markets regulations on labour market performances.

Finally, a third set of contributions investigates more deeply the determinants of employment performance, by relying on a broader range of statistics and indicators. Statistical definitions produce a sharp divide between the unemployed and the economically inactive, but in reality one should consider all those without work as being on a spectrum.

[1] It should be noted that the OECD [2006] proposes a revised "Jobs Strategy" putting forward the Danish flexi-security model as an alternative to complete markets deregulation. The role of "activation" policies on the labor market is particularly stressed.

[2] More details about theoretical channels of interactions across institutional arrangements on different markets will be given in the next Section.

At one end, one finds people defined as unemployed (i.e. those currently engaged in active job search) and, at the other end, one would have those who do not intend ever to look for a job (Gregg and Wadsworth, 1998). Most contributions in this field have notably focused on the consequences of markets deregulation on wages disparities and employment opportunities for marginal workers. Schmitt and Wadsworth [2002] argue that deregulation does not necessary yield better employment opportunities for those marginal categories, and is indeed associated with greater wage disparities and higher inactivity for marginal workers. As a consequence, the standard deregulation view should be analyzed against its implication for inactivity and joblessness as well. Moreover, there is some evidence of cross-country differences in participation rates, which might be linked to the institutional arrangements at works in those country.[3] In this line, Faggio and Nickell [2005] and Bicakova [2005] investigate the institutional and macroeconomic determinants of inactivity for low-skilled prime age men. These contributions provide some evidence of a substitution effect between unemployment and inactivity in a subset of countries (see Section 2.1 for more details).

In spite of a rich economic literature, strong empirical results are lacking on (at least) two main questions: the employment effects of institutional arrangements beyond the labour market, taking into account that interdependencies exist across supposed rigidities; and the impact of institutional arrangements on unemployment and inactivity for different categories of workers. Our paper aims to take a step further in our understanding of these crucial phenomena. Our estimation strategy is largely inspired by Nickel *et al.* [2005] that we amend in various directions.

First, we include in our analysis a large array of institutional arrangements, which capture imperfections on several markets (financial, product and labour markets) as well as the degree of independence of the Central Bank. Second, we consider three alternative measures of employment performance: the joblessness rate and its two components, i.e. the inactivity and unemployment rates; this will allow us to check for substitution effects across the different situations of non-employment.[4] Third, we investigate the impact of institutional arrangements and macroeconomic conditions on the employment performance of workers, disaggregated according to sex and age categories.[5] Fourth, we account for the possible interdependency between product and labour markets regulation, and check whether these two regulation are linked by a substitutability or a complementarity effect by including an interaction term and testing the subsequent marginal effect of each policy. Finally, this paper provides a contribution to the empirical literature by suggestion new solutions to the well-known problem of consistently estimating time-invariant variables within fixed effect models. We cope with this problem in two different ways: first, we adopt a specific estimation technique designed to improve estimations of time-invariant or slowly changing variables, proposed by Plümper and Trögger [2004] (FEVD procedure) ; second, we construct a new indicator of EPL based on annual 'observations' of reforms.

The paper is organized as follows. In the next Section, we present the theoretical and empirical background of our estimations. In Section 3, we present our empirical results for unemployment, joblessness and inactivity of the working age population, based on three estimators OLS/PCSE, GLS and FEVD. Section 4 displays results of the two extensions of our baseline model: the disaggregated analysis of joblessness, and the analysis of the interdependency between labour and products markets regulation. Some conclusive remarks are presented in Section 5.

[3] See Eurostat studies by Barham, 2002 and Weir, 2003.

[4] If one looks at the evolution of inactivity and unemployment rates for selected countries, there are indeed cases where a trade-off emerges, though this is not a general feature of our sample (see Appendix 6.3, Figures 1 to 3).

[5] Murphy and Topel [1997] as well as Faggio and Nickell [2005] focus on prime age men. Fortin and Fortin [1999] analyse the institutional determinants of inactivity in Canada by desagregating the working age population by sex and age groups.

2 Related literature, data and methodology

This Section presents the background for our estimations in four steps. First, we present the main theoretical channels through which the institutional variables, that will be included in our empirical study, affect the aggregate employment performance. Second, we review the main results of the empirical literature devoted to the institutional determinants of labour market performance, insisting on the three different areas of study already identified in the Introduction. Third, we present our database and give more details about our indicators of employment protection legislation (EPL) and central bank independence (CBI). Finally, we briefly discuss the methodological problems linked to the use of Time Series-Cross Section annual data and describe our proposed solutions to those problems.

2.1 main theoretical channels

We present here the main theoretical mechanisms put forward in the literature on the institutional determinants of employment. First, we assess the role of imperfections on labour, product and financial markets. Then we turn to the crucial question of Central Bank independence.

Labour markets imperfections. There is a rich literature detailing the positive effects of reducing labour market imperfections (see Introduction above): lowering EPL, net replacement rates, wage taxes and union density should lead to a lower real wage schedule and equilibrium unemployment; however, wage coordination is frequently assumed to enhance employment performance by allowing for wage moderation (Calmfors and Driffill, 1988). However, one should note that a negative impact of increased labour market flexibility and labour turnover emerges in a few papers. Snower and Diaz-Vazquez [1996] model an economy characterized by perfect competition and wage bargaining, where stronger turnover can lower employment if fluctuations are transient and union power moderate. Fella [2000] shows that redundancy pay may improve welfare by reducing the suboptimally high rate of turnover determined by individual firms in the presence of intertemporal externalities. Amable and Gatti [2006] extend this analysis to an economy with imperfect competition on product markets (see below).

Product markets imperfections. Nickell [1999] argues that product market deregulation should shift out firms labour demand curve and/or favour the entry of new firms. The benefits of increased product market competition also depend on the wage setting process. Because more competition on the product market makes firms' labour demand more sensitive to the real wage, the negative impact on both employment and profits of any increase in wages is larger. This reduces unions' claims and the bargained level of the real wage. Hence, unionized firms which face increased competition will benefit from a higher labour demand and a lower bargained real wage schedule. Amable and Gatti [2004] develop a dynamic efficiency wage framework with imperfect competition on goods market. The authors show that an increase in product market competition boosts labour turnover and reduces job security. As a consequence, the efficiency wage schedule compatible with more intense product market competition shifts upward: this mechanism pushes real wages up to the point that increased competition may generate employment losses.

Interaction across labour and product markets imperfections. Blanchard and Giavazzi [2003] show that increased product market competition may have short-term costs, such as decreasing rents and wages; labour market deregulation, by lowering rents, reduces incentives to fight for capturing them and eases the implementation of deregulation policies in the product market, and *vice versa*. Koeniger and Vindigni [2003] submit that free entry makes it more difficult for firms to bear the costs associated with an "inflexible" labour market; due to the positive effect of increased product market competition on employment, incentives to protect jobs are reduced. Amable and Gatti [2006] show that engaging in a process of product market deregulation yields an implicit labour market reform leading to a more intense turnover on the labour market. This mechanism is exacerbated by increased competition on the product market but is dampened by redundancy payments.

Hence, policies increasing job security may be necessary to offset the possible detrimental effects of a more intense labour turnover. In same cases, a complementarity may emerge between regulations in product and labour markets, both interacting to ensure more stable labour relations; in other cases, product market deregulation and labour market regulation become substitute policies which means that joint deregulation policies have conflicting effects on aggregate employment.

Financial markets imperfections. Wasmer and Weil [2004] consider a macroeconomic model where imperfections on both labour and credit markets interact. Imperfections rely on informational and search frictions and are modelled with the help of matching functions. Entrepreneurs must find credit before setting up a firm, and they must find workers before producing. Credit market imperfections delay the setting up of the firm and make the whole process more expensive, which ultimately depresses labour demand and contributes to raising the unemployment rate above the level which would have resulted from the existence of labour market imperfections alone. A similar interaction between imperfections in credit and labour markets may also be found in Acemoglu [2001]. Credit market frictions hinder investment and lower the economy's capital stock, which leads to a lower employment level if labour and capital are complementary or if labour market imperfections make the real wage downward-rigid. Thesmar and Thoenig [2004] propose a model where financial market development, by improving risk sharing between firms owners, increases the willingness of these firms to take risky bets. This in turn increases firm level uncertainty in employment and profits. Amable, Ernst and Palombarini [2005] propose a model of institutional complementarities where trade unions and firms have the choice between a cooperative negotiation targeting at the long-term success of the firm and a conflictual relation targeting at maximizing the current share. One important determinant in this game is the time horizon financial investors have as they influence the realization of future gains of cooperation between workers and firms. When financial investors are 'patient', a cooperative equilibrium can be attained. On the other hand, whenever one of the two bargaining parties gets too weak, the viability even of the long-term equilibrium is threatened.

Central Bank Independence. A traditional channel through which Central Bank Independence (CBI) might affect unemployment is *via* a Phillips curve mechanism: a more independent central bank would focus more on price moderation and implement a less accommodating monetary policy (i.e. more 'conservatism'), thus yielding higher unemployment in the medium term. In the presence of nominal rigidities and economic business cycles, a trade-off emerges between conservatism (which reduces inflation) and flexibility to respond to exogenous shocks -which reduces employment variability (Svensson, 1996). Recent papers focus on the impact of central bank conservatism on equilibrium unemployment. Soskice and Iversen [2000] show that, if the central bank is non-accommodating, sufficiently large unions, bargaining independently, have an incentive to moderate sectoral money wages, and thereby expected real wages. The result is an increase in the real money supply, and hence higher demand and employment. Lippi [2003] shows that if wage setters are non-atomistic, more conservatism may either increase or decrease equilibrium unemployment, depending on certain structural features of the economy. Intuitively, a large union understands that an increase in its own nominal wages, taking as given the nominal wages of the other unions, leads to an increase in inflation and hence to a reduction in the other unions' real wages. This reduction makes the other unions' labour cheaper (triggering labour substitution) and changes the economy's overall production. Both effects influence the labour demand faced by the union and, therefore, its employment choices. Crucially, conservatism determines the magnitude of both effects (as perceived by an individual union) since it affects the inflation effect of a given nominal wage rise. The effect of more conservatism on employment is negative if the 'substitution' effect dominates the 'output' effect.

Macroeconomic variables. Common macroeconomic controls include: competitiveness, money supply, and productivity. The effect of competitiveness can in principle go both ways: increased competitiveness (i.e. higher real exchange rate and improved trade

balance) could enhance employment performance by boosting international demand for national goods; moreover, inflationary pressure in the home country are dampened by an increase in real exchange rate, yielding wage moderation and a positive impact on employment. However, increased competitiveness requires national price moderation while national authorities (governments and central bank) concerned with improving medium term employment might be tempted to use expansionary policies to serve domestic objectives instead of external balance constraints. In this case, an improved employment performance in the medium term could go along with a decrease in the trade balance (Carlin and Soskice, 2005). We include the trend of trade balance in order to distinguish between the two channels of influence of the external balance constraint: the price channel (i.e. via the real exchange rate) and the 'price and volume' channel (i.e. via foreign demand). Finally, increased labour productivity should improve labour demand and employment. It should be mentioned that one could expect macroeconomic controls to act differently on unemployment and inactivity. In fact, increased competitiveness and average productivity could lead to the exclusion of low skilled workers likely to fall into inactivity. An increase in credit supply eases credit constraints and yields improved employment conditions.

2.2 empirical literature

A large body of literature has tested the influence of the institutional features of European labour markets on the level of unemployment. The basic results of the standard view may be summarized as follows (Baker *et al.*, 2005): the Employment Protection Legislation (EPL), the unemployment replacement rate, the unemployment benefit duration and the tax rate influence positively the rate of unemployment, i.e. contribute to raising it, whereas active labour market policy and wage coordination influence it negatively. The evidence supporting the standard view that labour markets deregulation yields a positive impact on employment is, however, seemingly not conclusive.

Focusing on the recent literature, Belot and Van Ours [2004] consider the effects of interactions between several institutional variables and distinguish between models with and without fixed effects. When the latter are introduced, all institutional variables turn non significant. When fixed effects are omitted, the tax rate, replacement rate and union density variables are significantly positively correlated to unemployment, but the coefficients for the wage coordination and employment protection variables are significantly negative. The results concerning the interaction effects are for the most part inconclusive.

Nickel *et al.* [2005] build on previous works such as Nickell [1997] and Elmeskov, Martin and Scarpetta [1998]. The authors use annual data and estimate a fixed effects model with lagged dependent variable. They find a significantly positive influence of the unemployment benefit replacement rate, benefit duration and the tax variable density on unemployment, a significantly negative effect of wage coordination, but no significant influence of employment protection or union density. Control variables include various measures of macroeconomic shocks, which turn out to have significant coefficients. What comes out of the estimations is that half of the rise in unemployment between the 1960s and the 1990s can be explained by macroeconomic factors, the other half depends on institutional variables concerning the labour market. The assessment of the effect of institutional variables independently of macroeconomic factors is made more complex if the two types of influences interact with each other. This issue is tackled in Blanchard and Wolfers [2000]. According to their results, labour market institutions produce high unemployment only in interaction with macroeconomic shocks. *However, their findings are very sensitive to changes in specifications, and the use of time-varying institutional variables considerably weaken their results.* More recently, a few papers such Freeman [2005], Baker *et al.* [2004] and [2005] challenge the robustness of the empirical findings on macro data pointing labour market institutions as responsible for a high and persistent level of unemployment. Expanding the time period used until the late 1990s, Baker *et al.* [2004]'s regressions show either no significant influence of institutional variables such as

employment protection, union density or the tax wedge. They even find counter-intuitive effects of the unemployment replacement ratio. The conclusion is that existing empirical results offer no compelling evidence linking labour markets institutions to unemployment: existing estimations are very sensitive to changes in the equations specification and the selection of explanatory variables is often biased.

Concerning the influence of institutional arrangements beyond the labour markets, one can refer to the empirical evidence on the impact of joint product and labour markets deregulation, provided in a few contributions such as Boeri *et al.* [2000] and Nicoletti *et al.* [2000] . These papers make use of OECD variables capturing the intensity and strength of regulation in product and labour markets. These indexes prove to be strongly correlated, thus suggesting the existence of an interdependency between the two policy dimensions. Nicoletti and Scarpetta [2002] tackle the issue of whether the inclusion of measures of Product Market Regulation (PMR) strengthen or weaken the evidence linking labour market institutions to employment.[6] They test this hypothesis with a series of cross-country time series regressions for 1982-1998 including product market regulation variables in addition to labour market variables. When PMR variables are excluded, they find no relationship between the size of the tax wedge and the employment rate. The relationship becomes significantly negative when PMR measures are included in the regressions, but the replacement rate variable is not always significant. The union density and EPL variables are both significant in all the regressions. Kugler and Pica [2003] show, on Italian data, that a tighter entry regulation hampers the gains associated with labour market deregulation. IMF [2003] provides an interesting study covering the period 1960-1998. Contrary to previous works, IMF [2003] takes into account the degree of independence of the central bank (variable CBI); also, the non linear impact of bargaining coordination is captured by including a squared term for this variable. A particular attention is given in this work to the interaction effect between bargaining coordination and central bank independence. The authors find a significant and positive coefficient for CBI and a negative sign for the coefficients of coordination and for the interaction term. One crucial result of this study is that low coordination associated with higher central bank independence yields higher unemployment. In other words, to reduce unemployment one should reduce the independence of the central bank, at least for low level of coordination.[7]

Recent empirical contributions have enlightened the impact of markets (de)regulation on activity and inactivity. This is illustrated by the study by Nickell *et al.* [2001]. The authors find some empirical support in favor of the markets deregulation view in regressions for the unemployment rate; however, this effect vanishes when the dependent variable is employment rate. This result can be explained by the existence of hidden phenomena such as: an increasing working age population and/or flows from labour market into inactivity. A series of papers have focused on the impact of deregulation on participation and on the employment opportunities for marginal workers (i.e. low-skilled prime age men). Murphy and Topel [1997] argue that biased technological change has decreased job opportunities for low-skilled prime age men, thus pushing them to quit the labour market in the United States. They also show that labour supply is more elastic for low wage levels, and that changes in wages have been larger for low-skilled individuals. Faggio and Nickell [2005] analyze the determinants of prime age men inactivity in the United Kingdom. The authors account for a biased technological change (against low-skilled workers) and a change in the eligibility conditions for disability transfer. Their empirical evidence shows that wages are negatively related to inactivity, and that disability transfers are positively related to inactivity. Besides, this effect appears stronger for less skilled individuals. The authors' main conclusion is that there exists a trade-off between wage opportunities and social transfers: labour supply of less skilled workers has been hurt because of the decreasing relative wage which probably discourages low-skilled who eventually quit the labour force. Finally, Bicakova [2005] proposes a comparative analysis of joblessness determinants for

[6] They use the non agricultural employment rate as dependent variable.

[7] For more comments on Nicolleti and Scarpetta [2002] and IMF [2003] papers, one can also refer to Baker et *al.* [2004] who discuss the robustness of their results.

prime age men in the United States, the United Kingdom and France. The author points out that for this category of workers, inactivity in the United States and the United Kingdom is larger than unemployment, whereas the reverse holds for France (mean between 1990 and 2003). Also, wages appear to have a negative and significant effect on prime age men inactivity in the United Kingdom and the United States, but no effect for France. This study challenges the markets deregulation view by showing that low wages decrease the incentives to work, and that employment opportunities are more unequally distributed in the United States and the United Kingdom than in France.

2.3 database and variables

Our sample spans over the period 1980 to 2004 (although some data are missing after 2000) and includes 18 countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom, United States.

The baseline model includes the institutional features of the labour market, also considered by Nickel *et al.* [2005]: EPL, unemployment benefit replacement rate, union density, the tax wedge, and wage coordination. Concerning product and financial markets imperfections, we consider the OECD index of global product market regulation (PMR), as well as the role of credit constraints (i.e. the amount of 'credit to the economy') and the intensity of financialisation (i.e. the ratio of 'financial assets' to GDP). We also include an indicator of central bank independence. Finally, a set of macroeconomic control variables is taken into account: money supply (the OECD 'credit to the economy' time series and long-run real interest rate), competitiveness (real exchange rate and structural trade balance), and average labour productivity.

A complete list of dependent and independent variables used in our estimations is provided below. Note that the real interest rate is not included below because it turned out to be non significant in all estimations.

Independent variables

EPL (0-3)	Employment Protection Legislation (based on own calculations)
PMR (0-6)	indicator of Product Market Regulation (OCDE)
COOR (0-3)	index of coordination in wage bargaining (Nickell *et al.*, 2005)
CBI (1-3)	central bank independence (based on Freitag, 1999; 1=total indep.)
RR	net replacement rates on unemployment insurance (Scruggs, 2004)
UD	union density, ratio of total reported union members (OECD)
TW	tax wedge, various specifications (OECD)
FA	ratio of total financial assets of institutional investors to GDP (OECD)
RER	first time difference of the real exchange rate (OECD)
Productivity	one period lag of log real GDP – log employment (OECD)
Credit	ratio of domestic credit to GDP (OECD)
TTB	based on the Hodrick-Prescott trend of trade balance (OECD)
EDUC	students enrolled in primary plus secondary educ. to total enrolled students (OECD)

Dependent variables

unemployment rate	ratio of unemployed to working age population
inactivity rate	ratio of inactive working age pop. to total working age pop.
jobless rate	unemployment rate plus inactivity rate

We provide hereafter more comments about two specific indicators that will be used in our estimations: i.e. the EPL variable and the Central Bank independence score.

Employment Protection Legislation

There are few variables representing employment protection legislation (EPL) that are available for empirical work. The OECD have devised an EPL indicators that is available for three dates: end of the 1980s, end of the 1990s and 2003. Blanchard and Wolfers [2000] propose an EPL measure based on the OECD indicator, then available for two dates only. They interpolated between the OECD's late 1980s and late 1990s scores for the 1990-1994 period and used the late 1980s figures for the whole 1980 decade. From the two data points proposed by the OECD, they created four five-year averages. On this basis, Nickell *et al.* [2002] created annual data points for 1980-1995. These cross-section time series measures of EPL are also used by the IMF study and by Baker et al. [2005] and Baccaro and Rei [2005]. We propose an annual measure of EPL that we constructed by taking the indicators above as a starting point. In addition to them, we considered the FRDB Social Reforms Database,[8] which collects, on an annual basis, information about social reforms in European countries over the period 1985-2005 in the areas of employment protection legislation, pension systems, unemployment/non-employment benefits and migration policies. Using the information provided in the database on the reforms affecting EPL, we estimated a model explaining the evolution of the EPL indicator of Nickell et al. [2002] with the various indicators about employment protection given in the FRDB Social Reforms Database and time trends as regressors.[9] This model was used to predict a series for EPL between 1980 and 2004. In order to check the relevance of the predicted EPL series, we compared the evolutions of our new indicator with Nickell *et al.'s* [2002] indicator as well as with the three data points given by the OECD. In order to avoid major discrepancies between our own series and the OECD scores, we modified accordingly the specification of the estimation model by modifying the inclusion of time trends according to countries and ultimately changing a few values of the series directly. We thus obtained a cross-section time series indicator of employment protection legislation for 18 countries over the 1980-2004 period. The procedure to construct our EPL indicator is described in Appendix 6.3. The evolution of the EPL indicator for few countries on our sample is documented in Appendix 6.3 (Figures 4 to 6).

Central Bank Independence

Our indicator is based on Freitag [1999] and commented by Armingeon *et al.* [2005]. It is a composite index constructed out of four other indicators, each of them has been divided in a category above and one under the median: 1) "bankales", by Alesina [1988], which ranges from 1 to 4, from low to high independence; this index considers whether the central bank has final authority over monetary policy, whether government officials sit on the governing board of the bank, and whether more than half of the members are appointed by the government; 2) "bankeff", an index proposed by Eijffinger and Schaling [1996], which ranges from 1 to 5, from low to high independence; it is based on the location of final responsibility for monetary policy, the absence or presence of government official on the board of central bank, and the percentage of board appointees made by the government; 3) "bankgr_2", proposed by Grilli, Masciandro and Tabellini [1991], measuring only political independence, from 0 to 8, from low to high independence; it focuses on appointment

[8] The FRDB Social Reforms Database has been developed by Giacomo Degiorgi, Elisabetta Frontini, Serena Fumagalli, Francesco Legrenzi, Mauro Maggioni and Francesca Mazzolari at the Fondazione Rodolfo Debenedetti. The Database is available at: http://www.frdb.org

[9] For countries not documented in the FRDB Social Reforms Database, we used only time trends and the three OECD scores.

procedures for board members, the length of members' terms to office, and the existence of the statutory requirement to pursue monetary stability; 4) "bankcuk", unweighted legal-independence index by Cukierman [1994], aggregated from sixteen legal characteristics of central-bank charters grouped into four clusters: the appointment, dismissal, and legal term of office of the governor of the central bank; the institutional location of the final authority for monetary policy and the procedures for the resolution of conflicts between the government and the central bank; the importance of price stability in comparison to other objectives; and the stringency and universality of limitations on the ability of the government to borrow from the central bank; the index ranges from 0 to 1. Given the four indexes above, the composite index of CBI that we use goes from 1 to 3, where '1' stands for a maximum of central bank independence (when all four indexes agree, that the central bank of this country is independent) and '3' stands for a maximum of central bank dependence. The index has been changed in some countries due to reforms and changes in law: Austria (1985f), New Zealand (1990f) Canada (1991f), France, Finland, United Kingdom, Sweden and Belgium (1993f). Two examples of the evolution of the indicator are given in the Appendix 6.3 (Figure 7).

2.4 methodology

Testing hypotheses regarding unemployment, inactivity and joblessness rates involves certain problems related with the use of Time Series-Cross Section (TSCS) data. We briefly report the way we deal with three methodological problems : heterogeneity of panel data ; the conjoint inclusion of time invariant variables and fixed effects ; serial correlation.

Let $y_{i,t}$ be the observation for the time series y at time t for unit i. Let $x_{i,t}$ be the observations for a vector of independent variables. A pooled model usually takes the following form:

$$y_{i,t} = \alpha + \beta \cdot x_{i,t} + \epsilon_{i,t} \tag{1}$$

$\epsilon_{i,t}$ is the error term. The consideration of a pooled data model, compared to either a country-specific times series model or a pure cross section, is usually imposed by the size of the sample. Most comparative analyses deal with a limited number of countries (small N) for a not too large number of periods (small T). In this respect, one usually distinguishes TSCS data from the panels found in microeconomic applied analysis, which are characterized by a large N- (very) small T data structure. This is also why a literature has grown emphasizing that the estimators fit for panel data may pose some problems when applied to TSCS data. With respect to the latter, Beck and Katz [1995] and [1996] have become the most influential references and their "panel corrected standard errors" (PCSE) estimator is widely used in comparative political economy. This estimator is basically applying the OLS with modified standard errors to take account of panel heteroskedasticity and contemporaneous correlation of the error terms.

The first issue raised by the consideration of a model such as 1 is how relevant it is to pool data. A fully unpooled model would consider specific β_i for each unit. A partially pooled model would consider several β_js applying to as many subset of countries. When the time dimension allows for it, it is usually better to consider an unpooled model, but as mentioned before, the size of the samples considered in comparative analyses mostly forbids such a strategy. Besides, Beck and Katz [2001] show that the traditional F test for pooling too often rejects pooling and that alternative methods related to the use of a random coefficient model do not solve the problem of partial pooling. The conclusion stated by Beck and Katz [2004] is therefore that '*the gains from pooling offset the costs of pooling more than standard statistical theory asserts*'.

A simple way to deal with country heterogeneity is to include fixed effects and to consider the following model:

$$y_{i,t} = \alpha_i + \beta \cdot x_{i,t} + \epsilon_{i,t} \tag{2}$$

Estimating a fixed effect model amounts to relating intra-unit changes in y to intra-unit changes in x, without addressing the problem of the relation between the average y and the average x across countries. All cross country variance is absorbed by the fixed effects. This feature has made many comparative analysts uncomfortable with the use of such a model since no explanation of what fixed effects stand for can be given.

The question of whether fixed effects should be included in TSCS models or not arises in most comparative empirical studies. It is possible to test for the inclusion of such effects. However, Beck and Katz [2004] state that F test for the significance of fixed effects may be too liberal in rejecting the null of no effects. Rejection is more likely in the presence of many units since a few of the fixed effects are likely to be significant. They suggest to include fixed effects when they are large and clearly significant. In this case as in others, there is no preset formula, but problems related to the omission of fixed effects are in many cases likely to be greater than those related to their inclusion (Plümper, Tröger and Manow [2005]).

The second problem concerns the fact that the inclusion of country fixed effects precludes the inclusion of time-invariant or slowly-changing variables as independent variables. Several of the variables we consider in our estimations are either invariant (at least for a non negligible part of the period considered) or change slowly. Distinguishing between their influence on unemployment, inactivity or joblessness and the influence of omitted country-specific variables will thus prove difficult. If one does not include fixed effects in the model, the time-invariant variables will carry the weight of all the country specific factors determining employment and unemployment. Plümper and Tröger [2004] propose a procedure for analyzing the effect of time-invariant variables in a model including fixed effects. Their procedure takes three steps: (i) estimate a fixed-effects model (ii) regress the unit effects on the time-invariant variables (iii) re-estimate the first stage including the error term of the second stage (xtfevd procedure).

Their Monte Carlo experiments suggest that the fixed effect vector decomposition (xtfevd) estimator is the least biased estimator when time-variant and time-invariant variables are correlated with the unit effects. When unit effects are uncorrelated with the time-variant variables, pooled OLS, random effects (RE) and fixed effects vector decomposition (FEVD) estimators give unbiased estimates whereas the Hausman-Taylor (HT) estimator gives biased estimates. When unit effects are correlated with the time-variant variables, pooled OLS and RE models perform poorly; FEVD and HT are unbiased, HT being less efficient. When unit effects are correlated with time-invariant variables, all procedures are equally biased, but HT is the less efficient. When unit effects are correlated with both time-variant and time invariant variables, FEVD is the most efficient and the least-biased estimator. FEVD is slightly worse than RE when time-variant variables are uncorrelated with the unit effects, time-invariant are correlated with the unit effects and the distribution of the unit effects is slightly skewed.

Another problem related to the use of TSCS data concerns serial correlation. Beck and Katz [1995] have advocated the inclusion of the lagged dependent variable in the regression to deal with this problem, and consider the lagged dependent (LDV) variable model with dummies which has the following form:

$$y_{i,t} = \alpha_i + \phi \cdot y_{i,t-1} + \beta \cdot x_{i,t} + \epsilon_{i,t} \tag{3}$$

It is well known that the least square estimator with dummies (LSDV) including a lagged dependent variable gives biased estimates. The usual approach with panel data is to use an instrumental variables (IV) estimator (Anderson and Hsiao [1982], Arellano and Bond [1991]). Kiviet [1995] takes a different approach. The LSDV estimator may biased but has often a smaller mean squared error than IV estimators. It is then better to estimate the bias and correct the estimation accordingly. This procedure may sometimes prove superior to the IV estimators but is somewhat heavy to implement. Besides, Beck and Katz [2004] show with the help of Monte Carlo simulations that in the case of TSCS data, i.e. with values of T greater than 10, 20 or even 30, the proposed fixes (Kiviet correction or IV methods) are not worth their costs.

To summarize, the general specification of our model is of the equation 3 type. We use annual data for each dependant variables, include a lagged dependant variable (LDV), and fixed effects. Concerning the interpretation of the model, we can note that, as in IMF [2003] and Nickel *et al.* [2001], the insertion of a lagged dependent variable is supposed to take into account the persistence stemming from agents' current position on the labour market (unemployment, inactivity and joblessness). The introduction of a lagged dependent variable is a corollary of the use of annual data: the labour market is unable to absorb exogenous shocks in one period, and the coefficient of the lagged dependent variable captures the speed of this adjustment process. Country and time dummies allow us to control both for shocks that are common to all country (time dummies) and specific to one country (country dummies). As argued previously, the inclusion of country dummies (i.e. fixed effects) is a sensible issue, especially in relation with the introduction of time invariant variables whose estimated coefficient are sensitive to inclusion/exclusion of those dummies. To deal with this problem, we use the specific estimator proposed by Plümper and Trögger [2004]. Besides, it should be noted that the inclusion of employment protection legislation variable, for which only few data is available may be a problem when we aim to assess the short run impact of this variable. We use then the indicator discribed above (see section 2.3).

3 Empirical results

We begin our analysis by testing the order of integration of our series, and apply several panel unit root tests: Im, Pesaran and Shin [2003], Maddala and Wu [1999] and Levin, Lin and Chu [2002] with different specifications (with or without trends, with or without drift). The results are given in Appendix 6.2. Most series appear stationary (sometimes with a drift or a time trend). Since we work with annual data, we take further precautions and test the stationarity of residuals from our regressions in the same way as above. The tests show that all residuals are stationary. We also check for autocorellation and heteroskedasticity of residuals, by using the tests proposed by Nickell et al. [2005]. For regressions concerning jobless and unemployment rates we can not reject the hipotheses of autocorellation and heteroskedasticity of residuals. Autocorellation is generally not a problem in regressions for inactivity though residuals are heteroskedastic. We correct for these problems in the following ways. Concerning autocorellation of residuals, we assume either, as advocated by Beck and Katz [1995], a "common rho" for all countries (first order autocorrelation coefficient), the value of which is presented in each table, or we introduce a panel specific rho , as in Nickell et al. [2005]. The two procedures give very similar results as tables below will show. Moreover, we take care of heteroskedasticity by adopting a 'robust' standard error estimator whenever possible.

The main results are presented below. First, we report our results for joblessness rate obtained through the estimation of our baseline model. As argued in the previous Section, we consider that FEVD is a better suited estimator in the presence of invariant time series. Nevertheless, in order to check for robustness of the results, we also present regressions obtained with two others estimators : PCSE and GLS.[10] Second, we disaggregate the analysis of joblessness by applying the same model to its components, i.e. inactivity and unemployment rates. By showing the sensitivity of inactivity to institutional variables, we confirm that inactivity and unemployment are two related situations. We also highlight the differences between the two statuses by distinguishing the transmission channel by which each institutional and macroeconomic determinant impact on non-employment : some variable impacts more on inactivity and others on unemployment. We extend this approach by controlling for education level.

[10] One should also note that PCSE is sometimes considered as a better estimator than GLS which can not eliminate serial correlation and might overestimate the significance of coefficients (see for instance Bacaro and Rei, 2005).

3.1 comparing three estimators

We start the empirical analysis by estimating our model for joblessness, i.e. the opposite of the employment rate. Regression results are provided below for three alternative estimators: a standard OLS/PCSE estimator, a GLS estimator and a FEVD estimator. Results are displayed in Table 1 and commented below.

In Column 1 we report results of regressions based on the FEVD estimator, while Columns 2-5 show results for OLS/PCSE and GLS estimators under alternative autocorellation models (common rho and panel specific rho). With the FEVD procedure, three institutional variables are treated as time-invariant in the regressions: product market regulation (PMR), Central Bank independence (CBI) and coordination (Coord). Besides, we carefully check how the introduction of time invariant variables changes our results. To do that, we introduce each variable successively as time invariant (see Appendix 6.1, Table A1). It is worth noting that our results are not affected throughout the procedure.

First of all, Table 1 show that our three different estimators yields similar qualitative results on the whole. However, it appears that the FEVD procedure allows us to improve the significance of the coefficients of our institutional variables, as well as the size of their impact. In particular, one can note the strong difference concerning the CBI and PMR variables, whose coefficients appear systematically non (weakly) significant under PCSE and GLS whereas they turn out significant under the FEVD procedure. Besides these two variables, results obtained under FEVD estimator are very similar to those obtained under PCSE and GLS with a panel specific correction for autocorellation (columns 4-5). The alternative specification with a common rho produces a lower level of significance, especially for EPL and coordination variables (columns 2-3). However it should be noted that under this last specification, results for the financial variable FA appear more in line with those of FEVD procedure. According to its better ability to account for the influence of institutional variables, we mainly focus hereafter on results obtained under FEVD procedure (column 1).

The coefficient for the lagged dependent variable is always significant and rather high, which points to a strong level of persistence in employment. Second, concerning the 'average' influence of institutional arrangements on employment performance, the results appear ambiguous. Looking at the impact of labour market imperfections, two types of results emerge. On the one hand, some of them support the standard view about the beneficial influence of labour market deregulation. This is the case for variables such as replacement rate (RR) and union density (UD) which turn out to have a positive impact on joblessness. On the other hand, a few results stress the beneficial impact of some labour market institutions on employment performance. Hence, variables such as employment protection legislation (EPL) and coordination (Coord) are significantly and negatively related to joblessness. The sign of the coefficient for the coordination variable is standard in the literature and confirms the 'corporatism hypothesis' of a beneficial influence of bargaining coordination on wage moderation (Calmfors et Driffill [1988]). The sign of EPL is clearly at odds with the standard view that lower EPL would yield higher employment. This on the other hand fits with theoretical results proposed by Amable and Gatti [2004] and [2006] underlying the beneficial effect of EPL on wage moderation and effort.

Turning to non labour market institutions, results appear also contrasted as regard to their influence on employment performance. On the one hand, the view stressing the adverse impact of product market regulation (PMR) on employment performance is supported (OCDE [2006] and Nicoletti, Scarpetta [2002]). The benefits of an increase in product market competition may come jointly from the entry of new firms, which boosts labour demand, and from the reduction of unions' claims and the bargained level of the real wage (Nickell [1999]). On the contrary, the variable for central bank independence (CBI) appears significantly and negatively related to joblessness,[11] while the financial assets (FA) variable has a positive coefficient. The impact of central bank independence is not

[11] The indicator for Central Bank independence (CBI) is higher when the Bank is less independent. Hence, a negative coefficient implies that a more independent Central bank augments joblessness, inactivity or unemployment

standard as more independence of the central bank is shown to be bad for employment. Hence, a Phillips curve mechanism may be at work, which counters the positive effect of independence on union wage moderation: a more independent central bank, placing a greater focus on price moderation and implementing a less accommodating monetary policy, leads to higher joblessness in the medium term. This result is notably at odds with that of IMF [2003], according to which a less accommodating monetary policy is beneficial for employment performance. The positive impact of the FA variable points to the possible negative effects of financialisation on employment: an increased financialisation yields a change in agent's time horizon, which may lead to industrial restructuring implying layoffs.

Table 1. Results for joblessness (various specification) : total population

	1	2	3	4	5
LDV	0.827***	0.825***	0.825***	0.821***	0.822***
	[26.84]	[21.74]	[27.28]	[21.94]	[27.00]
PMR	5.763***	2.096*	2.085	1.988*	1.965
	[5.58]	[1.71]	[1.29]	[1.68]	[1.29]
EPLBLD	-1.540***	-1.409**	-1.404*	-1.756***	-1.777***
	[3.24]	[2.14]	[1.93]	[2.87]	[2.60]
Coord	-1.442***	-0.389	-0.390	-0.793**	-0.775**
	[3.80]	[0.90]	[1.13]	[1.98]	[2.37]
CBI	-0.832***	0.175	0.181	0.061	0.062
	[3.63]	[1.02]	[0.92]	[0.39]	[0.33]
RR	2.403**	2.425*	2.406*	2.247*	2.227*
	[2.31]	[1.69]	[1.77]	[1.68]	[1.71]
UD	0.053***	0.057**	0.057**	0.043**	0.043*
	[4.37]	[2.35]	[2.27]	[2.07]	[1.95]
TW	0.019	0.019	0.018	0.031	0.031
	[1.04]	[0.52]	[0.54]	[0.93]	[1.03]
FA	0.014***	0.013**	0.013**	0.009	0.008
	[2.95]	[2.21]	[2.17]	[1.60]	[1.53]
RER	-2.709**	-2.818***	-2.836***	-2.573***	-2.650***
	[2.13]	[3.12]	[2.96]	[3.02]	[2.98]
Productivity	-3.812***	-3.658	-3.635	-3.864	-3.925
	[2.84]	[1.44]	[1.43]	[1.60]	[1.62]
Credit	-0.074***	-0.076***	-0.076***	-0.077***	-0.077***
	[5.35]	[7.12]	[6.90]	[7.96]	[7.67]
TTB	0.039	0.042	0.039	0.000	-0.002
	[0.69]	[0.34]	[0.35]	[0.00]	[0.02]
eta	1.036***				
	[4.78]				
Estimator	FEVD	PCSE	GLS	PCSE	GLS
AR1	common rho	common rho	common rho	panel spec.	panel spec.
Observations	227	247	247	247	247
final rho	0.20	0.14	0.14		

Finally, macroeconomic controls show a significant negative coefficient for the terms of trade variable; that is a standard result in the literature (Nickell et al. [2005]). One can interpret this coefficient as the result of the beneficial effect on employment stemming from increased competitiveness, or as the consequence of a high exchange rate on wage moderation. We try to distinguish between these two effects by the inclusion in the regression of the variable of trade balance which appears non significant. The productivity term has a significantly negative coefficient, which can be interpreted as a positive technology shock pushing labour demand upwards. The credit variable has a different interpretation than financial assets variable. It has a significantly negative coefficient, in accordance

with the hypothesis that relaxing credit constraints allows firms to expand production and hire more labour (Wasmer and Weil [2004], Acemoglu [2001]).

3.2 analyzing inactivity and unemployment

In this section, we present regressions for unemployment and inactivity rates, using the FEVD estimator.[12] We particularly focus on the similarities and differences between these two situations of non employment. Comparing columns 1 and 2 shows a similar impact of some institutional and macroeconomic variables on unemployment and inactivity. Inactive population appears even more sensitive to institutional determinants than unemployed population. This confirms that inactive population includes people who are close to the labour market. A few differences also emerge, pointing to the fact that inactivity and unemployment are close but still different situations.

Two variables impact in a similar fashion on both statuses: in line with the deregulation view, product market regulation presents a significant and positive impact on unemployment and inactivity; and an increase of the credit to the economy contributes to reduce jointly inactivity and unemployment, by stimulating the economic activity.

Concerning variables which have contrasting effects on unemployment and inactivity, the main results are as follows. First, one can note that the impact of coordination variable on joblessness appears to work more through unemployment than through inactivity. Second, other variables appear on the contrary to affect more inactivity than unemployment. In other words, they affect employment through their impact on social exclusion rather than on unemployment. This is the case for the EPL variable which has no significant influence on unemployment[13] but impacts on employment performance through inactivity. Also, tax wedge, union density, central bank independence and financial assets variables affect joblessness through inactivity but not through unemployment. The sign of their coefficient are in line with those displayed for joblessness: the influence of taxation or union density is in line with the standard deregulation view; financialisation and a high degree of independence of central bank yield worse employment performance through inactivity. In the same line, the coefficient of the TTB variable has no significant impact on unemployment. However it shows up significant and negative in regressions for inactivity. This result is consistent with an interpretation in terms of increased competitiveness yielding higher labour force participation. It is also worth noticing that, as the influence of the independence of central bank and trend of trade balance on employment performance is directly linked to their impact on the level of economic activity. One can interpret the previous results as follows: a low level of economic activity (associated to a less accommodating monetary policy or a low level of competitiveness) would mainly hurt the marginal categories (notably less qualified population) and push them to inactivity. Finally, the lagged productivity variable turns out to be crucial in the regressions: increased productivity is good for employment but not for inactivity (but this perverse impact is non significant). We interpret this ambiguous result as previously: higher productivity pushes aside low-skilled workers, possibly because increased productivity goes along with the use of more modern equipment and up-to-date skills.

[12] One should note that main results hold in regressions based on OLS/PCSE and GLS estimators, but might be less robust for some of our independent variables. This is notably the case for our time-invariant variable Coord, which turns out non significant in unemployment regressions, as well as PMR in inactivity regressions. See annex 6.1 table A2.

[13] In the same line, Nickell [1997] and Nickel et al. [2005] do not find a significant influence of EPL on unemployment.

Table 2. **Results for joblessness components : total population**

	1	2	3	4
	Unemp.	Inact.	Unemp.	Inact.
LDV	0.751***	0.854***	0.738***	0.860***
	[10.50]	[22.55]	[9.73]	[27.44]
PMR	2.172***	3.433***	2.117***	3.215***
	[2.81]	[3.63]	[2.65]	[3.97]
EPLBLD	-0.538	-1.034**	-0.334	-0.837*
	[1.00]	[2.42]	[0.52]	[1.88]
Coord	-1.281**	-0.322	-1.355**	-0.248
	[2.34]	[1.38]	[2.50]	[0.96]
CBI	-0.362	-0.386**	-0.353	-0.061
	[1.45]	[2.18]	[1.34]	[0.41]
RR	0.593	1.640*	-0.830	-0.365
	[0.53]	[1.77]	[0.64]	[0.47]
UD	0.022	0.029***	0.018	0.004
	[1.55]	[3.32]	[1.48]	[0.66]
TW	0.005	0.027*	0.011	0.042**
	[0.19]	[1.65]	[0.38]	[2.09]
FA	0.003	0.010**	0.005	0.009**
	[0.60]	[2.28]	[0.94]	[2.38]
RER	-1.233	-1.770	-0.994	-1.198
	[0.98]	[1.49]	[0.68]	[0.90]
Productivity	-5.577**	1.381	-8.007**	-7.339***
	[2.37]	[1.45]	[2.18]	[3.41]
Credit	-0.040***	-0.036***	-0.043**	-0.031**
	[2.71]	[3.07]	[2.43]	[2.17]
TTB	0.137	-0.080*	0.175*	-0.050
	[1.62]	[1.94]	[1.73]	[0.96]
Lageduc			-0.009	-0.075***
			[0.23]	[2.89]
eta	1.057**	1.000***	1.054**	1.000***
	[2.23]	[3.19]	[2.27]	[3.69]
Observations	227	247	178	196
final rho	0.39		0.33	

The previous hypotheses about low-skilled workers may be checked in regressions presented in columns 3 and 4, by controlling for the education level. Education plays a role with respect to inactivity but this variable is never significant in unemployment regressions. This result is consistent with the idea that less educated people are more exposed to inactivity rather than unemployment, i.e. they step out of the labour market if fired. Hence, some employment protection is necessary to keep them within the labour force. Moreover, it is interesting to note that the inclusion of the education variable makes the coefficient of the lagged productivity term negative in the regression for inactivity (column 4). Hence, positive productivity shocks lead to higher inactivity by pushing the low-skilled out of the labour force (column 2). However, increased productivity tends to decrease inactivity once the level of education of the workforce is controlled for, because more educated workers are able to adapt to productivity-enhancing technological change (column 4). Also, it is worth to notice that variables such as trend of trade balance, central bank independence and union density no longer have a significant impact on inactivity (column 4) whereas they were significant without the control for education level. This confirms that the increase in the level of activity associated to an accommodating monetary policy or high competitiveness will benefit principally to low-skilled workers. In

a symmetric way, the adverse impact of union density on employment performance would result from the exclusion of low-skilled workers. This last result is in accordance with the standard view according to which union density protect insiders but hurt marginal workers. The results presented in this section are summarized in Table 3.

As a first assessment, the following remarks can be made. We have found that the influence of institutional arrangements is actually far more complex than implied in most theoretical models and policy agenda. Notably, the results appear more complex than what is stressed by the 'new orthodoxy view'. We do not generally confirm the superiority in terms of employment performance of systems found on deregulation (or even flexi-security). On the contrary, the results lead to be cautious when assessing the influence of institutional arrangements as some forms of regulation may boost employment (such as employment protection legislation or coordination) whereas others play in a reverse way (such as union density or product market regulation). Also, the results claim for a clearer identification of the category of jobless population targeted by a policy, as the latter will not have a homogenous impact on that population. For instance, a reduction of employment protection may have a non significant impact on unemployment, but will have an adverse influence on employment performance by increasing inactivity. Careful empirical analyses are further needed to account for the effects of each institution. In this line, we proceed in the next section to a disaggregated analysis of non employed population. This way, the heterogeneity of non employed population is highlighted with more details as regard to their sensitivity to institutional arrangements.

Table 3. **Results: total population**[14]

	unemp.	inactivity	jobless.
EPL	NS	negative	negative
PMR	positive	positive	positive
Coord	negative	negative/NS	negative
CBI	negative	negative	negative
RR	NS	NS	positive/NS
UD	positive	positive	positive
TW	NS	positive	positive
FA	NS	positive	positive
RER	NS	negative/NS	negative
Product.	negative	positive/negative	negative
Credit	negative	negative	negative
TTB	NS/positive	negative	NS

4 Extensions

In this Section we use the FEVD estimator to test two extensions of our basic model. First, we study employment performances of different categories within the working age population disaggregated by sex and age. Second, we include in our baseline model a new independent variable capturing the interdependency between labour and product market regulations.

4.1 disaggregating inactivity and unemployment

In this Section, we present results from regressions for inactivity and unemployment disaggregated by sex and age groups. results for joblessness rate are not reported because they are globally in line with those presented for total working age population (see annex 6.1, table A5).[15] We only report below results for three categories of workers: unemployed

[14] The sign reported on the right-side refers to the result obtained after controlling for education level.

[15] Comparing results reported in annex with those of working age population, three remarks can be done. First, women aged 55 to 65 appear globally non sensitive to institutional arrangements.Also, the independence of central bank turns out to reduce non employment for young men and to be non significant

men aged 15 to 24, and 55 to 65, plus inactive prime age men (aged 25 to 54).[16] Further results are displayed in annexes A3-A4.

Both categories of unemployed population considered (i.e. men aged 15 to 24 and 55 to 65) appear to be relatively more sensitive to institutional and macroeconomic determinants (Table 11, column 1-2). The main differences, with respect to results for total working age population, concern the impact of employment protection legislation, financial assets, real exchange rate and trend of trade balance. These variables turn out to be significant in regressions below, whereas they had no significant impact in our baseline model (columns 2 and 4, Table 9). This is particularly interesting in relation to the standard view that rigid institutional arrangements would be more harmful for marginal workers, notably youth (see OECD [1999]). Our results indeed confirm a higher sensitivity to market imperfections in regressions for young and old workers (men). However, the signs of our coefficients are clearly at odds with the standard deregulation view. For instance, the variable EPL bears a significant and negative effect on the unemployment rate of men aged 15-24 and 55-65.[17] Concerning financial assets, an increase of financialisation appears to increase unemployment among young men, whereas this variable is generally not significant for the others categories of workers.[18] Moreover, a higher real exchange rate helps reducing unemployment of young men (through wage moderation), whereas it bears no effects for total working age population. The trade balance variable turns out to be positively related to the unemployment of young and old men: an improved external balance thus seems to be achieved through restrictive domestic policies rather than increased exports. Also, it is worth to notice the beneficial impact of a higher control on central bank for a reduction of unemployment of old men (whereas the impact of central bank variable remains non significant for youth).

Turning to the disaggregate analysis of inactive working age population, the results for prime age men (aged from 25 to 54) are reported in column 3. They are again contrasted as regards to those displayed for the working age population. Our regressions show that labour market protection has no significant impact on the level of inactivity (whereas it was significant and negative for working age population), and more regulation on the product market has a negative impact (whereas the sign of its coefficient was positive and significant previously). In other words, these results suggest that product markets deregulation would mainly harm prime age men, i.e. typical 'insiders' while this category would not benefit directly from a regulation in labour market. One possible interpretation of the results is that product market regulation protects low-skilled workers as it reduces competition in some declining activities. We check for the relevance of this hypothesis by controlling for the education level. If it is verified, one should find no impact of product market regulation in the new specification. Results are displayed in column 4 and globally confirm the hypothesis.[19] It should be also noticed that once one has controlled for the education level, the impact on inactivity of the independence of central bank variable as well those of financialisation and union density become non significant. In line with results concerning inactive working age population, this highlights that these institutions increase inactivity mainly through the exclusion of low-skilled workers. Actually, only the level of coordination and the lagged productivity variable remains significant in column 4. Hence, social exclusion of inactive prime age men appears mainly driven by macroeconomic conditions and specifically by the low level of labour demand associated to low

for young women.

[16] These rates are measured as the proportion of unemployed (inactive) workers among the male population of the specific age group.

[17] It can be notice that results for unemployed prime age men are in line with those reported for young and old men, notably as regards to the influence of labor market regulation.

[18] The perverse influence of financialisation on the unemployment rate also holds for young women (see annex 6.1, table A.3).

[19] One can note that these results are particularly interesting as regards to the recent literature which stresses the adverse impact of a biased technical progress toward skilled-workers on the inactivity of prime age men. See among others, Murphy and Topel [1997] and Faggio and Nickell [2005]. Nevertheless the beneficial impact of labour market protection on the level of activity of prime age men suggested by Bicakova [2005] is not confirmed.

productivity.

Table 4. **Results for disaggregated population by sex and age**

	Unemp.		Inactivity	
	1	**2**	**3**	4
	m_1524	m_5565	m_2554	m_2554
LDV	0.642***	0.697***	0.810***	0.845***
	[12.54]	[9.83]	[17.48]	[24.39]
PMR	3.408***	0.958**	-0.889**	-0.213
	[5.22]	[2.09]	[2.09]	[0.51]
EPLBLD	-1.177**	-1.192**	0.060	-0.235
	[2.50]	[2.52]	[0.18]	[0.57]
Coor	-1.797***	-0.579*	-1.308***	-0.893***
	[4.46]	[1.88]	[3.65]	[2.74]
CBI	-0.204	-0.335**	-0.361**	-0.069
	[1.03]	[1.98]	[2.29]	[0.40]
RR	0.984	-1.019	0.368	-0.562
	[0.91]	[1.13]	[0.56]	[0.76]
UD	0.042***	0.012	0.026***	-0.004
	[3.73]	[1.45]	[3.03]	[0.51]
TW	-0.037	0.017	0.003	0.026
	[1.42]	[0.73]	[0.17]	[1.15]
FA	0.008**	-0.001	0.007**	0.004
	[2.05]	[0.24]	[2.18]	[1.24]
RER	-2.645**	-1.021	-2.039*	-1.700
	[2.05]	[0.80]	[1.70]	[1.27]
Product.	-7.758***	-3.087**	1.668*	-8.585***
	[4.81]	[2.57]	[1.72]	[3.85]
Credit	-0.082***	-0.035**	-0.011	-0.001
	[5.48]	[2.49]	[0.92]	[0.09]
TTB	0.237***	0.117*	-0.030	-0.006
	[3.36]	[1.91]	[0.69]	[0.12]
Lageduc				-0.064**
				[2.52]
eta	1.035***	1.031***	1.000***	1.000***
	[5.42]	[3.11]	[3.91]	[4.10]
Observations	213	213	233	187
final rho	0.26	0.14		

4.2 interdependency across labour and product market regulations

In the previous section, we have focused on three categories of workers, that emerged from the disaggregated analysis of employment performances: for young and senior workers, employment protection legislation bears a positive impact on employment (whereas EPL has no significant effect in regressions for total unemployed working age population); for inactive prime age men, the variables EPL and PMR turn out to be non significant (whereas they have significant coefficients in regressions for total inactive working age population). These contrasting results lead us to investigate more deeply the impact of product and labour market imperfections by taking account of the interdependency between these two forms of regulation. Hence, we extend our baseline model by including an interaction term between EPL and PMR and test the following model:

$$y_{i,t} = \alpha_i + \phi \cdot y_{i,t-1} + \gamma \cdot PMR_{i,t} + \delta \cdot EPL_{i,t} + \zeta \cdot PMR_{i,t} \times EPL_{i,t} + \beta \cdot x_{i,t} + \epsilon_{i,t} \quad (4)$$

The inclusion of an interaction term means that the marginal effect of one variable, say EPL, varies with the level of the variable it is interacted with (Braumoeller [2004]). Hence, the marginal effect of employment protection is measured by:

$$\delta + \zeta \cdot PMR$$

and the marginal effect of product market regulation equals:

$$\gamma + \zeta \cdot EPL$$

We plot[20] the marginal effects with their margin errors in Figures 1 to 24.[21] The effect of each variable is plotted for different levels of the other variable. Interpreting the results allow us to determine the nature of the interdependency across labour and product market deregulations. In particular, we would like to know if these two forms of deregulation are complementary or substitute. Following a standard definition of complementarity, two deregulation policies are complementary if each of them is more effective in improving employment and welfare when the other one is also implemented. By contrast, two deregulation policies are substitutes if implementing any of them decreases the effectiveness of the other one.

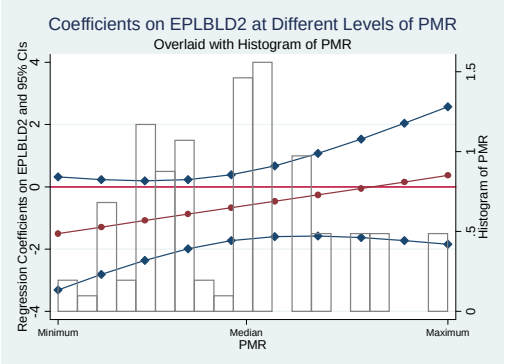

Figure 1. Unemployment, working age pop.

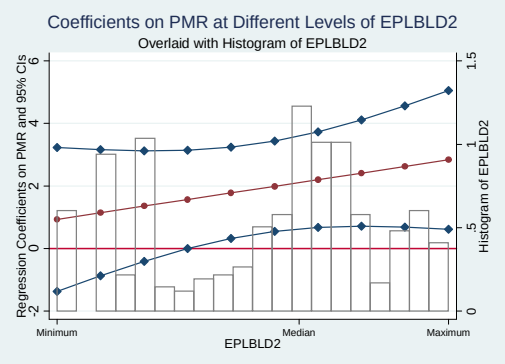

Figure 2. Unemployment, working age pop.

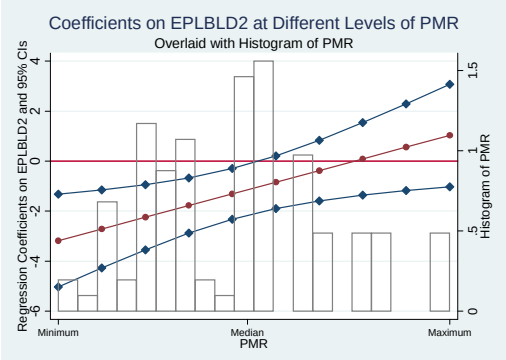

Figure 3. Unemployment, males 25-54.

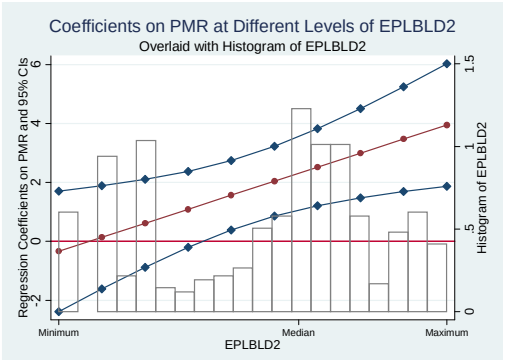

Figure 4. Unemployment, males 25-54.

[20] Thanks to the stata program devised by Bear F. Braumoeller.
[21] Regressions results are presented in Annex 6.1, table A6.

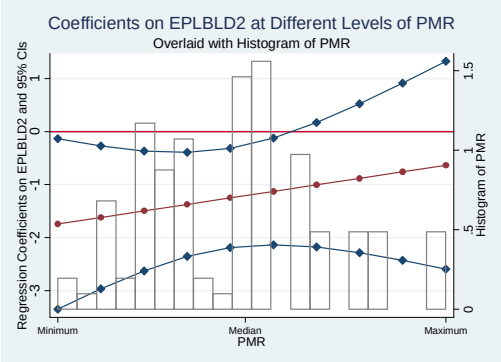

Figure 5. Unemployment, males 15-24.

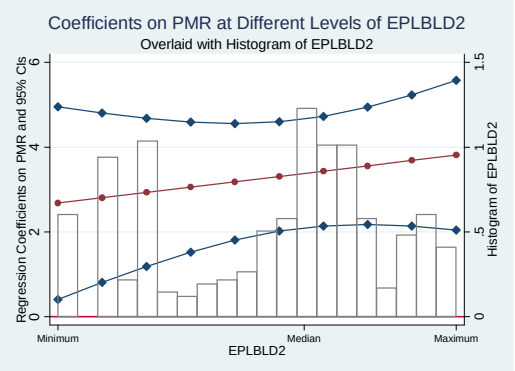

Figure 6. Unemployment, males 15-24.

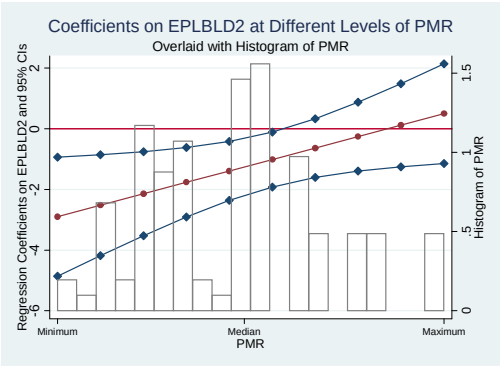

Figure 7. Unemployment, males 55-64.

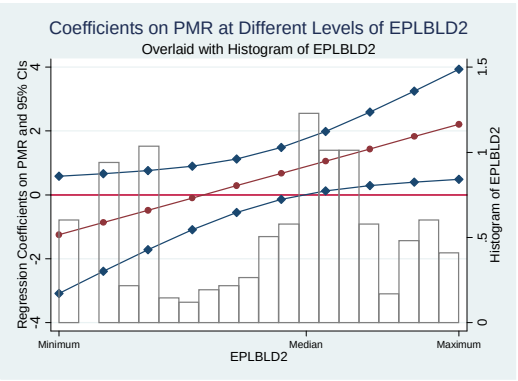

Figure 8. Unemployment, males 55-64.

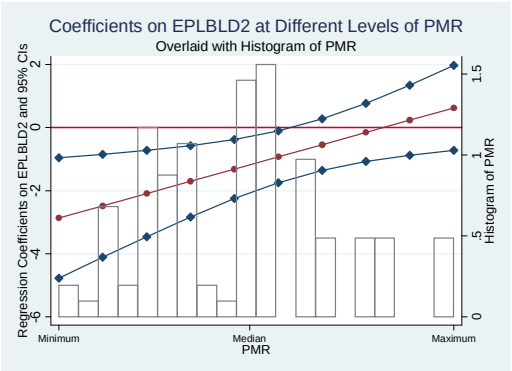

Figure 9. Inactivity, working age pop.

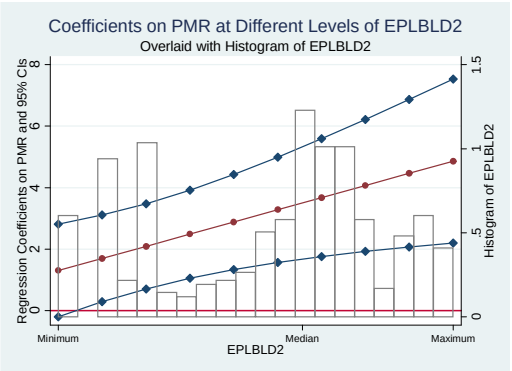

Figure 10. Inactivity, working age pop.

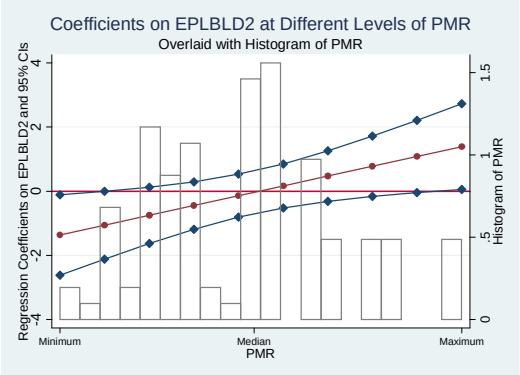

Figure 11. Inactivity, males 25-54.

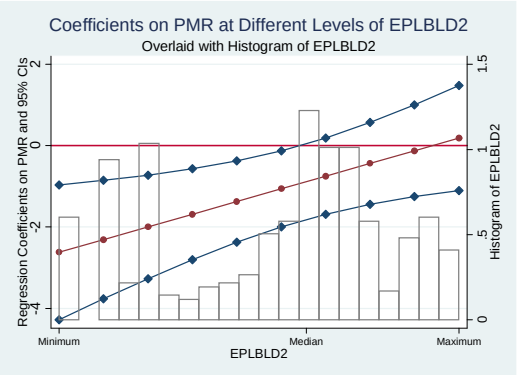

Figure 12. Inactivity, males 25-54.

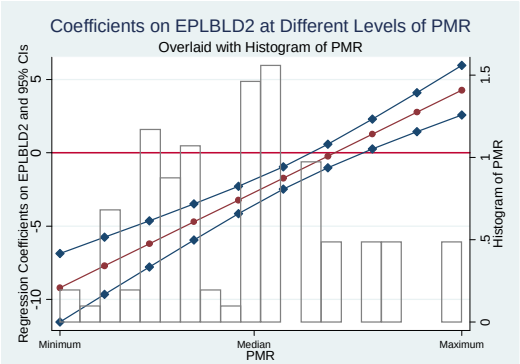

Figure 13. Inactivity, males 15-24.

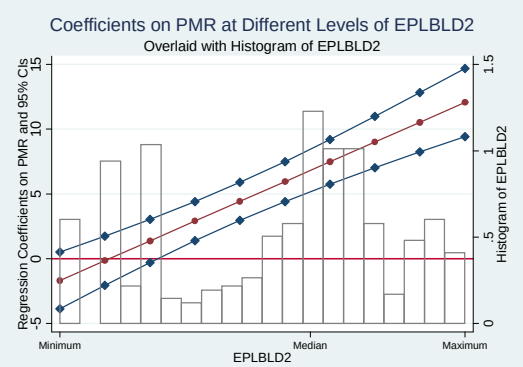

Figure 14. Inactivity, males 15-24.

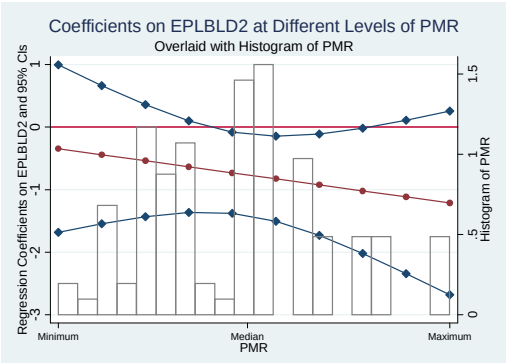

Figure 15. Inactivity, males 55-64.

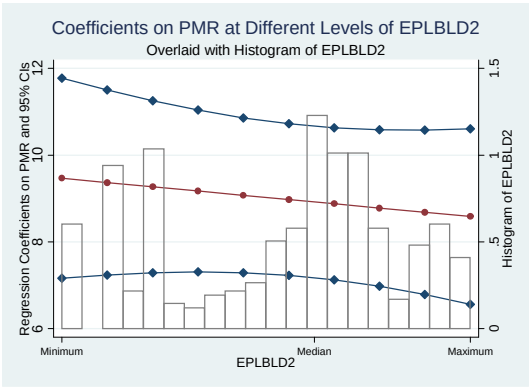

Figure 16. Inactivity, males 55-64.

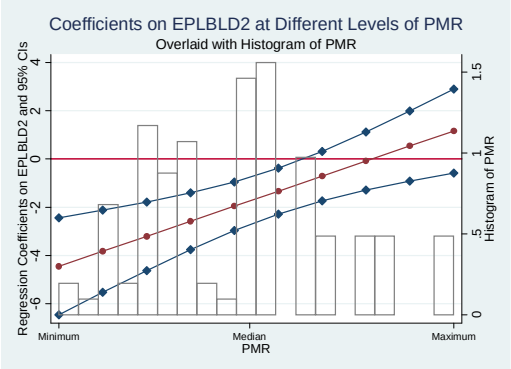

Figure 17. Joblessness, working age pop.

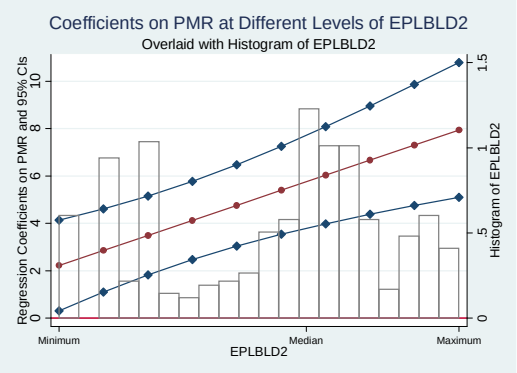

Figure 18. Joblessness, working age pop.

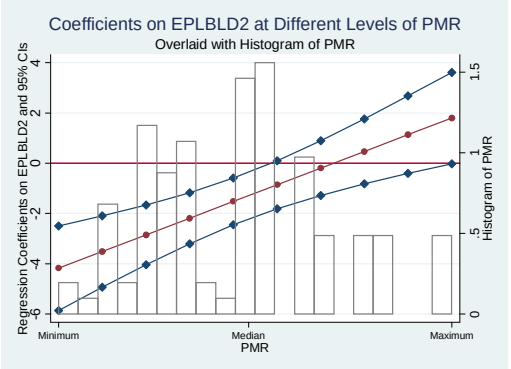

Figure 19. Joblessness, males 25-54.

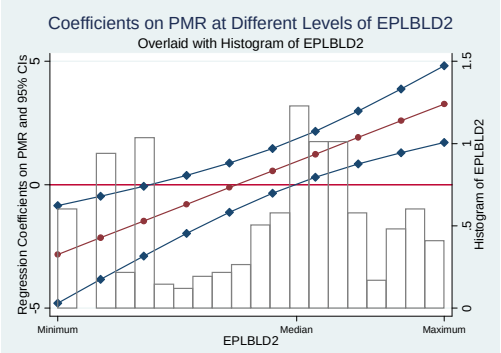

Figure 20. Joblessness, males 25-54.

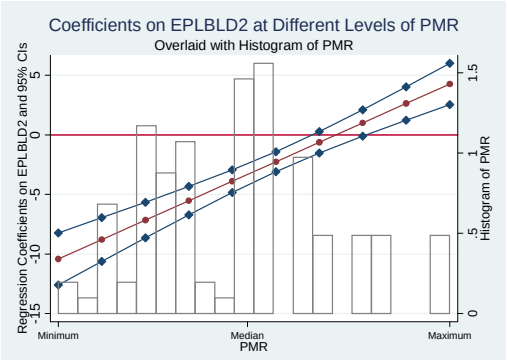

Figure 21. Joblessness, males 15-24.

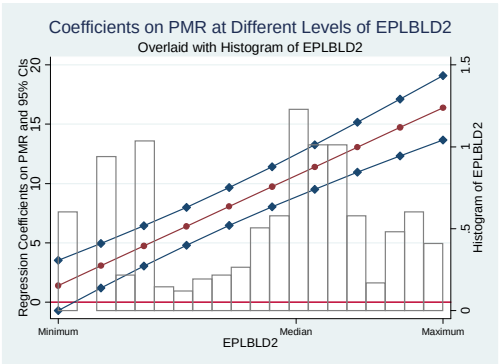

Figure 22. Joblessness, males 15-24.

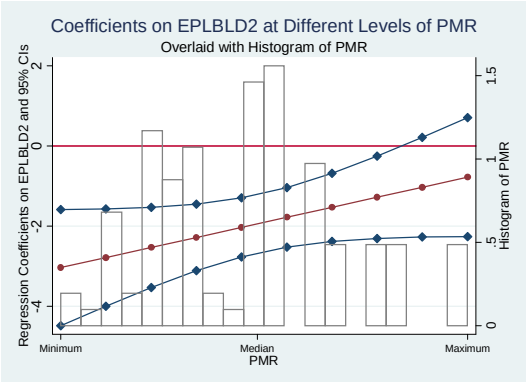

Figure 23. Joblessness, males 55-64.

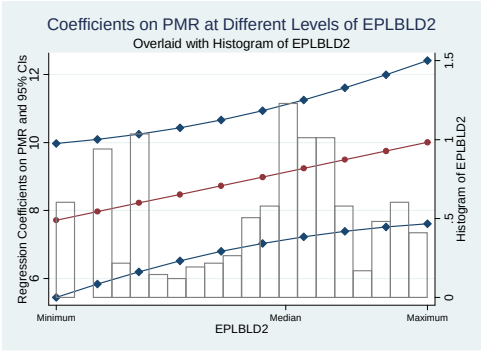

Figure 24. Joblessness, males 55-64.

First, one should note that the marginal effect of PMR is generally positive and significant for most of the values of EPL except for inactivity and joblessness of prime age males for below-median levels of EPL. This result offers some support to the common view that product market deregulation might be a good policy for employment. On the other hand, the coefficient measuring the marginal effect of EPL is almost always negative whenever significant. EPL seems to be detrimental only to employment of males under 24 at high levels of PMR. Hence, deregulation is not necessary the most suited policy to improve labour markets operation.

Given the definitions above, to know if decreasing EPL and PMR are complementary or substitute policies, one should look at changes in the coefficients of the marginal effects. One could say that labour market deregulation is a complementary policy with respect to product market deregulation, if lowering PMR is more effective in improving employment when EPL is also reduced: in this case, one would find that the positive marginal effect of PMR increases when EPL decreases. The results displayed in Figures 1 to 24 actually show the opposite result: the marginal effect of PMR is always stronger the higher EPL, with the only exception of inactive men aged 55 to 64 (Figure 16). Hence, in general product market deregulation is a more effective policy for employment if EPL is kept at a high level. In other words, reducing EPL yields a decrease in the adverse marginal effect of PMR on employment. Hence, decreasing labour market regulation indeed lowers the incentives to deregulate product markets. This points to a substitution effect across deregulation policies, and clearly indicates that a positive (and increasing) level of social protection is necessary to grasp all positive outcomes of product market deregulation. Concerning inactive men aged 55 to 64, results seem to indicate that a more standard complementarity is indeed at work, as reducing PMR would lead to a stronger decrease in inactivity for lower values of EPL. This would suggest that joint deregulation policies could benefit senior marginalized workers.

We get a similar although more complex picture when looking at the marginal coefficients for EPL. In fact, as already said, the marginal impact of EPL is not always significant. One can check that the marginal coefficient of EPL, when significant, is generally negative if PMR is set equal to the mean. In this case, labour market deregulation is not a good policy to improve employment performance. For higher levels of PMR, the marginal effect of EPL turns in general either non significant or positive, with the exception of inactive men aged 55 to 64. A positive marginal coefficient means that labour market deregulation would indeed be good for employment (this happens for inactive men between 15 and 24, Figure 13). However, as it can be seen, the positive effect of deregulation vanishes, or even becomes negative, whenever PMR is lowered towards the mean.

Hence, decreasing product market regulation makes deregulation in labour markets a bad policy for employment: again this result implies that deregulation policies are not complementary but rather substitute to each others. Concerning men aged 55 to 64 (Figure 15), EPL decreases inactivity when PMR is at the median level. A lower PMR would marginally reduce the effectiveness of EPL in fighting inactivity. However, we have seen from the analysis of the marginal effect of PMR, that for this particular category of workers, a low EPL makes product market deregulation more effective in reducing inactivity; at the same time, the analysis of the marginal effects of EPL shows that lowering EPL indeed increases inactivity or at least stops decreasing it. Hence labour market deregulation has a contrasted impact: it directly increases inactivity while ensuring a greater effectiveness of deregulation policies on product markets.

To give a clearer picture of the implications that can be drawn from our analysis of the interdependencies across deregulation policies, we can consider the following example. Let us take the case of a country characterized by a "high" level of PMR and EPL. This corresponds to 'rigid' labour and product market institutions. The standard policy recommendation would be to decrease the degree of rigidity on both markets by reforming the legislation in a more flexible direction, that is by reducing both EPL and PMR simultaneously. Referring to working age population, it can be seen that this would not be the best policy for employment. In fact, reducing EPL makes product market deregulation less effective (Figure 2), and has no effect on inactivity (Figure 9) or joblessness (Figure 17). An alternative policy would indeed be more effective according to our estimations: decreasing PMR while keeping EPL constant. This policy would allow to exploit the positive impact of product market deregulation (which is maximum at "high" levels of EPL), and to grasp the beneficial effects of EPL emerging at "low" levels of PMR (that is, for PMR set equal to the mean).

5 Conclusions

This paper empirically investigates three dimensions of employment performances: unemployment, joblessness and inactivity. More specifically, we propose a set of regressions allowing us to assess the role of institutional and macroeconomic determinants of employment performance. First, we analyze the impact of labour, product and financial market imperfections on joblessness. Second, we disaggregate joblessness along its components (unemployment and inactivity) to identify similarities and differences between alternative situations of non-employment. Finally, we study the determinants of employment performance for specific categories of workers, by distinguishing according to sex and age groups.

Concerning joblessness determinants, standard signs for the coefficients of variables such as the replacement rate, union density and product market regulation are found; all of them contribute to decreasing the overall employment performance. The regressions also verify the corporatism view according to which bargaining coordination improves employment performance. A few institutional arrangements appear to be beneficial for employment, i.e. employment protection legislation, the degree of control over the central bank, and financial market regulation. Contrary to common wisdom, employment protection legislation contributes to decrease joblessness: Also, a more independent central bank is not good for employment: a Phillips curve-type effect may be at work, which counters any positive effect of central bank independence on union wage moderation. Moreover, increased financialisation leads to inferior employment performance. Macroeconomic variables turn out to be crucial in the regression: higher productivity and relaxing credit constraints contribute to better employment performance possibly via pushing labour demand upward. An increase in the real exchange rate is also good for employment probably through wage moderation.

Regression results are also presented for two components of joblessness, i.e. inactivity and unemployment. Three main results emerge from this analysis. First, it appears from

the analysis that unemployment and inactivity are related but different situations. A few variables, such as product market regulation and credit to the economy, turn out to have a similar qualitative impact across unemployment and inactivity, and signs of coefficients are in line with those displayed for joblessness. However, some important differences emerge. The level of coordination has an impact only on unemployment. On the contrary, central bank independence, financialisation, real exchange rate, union density and the tax wedge variables appear to affect joblessness more through their impact on social exclusion than through their effect on unemployment. As for productivity, we find that increased productivity contributes to reducing unemployment, but at the same time fosters inactivity. Our interpretation of the result is the following: higher productivity pushes aside low skilled workers and thus increases inactivity. Extending the baseline model by including a variable capturing the level of education attainments yields two main insights. Education and employment protection legislation play an important role with respect to inactivity and joblessness rates whereas these variables are never significant in unemployment regressions. This is consistent with the idea that less educated people are stepping out of the labour market and that job protection may be a way to maintain them in the labour force. Also, the inclusion of the education variable makes the coefficient of the lagged productivity term negative in the regression for inactivity: increased productivity tends to decrease inactivity once the level of education of the workforce is controlled for, reflecting that more educated workers are able to adapt to productivity-enhancing technological change.

To account for heterogeneity across workers categories, the working age population is disaggregated by sex and age groups. Regression results for three main groups present significant differences relative to total working age population. The results are at odds with the standard view that rigid institutional arrangements are more harmful for marginal workers, notably youth. In fact, EPL appears to play a positive role in relation to the employment performance of senior and young men (whereas it has no significant influence for the working age population). Regressions for inactive prime age men lead also to contrasted result relative to those for inactive working age population: the EPL coefficient becomes non significant and PMR coefficient turn out to be significant and negative for this category. We verify that the beneficial impact of product market regulation on this category comes principally from the protection of less qualified workers. These results highlight the heterogeneous impact of institutional arrangements on different categories of nonemployed population. They emphasise the need for a careful empirical analysis when assessing the potential impact of deregulation policies.

In line with recent theoretical results on the interdependence across labour and product markets regulations, we also modify our baseline model to include an interaction term between PMR and EPL. This allows us to investigate the nature of the relationship between these two variables, i.e. complementarity vs. substitutability. We apply this extended model to the working age population as well as the three sub-groups previously identified. The analysis of the marginal effects of EPL and PMR within the extended model shows that decreasing labour market regulation generally lowers the incentives to deregulate product markets; moreover, lowering regulation on product markets makes labour market deregulation a bad policy for employment: a substitution effect across deregulation policies is at work, and a positive (and increasing) level of job protection appears necessary if one wants to grasp all gains from product market deregulation. Our results suggest that the overall impact of labour market deregulation on employment performance are negative at "low" levels of PMR, as suggested in a few recent theoretical contributions (see, for instance, Amable and Gatti, 2004). Moreover, in line with Amable and Gatti [2006], we find that interdependencies across policies are far more complicated than implied in most theoretical models and policy agenda. Careful empirical analyses are further needed to account for the effects of these interdependencies.

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6 Appendix

6.1 further results

We provide below results with FEVD and various combinations of time-invariant variables. As shown, results are not substantially modified by introducing additional time-invariants.

Table A1. **Variant with FEVD estimator**

	1	2	3	4	5	6
	Unemp.	Unemp.	Inact.	Inact.	Jobless	Jobless.
LDV	0.753***	0.752***	0.853***	0.848***	0.828***	0.823***
	[10.56]	[10.53]	[22.44]	[21.15]	[27.21]	[26.31]
PMR	1.054*	2.003***	2.695***	3.052***	3.883***	5.198***
	[1.81]	[2.80]	[3.63]	[3.58]	[5.63]	[5.62]
EPLBLD	-0.489	-0.530	-0.840**	-0.929**	-1.200***	-1.437***
	[1.00]	[0.99]	[2.52]	[2.26]	[3.34]	[3.07]
Coord		-1.239**		-0.242		-1.342***
		[2.35]		[1.07]		[3.63]
RR	0.372	0.593	1.085	1.369	1.730*	2.208**
	[0.35]	[0.55]	[1.35]	[1.57]	[1.83]	[2.21]
UD	0.020*	0.021	0.024***	0.026***	0.045***	0.050***
	[1.66]	[1.60]	[3.23]	[3.29]	[4.23]	[4.35]
TW	0.000	0.005	0.010	0.016	-0.001	0.009
	[0.01]	[0.19]	[0.75]	[1.10]	[0.08]	[0.51]
FA	0.002	0.003	0.007**	0.008**	0.011***	0.011***
	[0.58]	[0.58]	[1.99]	[2.04]	[2.61]	[2.66]
RER	-1.210	-1.235	-1.774	-1.803	-2.664**	-2.728**
	[0.96]	[0.98]	[1.49]	[1.52]	[2.09]	[2.15]
Productivity	-5.608**	-5.549**	1.327	1.569	-4.109***	-3.747***
	[2.45]	[2.38]	[1.42]	[1.61]	[2.93]	[2.77]
Credit	-0.039***	-0.040***	-0.033***	-0.034***	-0.070***	-0.072***
	[2.72]	[2.74]	[2.89]	[2.96]	[5.17]	[5.28]
TTB	0.151*	0.136*	-0.054	-0.076*	0.087	0.044
	[1.76]	[1.66]	[1.37]	[1.86]	[1.43]	[0.77]
eta	1.052**	1.051**	1.000***	1.000***	1.051***	1.052***
	[2.40]	[2.24]	[3.03]	[3.06]	[4.68]	[4.73]
Observations	227	227	247	247	227	227
final rho	0.38	0.39			0.21	0.21
Invariant	PMR	PMR;Coord	PMR	PMR;Coord	PMR	PMR;Coord

We present hereafter estimation results with PCSE and GLS with change of the correction used for erros autocorellation of residuals.

Table A2. **Unemployment Inactivity**

	Unemp.				Inact.	
	1	**2**	**3**	**4**	**5**	**6**
	mw_pat	mw_pat	mw_pat	mw_pat	mw_pat	mw_pat
LDV	0.770***	0.769***	0.766***	0.767***	0.854***	0.832***
	[18.93]	[21.68]	[19.49]	[21.86]	[19.89]	[24.77]
PMR	1.605*	1.617*	2.046**	2.090**	0.322	0.462
	[1.84]	[1.66]	[2.40]	[2.22]	[0.43]	[0.71]
EPLBLD	-0.513	-0.504	-0.458	-0.441	-1.034**	-0.984***
	[1.05]	[1.09]	[0.95]	[0.98]	[2.31]	[2.81]
Coord.	-0.190	-0.196	-0.282	-0.290	-0.246	-0.108
	[0.80]	[0.90]	[1.21]	[1.38]	[0.84]	[0.49]
CBI	0.019	0.024	-0.026	-0.024	0.226**	0.166*
	[0.16]	[0.19]	[0.23]	[0.20]	[1.96]	[1.83]
RR	0.759	0.735	0.394	0.410	1.640**	0.905
	[0.76]	[0.85]	[0.44]	[0.51]	[1.97]	[1.37]
UD	0.026*	0.026	0.020	0.020	0.029*	0.027**
	[1.77]	[1.60]	[1.47]	[1.34]	[1.87]	[2.04]
TW	0.010	0.009	0.016	0.016	0.027	0.009
	[0.47]	[0.45]	[0.81]	[0.77]	[1.07]	[0.48]
FA	0.003	0.003	0.004	0.004	0.010**	0.010***
	[1.01]	[0.92]	[1.22]	[1.13]	[2.26]	[3.28]
RER	-1.286**	-1.296**	-1.185**	-1.207**	-1.770***	-1.225***
	[2.24]	[2.23]	[2.16]	[2.17]	[3.04]	[2.70]
Productivity	-4.980***	-4.919***	-6.084***	-6.070***	1.381	0.791
	[3.53]	[3.24]	[4.45]	[4.20]	[0.76]	[0.55]
Credit	-0.044***	-0.044***	-0.043***	-0.043***	-0.036***	-0.035***
	[6.39]	[6.42]	[6.72]	[6.62]	[4.76]	[6.05]
TTB	0.123*	0.123*	0.139**	0.141**	-0.080	-0.018
	[1.92]	[1.72]	[2.21]	[2.07]	[0.94]	[0.29]
Estimator	PCSE	GLS	PCSE	GLS	PCSE	GLS
AR1	common	common	panel spec.	panel spec.	no	no
Observations	247	247	247	247	247	247
final rho	0.23	0.23				

Table A3. **Desagregation of Unemployment estimations**

	Unemp.			
	1	**2**	**3**	**4**
	m_2554	w_2554	w_1524	w_5565
LDV	0.692***	0.776***	0.741***	0.746***
	[12.80]	[12.24]	[15.46]	[7.20]
PMR	2.460***	2.531***	2.879***	0.330
	[3.70]	[3.05]	[4.55]	[0.75]
EPLBLD	-1.060**	-0.413	-0.022	-0.559
	[2.03]	[0.83]	[0.06]	[1.15]
Coord.	-2.105***	-1.718**	-1.762***	-0.243
	[3.64]	[2.46]	[3.89]	[0.84]
CBI	-0.625**	-0.586*	-0.445**	-0.225
	[2.45]	[1.90]	[2.10]	[1.31]
RR	1.730*	1.115	0.537	-0.618
	[1.67]	[1.13]	[0.63]	[0.51]
UD	0.025**	0.039**	0.066***	0.005
	[1.99]	[1.99]	[3.99]	[0.61]
TW	0.004	0.033	-0.013	0.009
	[0.14]	[1.22]	[0.60]	[0.40]
FA	0.002	0.004	0.007**	-0.003
	[0.44]	[0.90]	[2.18]	[0.76]
RER	-2.119	-0.643	-1.417	-0.122
	[1.65]	[0.50]	[1.11]	[0.10]
Productivity	-7.548***	-4.280**	-2.789**	-1.658
	[3.47]	[2.07]	[2.52]	[1.34]
Credit	-0.058***	-0.036**	-0.057***	-0.019
	[3.90]	[2.48]	[4.19]	[1.35]
TTB	0.203**	0.086	0.089*	0.033
	[2.30]	[1.10]	[1.75]	[0.61]
eta	1.098***	1.148**	1.027***	1.149
	[3.48]	[2.47]	[4.16]	[1.65]
Observations	213	213	213	213
final rho	0.33	0.30	0.06	0.14

Table A4. **Desagregation of Inactivity**

	Inact.				
	1	**2**	**3**	**4**	**5**
	w_2554	m_1524	w_1524	m_5565	w_5565
LDV	0.928***	0.879***	0.926***	0.705***	0.762***
	[68.86]	[51.15]	[75.31]	[24.48]	[27.69]
PMR	1.116***	6.652***	6.519***	8.945***	8.286***
	[2.97]	[7.81]	[9.33]	[10.12]	[9.33]
EPLBLD	-0.063	-2.200***	-2.976***	-0.791**	0.356
	[0.18]	[5.26]	[5.98]	[2.41]	[1.05]
Coord.	-1.077***	0.821***	0.256	1.235***	-0.038
	[3.77]	[3.17]	[1.07]	[4.88]	[0.16]
CBI	-0.654***	0.609***	0.396***	-0.772***	-1.908***
	[3.78]	[4.07]	[2.71]	[4.62]	[7.11]
RR	1.206	2.658***	5.154***	4.343***	3.693***
	[1.50]	[3.95]	[6.78]	[5.73]	[4.67]
UD	0.053***	-0.004	-0.018**	0.022***	0.075***
	[4.81]	[0.58]	[2.13]	[3.18]	[7.31]
TW	-0.007	0.052**	0.038*	0.017	0.026
	[0.40]	[2.49]	[1.93]	[0.92]	[1.39]
FA	0.008**	0.018***	0.011***	-0.008***	0.014***
	[2.54]	[5.18]	[3.82]	[2.75]	[4.72]
RER	-2.040*	-1.721	-2.655**	-2.535**	-1.554
	[1.70]	[1.43]	[2.21]	[2.09]	[1.29]
Productivity	3.398***	-1.599	-7.378***	-0.379	3.119***
	[2.84]	[1.54]	[5.27]	[0.42]	[3.13]
Credit	-0.029**	-0.061***	-0.083***	-0.012	-0.016
	[2.44]	[4.89]	[6.88]	[1.06]	[1.39]
TTB	-0.096**	-0.173***	-0.069	-0.150***	0.006
	[2.00]	[3.94]	[1.49]	[3.44]	[0.13]
eta	1.000***	1.000***	1.000***	1.000***	1.000***
	[4.96]	[8.42]	[9.47]	[10.56]	[8.99]
Observations	233	233	233	233	233

Table A5. **Desagregation of Joblessness**

	Joblessness					
	1	**2**	**3**	**4**	**5**	**6**
	m_2554	w_2554	m_1524	w_1524	m_5565	w_5565
LDV	0.657***	0.903***	0.828***	0.897***	0.736***	0.788***
	[16.40]	[45.45]	[50.80]	[58.56]	[24.49]	[23.95]
PMR	1.044**	3.549***	10.702***	8.895***	9.098***	8.240***
	[2.26]	[4.67]	[11.26]	[8.84]	[9.07]	[7.13]
EPLBLD	-1.127**	-0.444	-2.811***	-2.815***	-1.859***	-0.344
	[2.41]	[1.02]	[6.32]	[4.88]	[5.11]	[0.92]
Coord.	-4.393***	-2.281***	-0.360	-1.025***	0.575**	-0.370
	[7.22]	[3.96]	[1.36]	[3.31]	[2.48]	[1.32]
CBI	-1.248***	-1.426***	0.379**	-0.022	-1.026***	-1.986***
	[5.46]	[4.33]	[2.42]	[0.12]	[5.77]	[5.76]
RR	2.601***	2.539**	4.010***	6.503***	3.120***	3.110***
	[2.73]	[2.22]	[5.19]	[6.18]	[4.26]	[3.39]
UD	0.070***	0.102***	0.021***	0.023**	0.037***	0.084***
	[5.75]	[4.35]	[2.68]	[2.58]	[5.12]	[6.03]
TW	0.023	-0.004	0.006	0.006	0.030	0.040*
	[0.85]	[0.15]	[0.27]	[0.25]	[1.59]	[1.78]
FA	0.018***	0.014***	0.027***	0.016***	-0.008***	0.013***
	[4.10]	[2.94]	[7.01]	[3.96]	[2.94]	[3.53]
RER	-4.097***	-2.423*	-3.685***	-2.969**	-3.587***	-1.625
	[3.19]	[1.89]	[2.89]	[2.31]	[2.91]	[1.27]
Productivity	-4.525***	0.329	-9.764***	-11.124***	-3.177***	1.108
	[3.44]	[0.27]	[6.80]	[5.30]	[3.40]	[1.01]
Credit	-0.074***	-0.060***	-0.126***	-0.118***	-0.051***	-0.036***
	[5.04]	[4.26]	[8.92]	[8.20]	[4.18]	[2.77]
TTB	0.168**	-0.103	0.006	0.013	-0.062	-0.000
	[2.59]	[1.62]	[0.11]	[0.20]	[1.44]	[0.01]
eta	1.140***	1.041***	1.018***	0.989***	0.964***	1.064***
	[8.10]	[4.20]	[11.23]	[7.95]	[9.05]	[6.65]
Observations	213	213	213	213	213	213
final rho	0.26	0.23	0.10	0.24	-0.07	0.11

Table A6. **Extended model : estimations with interaction term between labour and market regulations**

	mw_pat			m_2554		
	1	2	3	4	5	6
	Unemp.	Inact.	jobless.	Unemp.	Inact.	jobless.
LDV	0.754***	0.848***	0.823***	0.700***	0.818***	0.661***
	[10.63]	[22.23]	[26.92]	[13.32]	[16.91]	[16.56]
PMR	0.837	1.118	1.921*	-0.562	-2.767***	-3.142***
	[0.67]	[1.40]	[1.89]	[0.50]	[3.10]	[2.92]
EPLBLD	-2.361	-4.482***	-7.049***	-5.123***	-2.638**	-6.944***
	[1.44]	[2.81]	[4.07]	[3.09]	[2.36]	[4.67]
PMR_EPL	0.980	1.836**	2.952***	2.210**	1.449**	3.143***
	[1.08]	[2.44]	[3.42]	[2.48]	[2.44]	[3.97]
Coord	-0.915**	0.306	-0.435	-1.278***	-0.757**	-3.253***
	[1.99]	[1.17]	[1.47]	[2.82]	[2.23]	[5.94]
CBI	-0.334	-0.369**	-0.779***	-0.557**	-0.326**	-1.179***
	[1.39]	[2.18]	[3.60]	[2.29]	[2.09]	[5.24]
RR	0.761	2.144*	3.129**	2.187*	0.712	3.230***
	[0.59]	[1.96]	[2.58]	[1.81]	[0.85]	[2.85]
UD	0.019	0.026***	0.046***	0.018	0.021***	0.060***
	[1.46]	[3.32]	[4.33]	[1.61]	[2.67]	[5.27]
TW	0.001	0.020	0.009	-0.006	-0.005	0.009
	[0.05]	[1.26]	[0.47]	[0.23]	[0.23]	[0.33]
FA	0.002	0.008**	0.011**	-0.001	0.006*	0.014***
	[0.37]	[2.16]	[2.59]	[0.14]	[1.75]	[3.42]
RER	-1.278	-1.833	-2.849**	-2.224*	-2.073*	-4.223***
	[1.01]	[1.54]	[2.24]	[1.73]	[1.72]	[3.29]
Product.	-5.610**	1.304	-3.979***	-7.609***	1.438	-5.050***
	[2.38]	[1.37]	[3.01]	[3.46]	[1.46]	[3.82]
Credit	-0.041***	-0.037***	-0.077***	-0.060***	-0.012	-0.076***
	[2.77]	[3.16]	[5.56]	[4.02]	[0.96]	[5.16]
TTB	0.139*	-0.073*	0.052	0.210**	-0.021	0.186***
	[1.66]	[1.76]	[0.92]	[2.39]	[0.47]	[2.86]
eta	1.039**	1.000***	1.025***	1.061***	1.000***	1.150***
	[2.22]	[3.34]	[4.94]	[3.36]	[3.52]	[7.87]
Observations	227	247	227	213	233	213
final rho	0.38		0.19	0.31		0.25

	m_1524			m_5565		
	7	8	9	10	11	12
	Unemp.	Inact.	jobless.	Unemp.	Inact.	jobless.
LDV	0.642***	0.870***	0.823***	0.709***	0.707***	0.734***
	[12.61]	[45.90]	[49.47]	[10.50]	[24.67]	[24.22]
PMR	2.622**	-2.387**	0.632	-1.427	9.513***	7.588***
	[2.15]	[2.01]	[0.55]	[1.42]	[7.83]	[6.39]
EPLBLD	-2.256	-15.444***	-17.218***	-4.467***	0.056	-4.077***
	[1.55]	[7.58]	[9.03]	[2.66]	[0.05]	[3.16]
PMR_EPL	0.583	7.087***	7.728***	1.784**	-0.456	1.187*
	[0.72]	[7.12]	[8.17]	[2.15]	[0.69]	[1.74]
Coord	-1.589***	3.334***	2.343***	0.060	1.067***	0.995***
	[3.74]	[7.34]	[6.40]	[0.19]	[3.85]	[3.69]
CBI	-0.191	0.732***	0.520***	-0.296*	-0.779***	-1.008***
	[0.96]	[4.79]	[3.37]	[1.82]	[4.65]	[5.73]
RR	1.122	4.482***	5.898***	-0.575	4.217***	3.478***
	[0.96]	[5.13]	[6.00]	[0.57]	[4.25]	[3.58]
UD	0.040***	-0.022**	0.002	0.007	0.024***	0.034***
	[3.63]	[2.57]	[0.26]	[0.90]	[3.38]	[4.77]
TW	-0.039	0.023	-0.026	0.007	0.019	0.024
	[1.50]	[1.12]	[1.19]	[0.31]	[0.96]	[1.19]
FA	0.007*	0.012***	0.020***	-0.003	-0.007**	-0.009***
	[1.90]	[3.85]	[5.74]	[0.80]	[2.59]	[3.33]
RER	-2.673**	-1.951	-4.055***	-1.068	-2.529**	-3.605***
	[2.07]	[1.63]	[3.19]	[0.84]	[2.09]	[2.93]
Product.	-7.804***	-2.105*	-10.296***	-3.357***	-0.309	-3.328***
	[4.76]	[1.87]	[7.32]	[2.79]	[0.33]	[3.50]
Credit	-0.082***	-0.065***	-0.134***	-0.036**	-0.012	-0.052***
	[5.51]	[5.25]	[9.53]	[2.58]	[1.04]	[4.24]
TTB	0.240***	-0.140***	0.045	0.126**	-0.155***	-0.053
	[3.40]	[3.07]	[0.84]	[2.06]	[3.46]	[1.20]
eta	1.031***	1.000***	1.008***	1.018***	1.000***	0.963***
	[5.11]	[9.32]	[12.09]	[3.25]	[10.50]	[9.05]
Observations	213	233	213	213	233	213
final rho	0.25		0.07	0.12		-0.07

6.2 unit root tests

Inactivity rate

test	lags	drift	trend	stat	conclusion
Ipshin	2			-0.327	NS
Ipshin	2		y	0.506	NS
xtfisher	2			29.41	NS
xtfisher	2		y	43.64	NS
xtfisher	2	y		79.49***	I(0)
levinlin	2			-2.63***	I(0)
levinlin	2		y	-1.7**	I(0)

Unemployment rate

test	lags	drift	trend	stat	conclusion
ipshin	2			-1.667**	I(0)
xtfisher	2	y		114.1***	I(0)
levinlin	2		y	-2.5	I(0)

jobless rate

test	lags	drift	trend	stat	conclusion
ipshin	2			-2.6***	I(0)
xtfisher	2	y		102.96***	I(0)
levinlin	2			-4.05***	I(0)

Unemployment benefit replacement rate

test	lags	drift	trend	stat	conclusion
ipshin	2			-6.53***	I(0)
levinlin	2			-6.93***	I(0)
xtfisher	2			61.96***	I(0)

Union density

test	lags	drift	trend	stat	conclusion
ipshin	2			0.829	NS
ipshin	2		y	1.02	NS
levinlin	2			-2.76***	I(0)
xtfisher	2			33.7	NS
xtfisher	2		y	17.9	NS
xtfisher pp	2			77.5***	I(0)
xtfisher	2	y		84.37***	I(0)

Income tax wedge

test	lags	drift	trend	stat	conclusion
ipshin	2			-0.308	NS
ipshin	2		y	-0.671	NS
levinlin	2			-1.74**	I(0)
xtfisher	2		y	56.9**	I(0)
xtfisher	2	y		112.8***	I(0)

Rate of inactivity for the population aged between 25 and 54

test	lags	drift	trend	stat	conclusion
ipshin	2		y	-1.0	NS
ipshin	2			0.2	NS
xtfisher	2			54.5**	I(0)
xtfisher	2	y		113.5***	I(0)
xtfisher	2	y		97.3***	I(0)
ipshin	2			-1.43*	I(0)
xtfisher	2			65.9***	I(0)
ipshin	2			-0.867	NS

Financial assets

test	lags	drift	trend	stat	conclusion
xtfisher	2	y		30.64	NS
xtfisher	2		y	30.78	NS
ipshin	2			1.009	NS
ipshin	2			64.16***	I(0)

RER

test	lags	drift	trend	stat	conclusion
ipshin	2			-5.7***	I(0)
xtfisher	2			99.5***	I(0)

labour productivity (GDP per employed)

test	lags	drift	trend	stat	conclusion
ipshin	2			2.5	NS
ipshin	2		y	1.35	NS
xtfisher	2	y		72.5***	I(0)

credit_to_economy

lags	drift	trend	stat	conclusion
2			36.8	NS
2		y	24.0	NS
2	y		98.5***	I(0)
2		y	1.23	NS

Inflation rate (Inflation)

test	lags	drift	trend	stat	conclusion
xtfisher	2			89.7***	I(0)
ipshin	2		y	-2.51***	I(0)

lag_prim_second_educ_alllevel

test	lags	drift	trend	stat	conclusion
xtfisher	2	y		86.8***	I(0)
ipshin	2			-3.49***	I(0)

6.3 EPL indicator and other figures

Employment Protection Legislation indicator

For countries that are documented in the FRDB Social Reforms Database, we estimate a model explaining the evolution of the EPL indicator by Nickell et al. [2002] using the indicators of employment protection given in the FRDB Social Reforms Database as well as country dummies and time trends as regressors. In particular, we run OLS estimations using the following regressors by FRDB Database:

- *index_fepl*: a measure indicating the precise number of reforms passed each year in each country, as well as the direction of their effect on labour market flexibility. Reforms are characterized as being directed towards more flexibility if they decrease restrictions in several domains such as wage setting, firing restriction, working time regulation etc.
- *impact_fepl*: a measure accounting for the number of reforms towards more flexible labour markets (per year per country) as well as their more or less comprehensive nature: reforms are characterized as more comprehensive if their apply to all, or a large majority of, professional categories, contract typologies etc. Reforms are less comprehensive of they apply only to specific categories of workers, contracts, firms etc.

The models that we estimate have typically the following specification:

$$y_{i,t} = \alpha_i + \beta \cdot x_{i,t} + t + \epsilon_{i,t}$$

$y_{i,t}$ being the EPL indicator by Nickell et al. [2002]; $x_{i,t}$ being equal to *index_fepl* and/or *impact_fepl*; t being a common and/or country specific trend. On the basis of such regressions, we predict annual EPL series over the period 1980-2004, for each country in our sample that is included into the FRDB Database. These series are then checked against reported values of the indicators by OECD and by Nickell et al. [2002]. The advantage of using our EPL series (with respect to previous existing ones) is that they embed additional annual information about the evolution of employment protection legislation, provided by the FRBD Database.

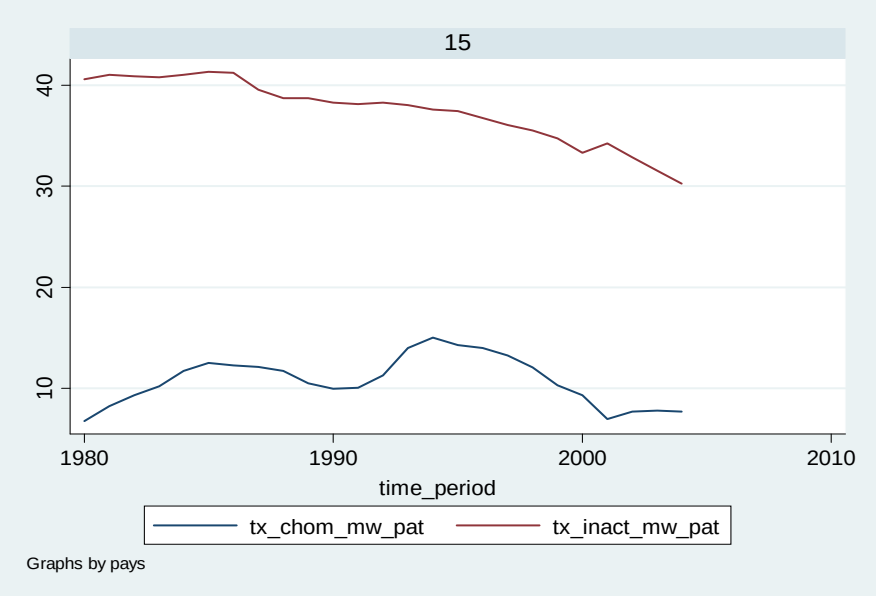


Figure 1. Unemployment and inactivity in Spain

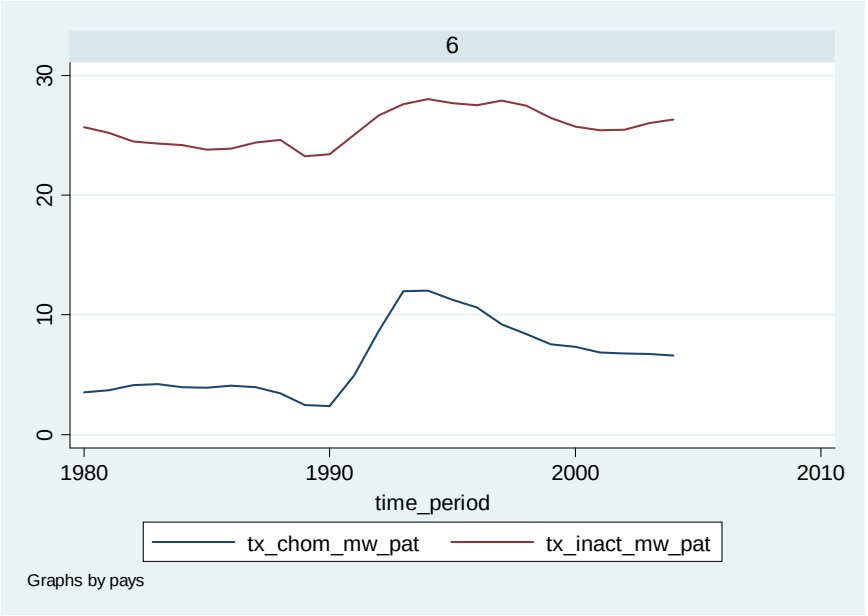


Figure 2. Unemployment and inactivity in Finland

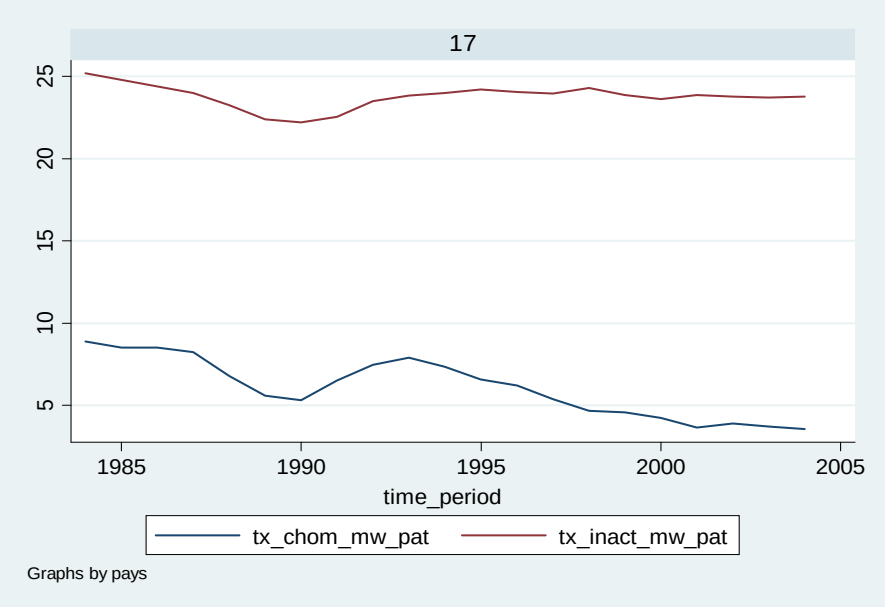
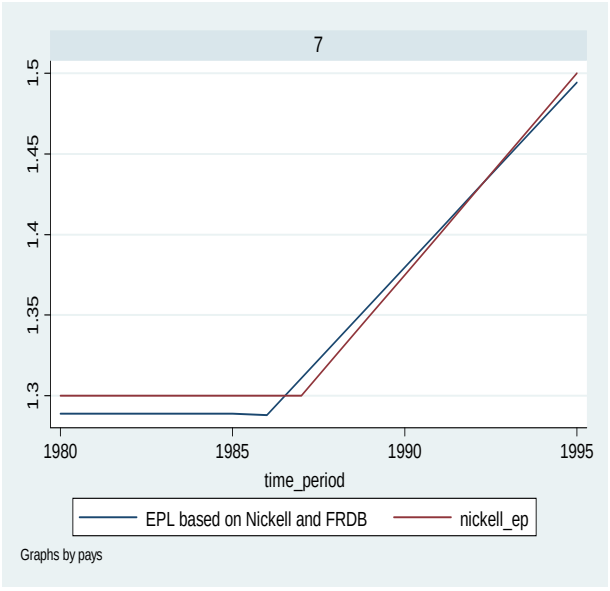


Figure 3. Unemployment and inactivity in the UK



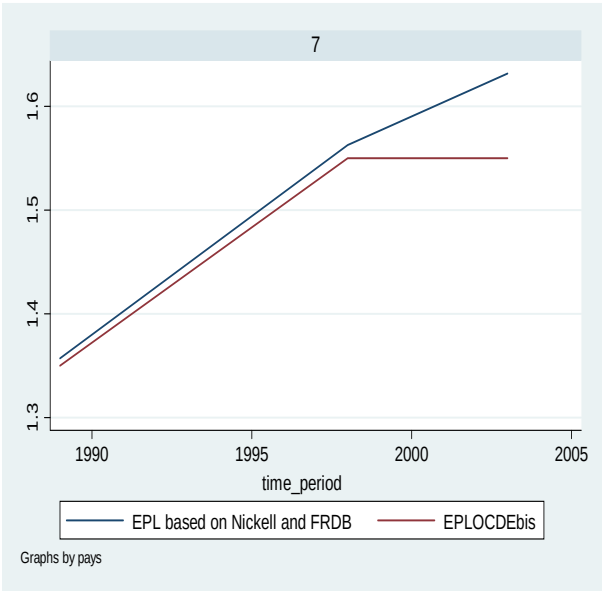


Figure 4-5. New EPL indicator for France

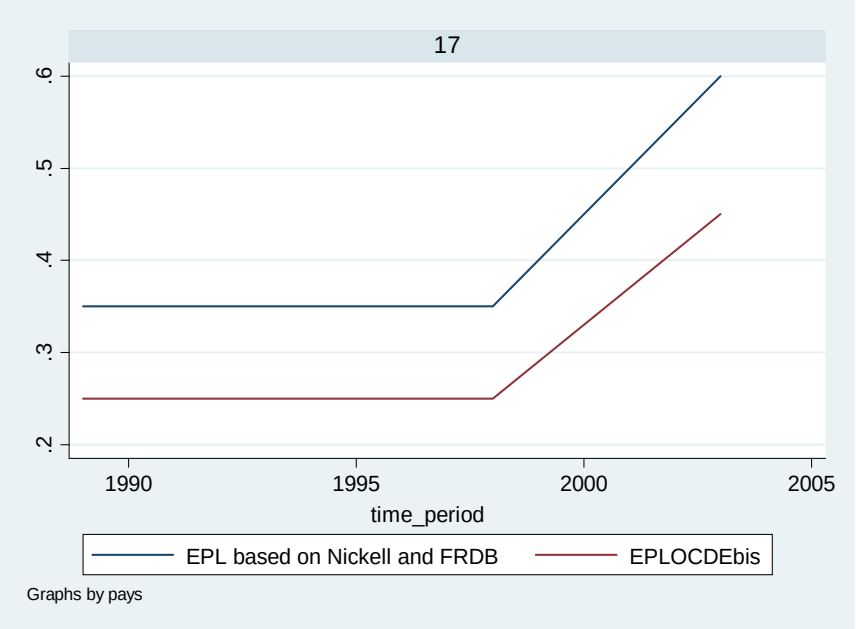


Figure 6. New EPL indicator for the UK

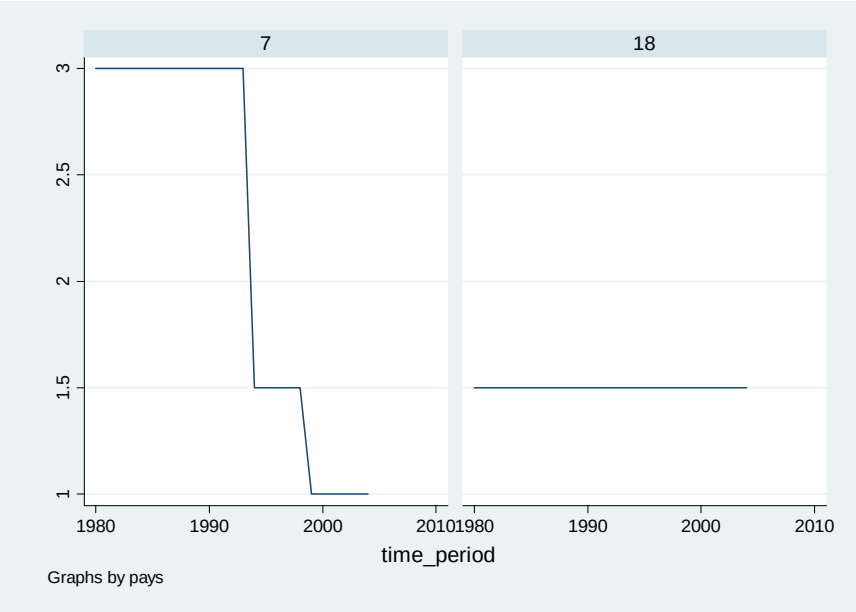


Figure 7. CBI for France (7) and the US (18)