INTERACTIONS BETWEEN PRODUCT AND LABOUR MARKET REGULATIONS: DO THEY AFFECT EMPLOYMENT? 
EVIDENCE FROM OECD COUNTRIES

by

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**Introduction**

1. How do labour market institutions and regulations interact with the product market environment in determining labour market outcomes? Is increased product market competition likely to have sizeable effects on employment performance? In this paper, we address these issues by providing some empirical evidence from OECD countries over the past two decades. Our working hypothesis is that competition, or the lack of it, interacts with labour market regulations and institutions to affect the functioning of the labour market in important ways. Recent research has set out a variety of channels through which this may happen (Krueger and Pischke, 1998; Nickell, 2000; Nicoletti et al., 2001; Blanchard and Giavazzi, 2001; Amable and Gatti, 2001). However, there is no agreement on the direction and empirical relevance of the effect of competition on employment at the aggregate level. For instance, some have pointed out that the primary (short and long-run) effects of product market competition are to be expected on output and productivity (Blanchard, 2001), while their effects on employment are likely to be transient and of uncertain sign. Long-run employment effects are possible, but their direction and relevance may depend on both the particular policies that brought about an increase in product market competition (Blanchard and Giavazzi, 2001) and the institutional features of the labour market (Amable and Gatti, 2001).

2. The long-run effects of competition on employment are ultimately an empirical issue, but empirical analysis has been made difficult by the lack of adequate indicators expressing the intensity of competition, especially in a cross-country context. Traditional indicators (such as measures of market power) are often endogenous and irrelevant for policy. Recently, a detailed set of cross-country indicators of product market regulation has been constructed by the OECD (Nicoletti et al., 1999), measuring the

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1. Banco de Portugal Conference on “Labour Market Institutions and Economic Outcomes”, 3-4 June 2001, Cascais. The views expressed in this paper are our own and should not be held to represent those of the OECD or its Member governments.

2. For instance, markup estimates or industry concentration indices are generally useless for both competition authorities, which operate at the level of micro-markets, and policy-makers, who need to identify the policies that curb overall product market competition.
degree of friendliness to competition of policies, in particular areas and overall, based on a large set of indicators on regulatory provisions in OECD countries. Given that the degree of product market competition cannot be easily gauged from direct observation, the OECD indicators focus on its policy determinants. Combining these indicators with measures of labour market regulations and institutions, recent empirical studies have explored the aggregate long-run effects of product market deregulation on employment (Nicoletti et al., 2001; Boeri et al., 2000; Messina-Granowski, 2001), finding cross-country evidence suggestive of a positive impact. The advantage of our policy indicators is that they provide truly exogenous variables to be related to labour market outcomes and may help to sort out policies that are bad or good for employment. Their main limitation is that they only have a cross-country dimension and, therefore, provide only a partial match to the available time-series information concerning developments in labour market performances and policies.

3. This paper revisits the evidence on product-labour market interactions by updating the analysis of Boeri et al. (2000) and Nicoletti et al. (2001) and, more importantly, takes a further step in the analysis by looking at the effects of product market regulatory reform on employment in 20 OECD countries over the 1982-1998 period. To this end, a time-varying regulatory indicator is constructed for each country in the sample, based on detailed information on regulatory developments in several service industries. The impact of regulatory reform on long-run employment performance is estimated jointly with the effect of labour market regulations and institutions, such as employment protection, bargaining arrangements and social policies, that are commonly considered to be important determinants of employment equilibrium levels (Scarbetta, 1996; Elmeskov et al., 1998; Layard and Nickell, 1998). The empirical results strongly suggest that regulatory reform in both labour and product markets is needed to raise significantly long-run employment rates.

4. The plan of the paper is as follows. Section 1 reviews the theoretical and empirical evidence concerning the effects of regulations in the product and labour markets on employment. This section also sheds some light on the possible interactions between regulatory regimes in the two markets. Section 2 presents the quantitative indicators of the strictness of the labour market and product market regulations, and discusses the cross-country co-variations between indicators of labour and product market regulations. Section 3 analyses the relationship between, on the one hand, PM and LM regulations, and, on the other hand, labour market performance with particular emphasis on the level and composition of employment. The section first relates employment rates to a detailed cross-country measure of overall product market regulation, then the effects of product market regulation on employment are explored on a cross-country time-series basis using the new (time-varying) indicators of regulatory reform.

1. **Labour and product market regulations and their effects on the labour market**

5. Economic regulation can be broadly defined as the use of the coercive power of the government to restrict the decisions of economic agents. It may include restrictions on firm decisions over entry, exit, the use of inputs, the quantities and the types of output produced as well as prices. These restrictions are likely to affect significantly (in intended or unintended ways) the functioning of labour and product markets. Moreover, since market forces will continue to act even under the most stringent regulatory conditions, outcomes in the labour and product markets will generally be driven by the interplay of those indicators.

3. The aim of the OECD indicators is to measure to what extent competition and firm choices are restricted in industries and areas where there are no a priori reasons to expect the government to interfere or where regulatory goals could be achieved by less coercive means. They have no ambition to measure the quality or the effectiveness (e.g. in terms of ability to achieve stated public policy goals) of existing regulatory environments.

4. For a discussion of the concept of economic regulation, see Viscusi et al. (1997).
forces with the existing regulatory framework. As a result, regulation can be expected to have important repercussions on overall allocative and productive efficiency.  

6. In the following, the focus is set on a subset of government-imposed restrictions that may affect the level and composition of employment. These include (i) labour market regulations disciplining hiring and firing decisions of firms; (ii) product market regulations restricting firm decisions over entry and output; and (iii) direct interventions of the state in resource allocation, especially through public ownership and control of business enterprises. Conceptually, these regulatory interventions may all have both direct and indirect effects on labour market equilibrium, either in isolation or interacting among them and with other public policies.

1.1 The employment protection legislation: rationale and effects on the level and the dynamics of employment

The rationale and potential effects of employment protection legislation

7. In all OECD countries, there are rules and regulations that govern the employment relationship between workers and firms. Those referring to hiring and firing practices are often referred to as "employment protection" legislation (EPL). These rules and regulations govern unfair dismissals, restrictions on lay-offs for economic reasons, compulsory severance payments, minimum notice periods and administrative authorisations.

8. The EPL regulations may affect the equilibrium level of employment -- as well as its dynamics over the business cycle -- in different ways:

- By reinforcing job security, EPL may enhance productivity performance, as workers will be more willing to co-operate with employers in the development of the production process (Akerlof, 1984).

- To the extent that EPL leads to long-lasting work relationships, it may encourage employers to provide training to workers with potentially beneficial effects on human capital and labour productivity. A better skilled workforce may also increase internal flexibility and thus lead to a better functioning of production activity (Piore, 1986).

- EPL may also be a way to internalise the social costs of dismissals by moving the social burden of re-allocating a worker to another job closer to the firm’s profitability criteria (Lindbeck and Snower, 1988).

- However, if these regulations are very strict, as in many European countries, firms may become more cautious about adjusting their workforce with the ultimate effect of reducing labour turnover, e.g. movements from employment to unemployment and from unemployment back to employment (Bertola, 1992).

- In addition, if hiring and firing costs are not transferred into lower wages, total labour costs for the firms increase and this may lead to a lower level of employment, other things being equal.

5. For instance, the cost of US Federal regulations were estimated to range from 4 to 10 per cent of GDP (Office of Management and Budget, 1998), while the costs of regulation for the Dutch economy were estimated to range from 11 to 14 per cent of Net National Income (Bergeijk and Haffner, 1996).
- The effective coverage or implementation of standard employment protection provisions influences the overall strictness of EPL regulations. For example, in many countries employment protection provisions for workers with regular contracts are often extended to those with fixed-term contracts after a given tenure or number of renewals has been reached. In addition, in some countries, the judicial system appears to have interpreted legislation more strictly than was intended by the law.

- A different degree of strictness of regulation governing permanent versus temporary employment (fixed-term contracts and contracts through temporary work agencies) may affect the structure of employment. Stricter regulations for permanent contracts relative to those for temporary contracts are likely to promote a shift from permanent to temporary employment (as it is occurring in a number of European countries). This has the potential effect of distorting the optimal composition of employment between temporary and permanent contracts. Moreover, those who are able to maintain a permanent contract (often the insiders) will enjoy an even higher level of job security, bringing about an increase in wage pressure (Bentolila and Dolado, 1994). In contrast, those under temporary contracts (often youths and other workers with little work experience or low skills) will bear the brunt of employment adjustment (Saint Paul, 1996).

What do previous empirical studies suggest about the impact of EPL on the labour market?

9. Empirical evidence on the impact of employment protection legislation is mixed, not least because of the lack of suitable data on the enforcement and evolutions of regulations over time (Bertola et al., 1999). A clear distinction exists between the potential effects of EPL on employment turnover and on the equilibrium level of employment (unemployment) and its compositions (temporary/permanent; youths/prime-age workers etc.).

- Employment turnover: There is consistent empirical evidence that strict employment protection legislation reduces unemployment turnover. Under strict EPL provisions, the unemployment pool is more stagnant, with fewer people being laid off, but also fewer unemployed people getting a new job. (Bentolila and Bertola, 1990; and Nickell and Layard, 1998). The effects on employment turnover are less clear cut: Bertola and Rogerson (1997) and Boeri (1999) found similar job creation and job destruction rates across countries with different EPL regimes but lower unemployment inflows in flexible labour markets. As stressed in Boeri (1999) and OECD (1999), a possible explanation is that strict EPL may foster job-to-job shifts rather than overall employment turnover because insofar employers and workers will seek direct shifts from one job to another without intervening unemployment spells, in order to avoid the associated dismissal and search costs.

- The level of employment: Some studies (e.g. Scarpetta, 1996) suggest a detrimental effect of strict EPL on the level of employment to working-age population ratios. Nickell and Layard (1998) indicate that this may be partially due to the low participation rates in Southern European countries, which also have strict EPL. However, participation rates may be low, especially amongst the youths, precisely because employment prospects are lower the stricter the EPL system.

- Overall unemployment rate: There is also no consensus as to the overall impact of EPL on unemployment. Part of the disagreement stems from the use of different models. However, disagreement persists even amongst papers using the same indicator (the OECD summary index, see OECD Jobs Study, 1994). While a study by Elmeskov, Martin and Scarpetta (1998) suggests a somewhat more robust effect on unemployment if changes in EPL over the past two decades are taken into account, OECD (1999) could not find a statistically significant effect of EPL on aggregate employment.
Composition of employment and unemployment: Nickell and Layard (1998), Scarpetta (1996) and OECD (1999) suggest a stronger effect of strict EPL on youth unemployment. Moreover, Grubb and Wells (1993) indicated that strict EPL for permanent workers may encourage firms to shift to temporary workers and more generally foster self employment.

Persistence of unemployment. By reducing unemployment turnover, strict EPL is also found to slow down the labour market adjustment after an exogenous shock (Jackman et al., 1996; Scarpetta, 1996). Unemployed workers may lose human capital over time and they may exert a lower moderating impact on wages (Blanchard, 1998; Bertola, 1990).

Dualism. Countries with stronger employment protection for regular contracts tend to display a bimodal tenure distribution with either very short or very long tenures (Boeri, 1999). In countries where fixed-term contracts are liberalised, a large share of employees with fixed-term contracts tend to insulate permanent workers from adjustment (Bentolila and Dolado, 1994), thereby increasing their bargaining power and the corresponding wage pressures.

1.2 Product market regulation and the labour market

In the product market too, regulatory provisions are generally motivated on public interest grounds. The main rationales for product market regulations include natural monopoly conditions, externalities, asymmetric information and other types of market failures. However, economic theory also suggests that regulations are generally implemented as a response to pressures of interest groups acting to maximise their (broadly defined) incomes. As a result, regulation may be biased towards benefiting interest groups that are better organised and gain more from regulatory interventions. A detailed analysis of these issues is outside the scope of this paper. It should be noticed, however, that existing regulatory frameworks may be flawed by several (possibly concurring) factors:

- the effects of some regulatory provisions often drift away from the original public interest aims, resulting in the protection of special interest groups; special interest groups are usually composed of a relatively small number of producers whose individual marginal gains from regulatory interventions are large as opposed to the large audience of consumers, who are typically dispersed and ill-organised and whose marginal gains are individually small. See Peltzman (1989).

- regulations and their implementation are sometimes likely to involve costs that exceed their expected benefits;

- technical progress and the evolution of demand can render obsolete in a number of instances the design of existing regulations;

- the progress in regulatory techniques may make it easier than in the past to fine tune regulation, e.g. by separating potentially competitive and inherently imperfect markets.

As a result, in the absence of regulatory reform, existing regulations are likely to be often ineffective and unnecessarily restrictive of market mechanisms in both the product and labour markets, potentially bringing about static and dynamic inefficiencies and losses in social welfare.


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12. The effects of product market regulations on labour market outcomes are complex because they are mediated by market behaviour, industry structure, governance issues and labour market institutions. In general, entry restrictions may originate from explicit legal impediments or limitations on the number of competitors allowed in certain markets as well as from the lack of administrative transparency and/or heavy administrative burdens (so-called administrative regulation). Entry restrictions are also associated with international trade and investment policies that deter competition by non-resident firms either through explicit measures (such as tariffs and legal limitations on foreign ownership) or implicit measures (such as non-tariff barriers and administrative obstacles to the establishment and operation of foreign firms in the domestic market).

13. Entry restrictions in (otherwise) competitive markets cause production inefficiencies by reducing equilibrium output, moving firm size away from the minimum efficient scale of operation and sheltering inefficient firms from competition by new entrants. Ill-designed entry regulations may cause similar inefficiencies in imperfectly competitive markets by reducing or eliminating actual or potential competition. In addition, entry restrictions constrain the supply of a particular type of capital, entrepreneurial ability (Krueger and Pischke, 1998). Finally, by reducing product market competition and international technology spillovers, restrictions to foreign competitors are likely to result in lower output and employment growth negatively affecting long-run employment levels.\(^\text{10}\)

14. The inhibition of product market competition has immediate consequences for labour demand both at the firm level and in the aggregate. In general, the wage elasticity of demand will be reduced and the labour demand schedule will shift inwards (Hicks, 1932). In addition, the existence of rents induced by the lack of competition will generally prompt employees to ask for wage premia, especially if they are unionised.\(^\text{11}\) Ceteris paribus, this will induce firms to choose capital-labour ratios higher than in a competitive situation, causing lower employment and additional productive inefficiencies.\(^\text{12}\) Therefore, except in some cases of natural monopoly, entry restrictions will generally negatively affect economic efficiency and labour market equilibrium relative to a perfectly competitive benchmark, having important effects on both the overall level of employment and its composition. The level may be negatively affected by distortions in labour demand, upward pressures in wage rates and reduced rates of enterprise creation and survival, the composition by the differential effects of regulatory and administrative provisions on different kinds of enterprises (e.g. sole proprietor vs corporate firms). While the nature and the intensity of these effects will depend also on the features of labour market institutions (e.g. degree of unionisation and centralisation of bargaining mechanisms), their sign will generally remain the same across different institutional settings (Nickell, 1998).

15. State control over business enterprises, through either ownership or administrative guidance, is a well-known potential source of inefficiency.\(^\text{13}\) State ownership generally shelters from the market discipline exercised by private shareholders as well as from the threat of takeover or bankruptcy. Corporate control and monitoring is made more complex than in private enterprises by the supplementary hierarchy of principal-agent relationships involving the interests of politicians and bureaucrats. In addition, the

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9. For a review of the rationale, the status and the potential effects of regulatory reform in OECD countries, see OECD (1997b).


11. For a survey of theory and evidence on the effects of product market competition on wages, see Nickell (1998).

12. The ratio would not be optimal from a social perspective because the cost of labour to the firm would exceed the opportunity cost of labour to society.

incentives and objectives of public managers are different from those of managers of private firms, often deviating from pure profit maximisation. Searching for political support rather than for support from shareholders, the public manager will generally have a tendency to over-use capital and/or labour, practice less price discrimination (when endowed with market power) and satisfy the non-economic goals imposed (implicitly or explicitly) by the government. These distortions are often favored by the presence of soft budget constraints, due to the availability of state aid and debt guarantees. To the extent that state control shelters inefficient firms from competitive pressures and creates or preserves market power, it can be expected to have the same effects on labour market equilibrium as entry restrictions.

16. Clearly, in some sectors, such as non-tradeables and/or public utilities, protection from domestic and foreign competitors and labour hoarding by state-controlled firms can maintain employment artificially high for some time, but the related productive inefficiencies are likely to spill over to the entire economy, reducing equilibrium output and employment elsewhere, and the implied budgetary costs are likely to result in an increased tax burden which reins in economic growth. In any case, the increasing integration of OECD economies (both de facto and de jure, through international treaties and agreements) makes it practically impossible to pursue such policies even in the relatively short run.

1.3 Policy interactions

17. Labour market outcomes may also be affected by the interaction of EPL with other policies and labour market institutions as well as with product market regulations. The first type of interactions has only recently been analysed in the empirical literature. Bertola and Rogerson (1997) and Elmeskov, Martin and Scarpetta (1998) suggest that higher employment turnover costs due to more stringent employment protection legislation are associated with higher unemployment in countries with intermediate bargaining systems where wages do not fully adjust. Moreover, Buti et al. (1998) point out that stringent EPL may act as a substitute for unemployment insurance benefits. Under this hypothesis, countries might opt for either generous unemployment benefits with lax EPL or vice versa. They argue that a combination of very generous benefits with strict EPL would lead to higher structural unemployment. However, the authors use simple bivariate correlation in their analysis, and Elmeskov, Martin and Scarpetta (1998) found no significant evidence of this interaction in an econometric analysis of the determinants of structural unemployment for a large sample of OECD countries.

18. Potential interactions between EPL and product market regulations are manifold and may have significant effects on labour market outcomes. For instance, the possibility that lower employment levels in monopolistic sectors is compensated by higher employment in other more competitive sectors depends on the flexibility of wages in these other sectors to accommodate higher employment of “released” workers. If wages do not fully adjust because of high reservation wages, high wage floors and/or nation-wide wage agreements, then lower aggregate employment is likely to result. Moreover, the insider power of workers employed in firms sheltered from competitive pressures (either by legal, administrative and trade restrictions or public ownership) can be compounded by the presence of unduly restrictive EPL, pushing up wage premia and lowering equilibrium employment. Similarly, the existence of thresholds for the application of EPL to collective or individual dismissals may affect the minimum efficient scale of firms (after accounting for the cost of regulations) and favour particular kinds of company structures (such as sole proprietor firms). This effect can be reinforced (or weakened) by a profile of administrative burdens favouring (or discouraging) the creation of individual firms. Therefore, on the whole, different combinations of the regulatory regimes in the labour and product market can be expected to result in different labour market equilibrium configurations, potentially distorting the optimal level and composition of employment (e.g. between dependent and self-employment). At the same time, the effects of regulatory reform are likely to be different depending on the initial combination of regimes and on the sequencing of the reforms in the two markets. To date, empirical evidence on the relationship between labour and product
market regulations across countries and on their effects on labour market outcomes has been lacking\textsuperscript{14}. The next sections of this paper provide an initial attempt in this direction.

2. **Assessing differences in regulatory regimes across countries**

19. From a theoretical standpoint, there is a strong presumption that ill-designed regulatory regimes, which unduly restrict labour and product market competition and distort governance mechanisms may reduce equilibrium employment and affect its composition. However, since regulations are usually introduced in second-best situations related to purported market failures, their actual impact on labour market outcomes can only be ascertained empirically, attempting to relate differences in regulatory regimes over time and/or across countries to the observed patterns of employment.

20. The analysis of the linkage between regulation and labour market performance has generally stumbled on the lack of synthetic and comparable measures of the stance of regulation across countries. In this paper, a large set of information on product and labour market regulations at the economy-wide and sectoral levels was used to establish cross-country and time-series patterns of regulation (see below). Information on labour and product market regulations consists of a multitude of sector-specific or general-purpose provisions. Although, in principle, cross-country comparisons of individual provisions are possible, the analysis of the linkages between regulation and labour market performance is meaningful only after some aggregation has been made. Therefore, information that was essentially scattered and qualitative had to be measured in quantitative terms and summarised in a uniform and, as much as possible, objective way across countries.

21. Two main sets of regulatory indicators were used in this paper: static cross-country indicators measuring differences in product and labour market regulation at one point in time, and dynamic cross-country indicators measuring the evolution of product and labour market regulation over time (so called “regulatory reform”). The first set of indicators has a wider and deeper coverage of regulatory provisions, over the entire economy and across different regulatory areas; the second set covers a more limited number of regulatory domains in a subset of energy and service industries. Nonetheless, we consider that the dynamic indicators provide a good proxy of the evolution of the overall regulatory stance in the OECD economies covered in this study.

22. Static cross-country comparisons of regulatory regimes were performed using a multidimensional approach. The focus was set on summary indicators synthesising several dimensions of labour or product market regulation\textsuperscript{15}. These indicators were obtained (using a data-based aggregation methodology) as a combination of first level, more detailed, indicators of individual regulatory provisions. The main advantage of this approach is that the relative positions of countries evaluated along multiple dimensions are unlikely to be as sensitive to data problems as those positions established on the basis of multiple comparisons of unidimensional indicators.

23. The overall regulatory environment was analysed along four main axes, distinguishing between (a) the control of resources and market behaviour by the state; (b) barriers to entrepreneurial activity; (c) barriers to trade and investment; and (f) employment protection legislation for permanent and temporary workers. In order to organise and simplify the data, a multiple-tier structure of indicators was established,

\textsuperscript{14} For a somewhat crude attempt to study the combined effects of labour and product market regulations on economic growth in European countries, see Koedijk and Kremers (1996).

\textsuperscript{15} The indicators only cover formal regulations, leaving out other kinds of regulatory interventions such as administrative guidance or self-disciplinary measures of professional associations. Moreover, no attempt was made to measure the quality of product market regulations and the extent to which they are actually enforced.
featuring at the bottom the individual provisions, at the first level the aggregation of these provisions into indicators of single dimensions of regulation (first-level indicators), at the next level the aggregation of these first-level indicators into the four axes of regulatory intervention (summary indicators) and at the top the two indicators of overall regulation in the product and labour markets.  

24. In order to reduce discretion, factor analysis was used to identify regulatory regimes and to aggregate first-level indicators into the summary measures of product and labour market regulation. Factor analysis made it possible to aggregate the first-level indicators according to an “objective” weighting procedure (the contribution to the overall variance in the data) that maximises in a parsimonious way the proportion of the total variance in the data explained by the resulting indicators. This approach yields a minimal set of indicators that best summarises the variance of regulation across countries, with no priors as to which regulatory provisions may be most influential on performance and no arbitrary weights involved in the aggregation of the first-level indicators. Nonetheless, given the qualitative nature of most of the basic information on regulation, some degree of subjectivity was inescapable in the construction of the first-level regulatory indicators.

2.1 Indicators of labour market regulation

25. As a step ahead in the analysis of the effect of EPL on labour market performance, this study uses a set of indicators of employment protection legislation concerning both regular and temporary workers.

Regulation of permanent employment

26. We focus on the strictness of the following individual dismissal protections for workers with permanent contracts: i) procedural inconveniences that employers face when trying to dismiss a worker; ii) notice and severance payments; and iii) prevailing standards of and penalties for “unfair” dismissals. Table 1 presents the different aspects that have been considered within these three broad categories.

16. The first-level indicators were obtained by turning qualitative information into numerical format using a system of codes (e.g. the presence or the absence of a regulatory provision were assigned different codes) and by ranking the resulting data on individual regulatory provisions on an identical 0-6 scale reflecting the implied degree of restrictiveness of the provisions (from least to most restrictive). Around 70 first-level indicators have been used to construct the two summary indicators of product and labour market regulation.

17. A similar approach was used by Berlage and Terweduwe (1988) for the aggregation of a set of indicators of economic development.

18. Factor analysis identifies, within each regulatory domain, the subsets of detailed indicators that are most associated with different underlying (unobserved) factors. These factors, which generally have an economic interpretation, identify regulatory sub-domains (e.g. public ownership, within the state control domain). Within each of the factors, the detailed indicators are weighted according to the proportion of their cross-country variance that is explained by the factor their associated with. Using the estimated weights, countries can be “scored” along each of the factors. The relative contributions of each of the factors to the explanation of the overall variance in the data are used as weights in further aggregating the country scores in each regulatory sub-domain (i.e. the factor-specific scores) into the summary indicators of regulation by domain. For more detail, see Nicoletti, Scarpetta and Boylaud (1999).

19. Basic indicators of EPL can be found in (OECD, 1999).
Table 1. EPL Indicators for permanent workers

<table>
<thead>
<tr>
<th>Regular procedural Inconveniences</th>
<th>Procedures</th>
<th>Delay to start a notice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notice and Severance pay</td>
<td>Notice period after</td>
<td>9 months</td>
</tr>
<tr>
<td>For no-fault individual dismissals</td>
<td>Severance pay after</td>
<td>4 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 years</td>
</tr>
</tbody>
</table>

27. **Procedural requirements** refer to the process that has to be followed from the decision to lay off a worker to the actual termination of the contract. They include: the delay before the notice of dismissal can start (for example, because there has to be a series of previous warnings); whether a written statement of the reasons for dismissal must be supplied; whether a third party (such as a works council or the competent labour authority) must be notified or consulted; and whether dismissal cannot proceed without the approval of a third party.

28. **Notice and severance pay** may differ for blue-collar and white-collar workers, or for dismissals for personal reasons and for economic redundancy (see OECD, 1999). In general both notice and severance payments tend to be higher for white-collar workers and for redundancies than for blue-collar workers. In this study we consider an average of regulations affecting the two categories of workers.

29. Under “**difficulty of dismissal**” the analysis includes the length of the **trial period** because during this period a dismissal cannot be contested for its unfairness: the shorter the trial period the stricter is the regulation on unfair dismissal. Moreover, account is taken of cases where the employer cannot demonstrate appropriate previous efforts to avoid the dismissal, or when social, age or job tenure factors have not been considered. Finally, account is taken of the fact that, in some cases, labour courts may require employers to **reinstate** a worker affected by an unfair dismissal, or award high compensation payments in excess of regular severance pay.

**Regulation of temporary forms of employment**

30. As discussed below, many OECD countries have reformed regulations for temporary employment, by either allowing fixed-term or TWA (temporary work agency) contracts, or by liberalising their use. Indicators of the stringency of EPL for temporary contracts are reported in Table 2. They refer to: i) the “objective” reasons under which they could be offered; ii) the maximum number of successive renewals; iii) and the maximum cumulated duration of the contract. Most Anglo-Saxon countries have always allowed the use of temporary contracts without any significant restrictions. Currently, some countries continue to list specific situations that may, however, go beyond “objective”, time-limited tasks (e.g. business start-ups or workers in search of their first job). There are also significant differences on the maximum duration of fixed-term contracts. While in Canada, Ireland, the United Kingdom and the United States there are no limitations on the number of renewals, in a number of other countries this is only the case if separate valid “objective” reasons can be given for each new contract. In these cases, after
successive renewals labour courts may be asked to examine the validity of the request for a further contract. In this respect, a number of countries facilitate the use of fixed-term contracts by setting by law the maximum number of renewals (e.g. Belgium, France, Germany and the Netherlands).

Table 2. EPL Indicators for temporary workers

<table>
<thead>
<tr>
<th>Temporary Contracts</th>
<th>Valid cases other than the usual &quot;objective&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-term contracts</td>
<td>Maximum number of successive contracts</td>
</tr>
<tr>
<td></td>
<td>Maximum cumulated duration</td>
</tr>
<tr>
<td>Temporary work agency (TWA) employment</td>
<td>Types of work for which is legal</td>
</tr>
</tbody>
</table>

Summary indicators of employment protection legislation over the past decade

31. The summary indicator of EPL refers to the late 1980s and to 1998. The raw indicators of regulations referring to the late 1980s (on which the summary indicators have been constructed) are from the OECD Jobs Study (1994). The EPL indicator used in the econometric analysis below is time-varying, with the shift in regime from the 1980s stance to the 1990s being defined on the basis of information about the timing of major EPL reforms (concerning both temporary and regular workers) in OECD countries. Figure 1 plots the summary indicators of EPL for permanent and temporary workers for the late 1980s and for 1998. In countries along the diagonal the summary EPL indicator did not change over the 1990s; in those above the diagonal regulations became tighter in the past decade; and in those below the diagonal regulations were relaxed.

32. Broadly speaking, there has been a tendency for a significant deregulation of temporary contracts, while only modest changes have been recorded for permanent contracts. Only Finland, Portugal and Spain have significantly eased regulation for permanent workers. In Finland both the delay to the start of notice and the notice period itself were reduced; and in Spain new permanent contracts were introduced with lower (although still high) severance payments. The Netherlands eased restrictions on dismissals, widening exemptions from general dismissal law but increased the minimum notice period and decreased the maximum periods. In the process of harmonising notice periods for blue-collar and white-collar workers, Germany increased the length of notice for long-tenure workers. By contrast, mandated notice periods seem to have decreased somewhat in Spain, Sweden and Finland.
Figure 1. Indicators of the strictness of employment protection legislation, 1990-98

Panel A. Regular and temporary contracts

Panel B. Regular contracts

Panel C. Temporary contracts

In a number of countries (e.g. Japan, Germany, Italy, Belgium, the Netherlands, New Zealand and Sweden) fixed-term contracts can now be used in a wider range of situations than in the late 1980s. The maximum number of successive renewals has been extended in Germany, Italy, Belgium, the Netherlands
and Sweden. Increases in the maximum cumulative duration of successive contracts have been legislated in Germany, Italy, Belgium, the Netherlands, Portugal and Sweden. In Spain, fixed-term contracts were liberalised in the late 1980s, and, following the dramatic increases in their use, some restrictions have been re-imposed recently. In Denmark and Sweden, all restrictions on the types of work for which TWA employment is legal have been removed and in Italy and Spain TWAs have become legal for certain types of work while having previously been illegal in all circumstances. Other relaxations on the range of jobs for that TWA are allowed have taken place in Denmark, Germany, the Netherlands, Norway and Japan. In Denmark restrictions on the number of renewals have been removed; and the maximum duration of successive contracts has been increased in Germany, Belgium, Denmark, Portugal and the Netherlands. Other countries took limited or no action to reform this kind of labour market regulations.

2.2 Indicators of product market regulation

Static, in-depth, indicators

34. Product market regulation was analysed along three main axes: (a) direct state control of economic activities, through state shareholdings or other types of interference in the decisions of business sector enterprises and the use of command and control regulations; (b) barriers to private entrepreneurial activity, through legal limitations on access to markets or administrative burdens and opacities hampering the creation of businesses; and (c) regulatory barriers to international trade and investment, through explicit legal and tariff provisions or regulatory and administrative obstacles. The country rankings resulting from the corresponding summary indicators are shown in Figure 2.

35. The analysis of direct state control was based on five first-level indicators concerning (i) the presence of state-controlled enterprises in business (two and three digit) industries, (ii) the presence of special voting rights in private enterprises, (iii) the degree of control exercised by legislative bodies over state-owned business sector enterprises, (iv) the propensity to resort to command and control, rather than incentive-based, regulatory provisions and (v) the extent of public ownership in the non-agricultural business sector\(^{20}\). Based on these indicators, hierarchical cluster analysis identified two large groups of countries. A group of “incentive-based” countries, including most common-law countries, Japan, Germany and Sweden, characterised by a below-average degree of state control and a group of “command-based” countries, including the other OECD countries. Within these groups, countries differ mainly by the extent of government interference in the operation of private businesses (e.g., special voting rights and use of command and control regulations). Correspondingly, two main underlying factors were identified in the data, clearly separating out government interference in private business operation from the other indicators of state control. The summary indicator of direct state control shows considerable variation across countries and identifies the US, the UK, Canada, Sweden and Japan and New Zealand as the countries with relatively low state control. At the other extreme, Greece, Italy and Belgium are identified as the countries with the highest state control.

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\(^{20}\) Indicators (i)-(iv) are based on national sources (see Nicoletti, Scarpetta and Bovalaud, 1999); indicators (v)-(vi) drew on Centre Européen des Entreprises à Participation Publique, CEEP (1997); for non-European countries on Gwartney and Lawson (1997).
Figure 2. Summary indicators of product market regulation

1. Country scores reflect the results of factor analysis. Summary indicators are obtained weighting factors by their relative contributions in explaining the total variance of the factors. All variables were cast in 0-6 scale from least to most regulated.

2. Factor analysis applied to basic indicators.

36. The analysis of regulatory barriers to entrepreneurial activity was also based on six first-level indicators concerning (i) the features of the licensing and permit system, (ii) initiatives to reduce administrative burdens, (iii) administrative transparency, (iv) legal limitations to entry in (two and three digit) business industries, and administrative burdens on the creation of (v) corporations and (vi) sole proprietor businesses. Countries proved to be relatively dispersed along the various dimensions of this axis of regulatory intervention and no readily interpretable groupings could be established by means of

- Indicators (i)-(iv) are based on national sources (see Nicoletti, Scarpetta an Boylaud, 1999); indicators (v)-(vi) drew on Logotech, S.A. (April 1997), Etude comparative internationale des dispositions légales et administratives pour la formation de petites et moyennes entreprises aux pays de l’Union Européenne, les Etats-Unis et le Japon, Projet EIMS 96/142; and Bureau of Industry Economics (1996).
cluster analysis. Three main factors could be identified relating to legal barriers, administrative burdens on the creation of businesses and more general barriers created by administrative procedures. The summary indicator suggests that, overall, barriers to entrepreneurship are less variable than state control across countries. According to this indicator, countries with the lowest barriers include the UK, Canada and Spain, while the highest barriers are found in Belgium, France and Italy. The average ranking of the United States reflects low legal barriers but relatively heavy administrative procedures.

37. The analysis of barriers to international trade and investment was based on five first-level indicators: (i) legal and administrative barriers to foreign ownership of businesses, (ii) the existence of explicit provisions discriminating business activity on the basis of nationality, (iii) nationality discrimination implied by regulatory and administrative procedures, (iv) average trade tariffs and (v) the incidence of non-tariff barriers to trade. Due to the limited coverage of some of these indicators, the focus had to be restricted on a few issues, not necessarily fully representative of the countries’ trade and investment policies. Cluster analysis classified countries in two broad groups: a highly homogeneous group comprising the majority of European countries and the United States; and an idiosyncratic group of countries, partly characterised by less open trade policies, including five European countries (Norway, Sweden, Greece, Switzerland and Portugal), the australasia countries (New Zealand and Australia), Japan and Turkey. Two main discriminating factors were identified: tariff and regulating barriers, including indicators (ii) (iii) and (iv), and other barriers, including indicators (i) and (v). The resulting summary indicator ranks France, Italy, the UK, Denmark, Ireland, the Netherlands and the United States as being the most open, while Canada, Sweden, Greece and Mexico appear to have a relatively high level of barriers.

38. Using these summary indicators three patterns of overall product market regulation could be established: a mostly common-law group, characterised by a combination of relatively liberal inward and outward-oriented regulatory policies; a mostly continental European group (including also Australia), characterised by relatively liberal outward-oriented policies, but more interventionist and restrictive inward-oriented policies; and an idiosyncratic group composed of countries with widely different inward-oriented policies but sharing relatively closed outward policies (including Canada, Sweden, Portugal and Greece). The summary indicator of product market regulation suggests that the countries having the most liberal regulatory approaches are the United Kingdom, the United States and, to a lesser extent, New Zealand, Ireland and Japan, while the most restrictive approaches are found in Greece and, to a lesser extent, Italy and Belgium (Figure 3). In order to interpret these results correctly, it should be reminded that only formal and explicit regulations have been taken into account, leaving out all other informal procedures through which the government or trade associations can influence economic behaviour as well as possible differences in enforcement.

22. Indicators (i)-(iii) are based on national sources (see Nicoletti, Scarpetta and Boylaud, 1999); indicators (iv)-(v) drew on OECD (1997a).

23. In order to increase the coverage, missing values for some of the EU countries were set equal to the values suggested by EC provisions.
1. Factor analysis applied to summary indicators of state control, barriers to entrepreneurial activity and barriers to trade and investment.

Dynamic regulatory reform indicators

39. Reconstructing past developments in product market regulation is a difficult task for many reasons. First, national administrations have a short memory when it comes to changes in regulation: turnover of civil servants and incomplete and unsystematic reporting of past regulatory activity make it impractical to collect information from national sources alone. Second, regulatory reform is a relatively recent phenomenon: the more back in time one goes, the less attention to product market regulation one finds in the press and in specialised publications. Third, published professional or academic sources often follow the fashion of the day, concentrating on specific industries (e.g. telecoms) and regulatory areas (e.g. public ownership), but rarely on a continuous basis. These problems are compounded when information on past regulatory developments is sought for a large set of countries. As a result, the available data are often scattered and incomplete, and refer to a set of industries that does not necessarily cover a large share of the economy.

40. The data used in this paper covers regulations and market conditions in seven energy and service industries over the 1970-1998 period: gas, electricity, post, telecoms (mobile and fixed services), passenger air transport, railways (passenger and freight services) and road freight. The coverage of regulatory areas varies across industries. Regulatory barriers to entry are reported for all industries; public ownership is reported in all industries except road freight; vertical integration is documented for gas, electricity and railways; market structure is documented for gas, telecommunications and railways; and price controls are reported for road freight. Time-series information on regulatory and market developments was drawn from five main sources:

- the OECD: Regulatory Reform, Privatisation and Competition Policy (1992); OECD Roundtables on competition and regulation, various issues; The OECD International Regulation Database; OECD Reviews of Regulatory Reform, various issues;

- the European Conference of Ministers of Transportation: Rail Restructuring in Europe, 1998; Regulatory Reforms in the Transport Sector, 1987; Competition Policy and Deregulation of Road Transport, 1990; Railway Reform, 2001;

– the European Commission: *Liberalisation of Network Industries* (and background documents), 1999;


41. As in the construction of static in-depth indicators, countries were classified in each period along a 0-6 scale from least to most restrictive on each of the regulatory and market dimensions covered in the analysis. However, unlike static in-depth indicators of product market regulation, the dimensions available for time-series data were too few to be able to aggregate detailed indicators by means of factor analysis. Therefore, industry-specific time-series indicators of regulatory and market environment were created by simple average of the regulatory and market features covered in each industry. Similarly, the aggregate time-series indicators used in empirical analysis were obtained by averaging over all industries in each country.24 The resulting indicators were interpreted as a proxy for the overall regulatory policies followed by OECD countries over the sample period.

42. Table 3 shows the evolution of the time-varying regulatory indicators for the countries included in the sample. Over the past two decades, regulatory reform was deepest in the United Kingdom, New Zealand, the United States and Australia, while policies changed relatively little in Southern European countries, France and Switzerland. Three main policy patterns can be identified looking at the evolution of regulatory indicators: the United States, which began regulatory reform at the turn of the 1980s; the United Kingdom, New Zealand and Canada, which began reforming during the 1980s; and most other countries, which changed regulatory policies over the 1990s. In 1998, the cross-country correlation between the time-varying regulatory indicator and the static in-depth indicator is close to 70 per cent, suggesting that the former is a good proxy for the latter.

24. An alternative would have been to aggregate across industries using value added or employment weights. However, value added or employment data at this level of disaggregation are seldom available. More importantly, this would have underevaluated the reform drive in important industries, such as electricity or telecoms, which have a relatively low weight but are crucial inputs into overall economic activity.
### Table 3. Product market regulatory reform in selected OECD countries

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1. Simple averages of indicators for 7 industries: gas, electricity, post, telecoms, air transport, railways, road freight. Depending on the industry the following dimensions have been included: barriers to entry, public ownership, market structure, vertical integration, price controls.

### 2.3 The relationships between regulations in the labour and product markets

The analysis of the various dimensions of regulation in the product and labour markets can be combined to investigate the features of the overall regulatory environment across OECD countries. Interestingly, the overall indicators of product and labour market suggest that, in general, restrictive product market regulations are matched by analogous EPL restrictions. The correlation between the summary indicator of product market regulation and EPL is 0.73 (significant at the 1% level) (Figure 4). Restrictive regulations in the product market tend to be associated with restrictive EPL provisions, resulting in both weak product market competition and stickiness in labour reallocation. This correlation in regulatory regimes suggests that the influence of regulations on labour and product market outcomes may be compounded, making regulatory reform in only one market less effective than simultaneous reform in the two markets.
To clarify further the relationship between product market regulations and EPL, we used cluster analysis to identify groups of countries that share common patterns across the two sets of regulations. The analysis was performed using as basic data the three summary indicators of product market regulations -- state control, barriers to entrepreneurial activity, and barriers to international trade and investment -- together with the two summary indicators of EPL for regular and for temporary employment. We identified three main country clusters:

- The first cluster includes common-law countries (the United States, the United Kingdom, Canada, Ireland, Australia and New Zealand). They are characterised by a relatively liberal approach in both the labour and product markets.
- The second cluster includes most continental European countries and Japan. They share relatively restrictive product market regulations. This group can be further split in two sub-groups according to the EPL stance: Denmark and Switzerland being less restrictive than Germany, Japan, Austria, the Netherlands, Sweden, Finland and Belgium.
Finally, the third cluster includes southern European countries (France, Greece, Italy, Portugal and Spain). They combine restrictive EPL and product market regulatory regimes. Norway is also included in this group, though mainly because of its relatively tight regulatory regime in the product market.

The cross-country correlation between product market regulations and EPL can be related to political economy considerations. For example, by increasing the speed of labour market adjustment, less restrictive EPL may make regulatory reform in the product market easier to implement. On the other hand, restrictive product market regulations may make it less urgent for entrepreneurs to lobby for and for workers to accept an easing of EPL. At the same time, in firms sheltered from competitive pressures (either by legal, administrative and trade restrictions or public ownership) the insider power of workers may be higher, leading to greater protection from dismissals. Explaining the way in which interactions between agents’ incentives and government policies may shape regulatory environments in the labour and product markets is an interesting agenda for further work.

3. Regulations and labour market performance

As stressed in the introduction, the OECD countries display large differences in labour market performance despite underlying market forces that have led to increasing economic integration. To some extent, differences in performance may be due to macroeconomic factors, such as differences in cyclical developments and the inertia deriving from the historical divergence of economic policies across countries, which resulted in different equilibrium configurations. However, the widespread implementation of policies aimed at ensuring macroeconomic stability for sustainable growth, in Europe and in other OECD countries, suggests that part of the performance gaps must be related to other factors. These may include policies, regulations and institutions affecting directly the labour market as well as the regulatory environment characterising the product market. In this section we focus on three aspects of labour market performance that seem to be particularly sensitive to regulations: 1) the overall employment rate in the non-agricultural business sector (employment divided by the working age population); 2) the incidence of self-employment in total business sector employment; and 3) the incidence of temporary in total employment.

3.1 Bivariate correlations between regulations and employment patterns

Figure 5 plots employment rates (total and for the non-agricultural business sector) in the OECD countries in 1998. There are clearly significant differences in the share of working age population which is employed, especially in the non-agricultural business sector: in the latter it ranges from less than 40 per cent in Greece to almost 65 per cent in Japan. These differences are related to overall labour market conditions in different countries, which also affect the decision of certain groups (youths, women in particular) to enter in the labour market, as well as to the role of the state as an employer in the economy. There have also been different trends over time. North American countries, Japan, the UK, the Netherlands and some other smaller countries in Europe have shown a positive trend over the past two decades. In contrast, some of the Nordic countries have shown a significant fall in the early 1990s and most other European countries have shown stable or slightly declining trends.

25. A lax EPL regulation may, however, make workers’ resistance to regulatory reform fiercer insofar as insiders would be less protected in the event of redundancies.
The OECD countries also show marked differences in the composition of employment. Figure 6 plots the share of self-employment in total employment across countries and across the main sectors of the economy. Despite significant cross-sectoral differences, some common patterns can be identified. There is a clear tendency for Mediterranean countries to have a higher incidence of self employment in all sectors of the economy, and particularly so in the service sector, while the proportion of self employment is much lower in continental Europe and in most English-speaking countries. The agricultural sector stands apart in this respect insofar as a larger than average proportion of self employed is found in countries with a relatively lower overall degree of development (Turkey, Greece).

The proportion of temporary employment also varies a great deal across countries and over time. Figure 7 plots the incidence of temporary employment in total employment in 1986 and in 1999. There has been a tendency in the majority of OECD countries to increase the proportion of temporary employment in total employment, and particularly so in Spain where almost one-third of total employment was under temporary contract in 1999. It is more difficult to find clear geographical divides as the incidence of temporary employment is relatively high in some European countries as well as in Australia. However, in contrast with patterns recorded in previous recovery, the growth in temporary employment has played a major role in total employment developments, compensating falling (or stable) permanent employment in a number of European countries such as Austria, France, Germany, Italy, Portugal and Sweden. In the other countries a more balanced combination of employment has been observed with both permanent and temporary jobs being created.

It should be stressed, however, that the nature of temporary contracts in the latter is different from most of those in Europe: temporary contracts in Australia are “casual” jobs offered to young workers who prefer to bargain the non-coverage of pension and health insurance for a higher pay.
Figure 6  Share of self employment, mid-1990s

(percentage of total employment in the business sector)

Source: OECD database.
50. How do these patterns of employment relate to regulations in the product and labour market? As mentioned in the previous section, empirical evidence on the labour market effects of regulations is mixed and often altogether lacking. In this section we relate the indicators of product and labour market regulations to the three main indicators of employment patterns. Figure 8 focuses on business-sector employment rates. Agricultural employment is not considered in the figure given the large proportion of self-employed in that sector who are only marginally affected by the product and labour market regulations examined in this paper. The bottom panel suggests that a significant correlation exists between employment rate and the stance of EPL: tight regimes tending to be associated with a lower proportion of employment in the non-agricultural business sector. The relationship between product market regulation and business sector employment is of comparable strength considering either the 1998 in-depth measure of regulation or the time-series index (for 1998).
Figure 8  Employment rate in the non-agricultural business sector and regulations, 1998

Employment rate (per cent)

Correlation coefficient -0.68

Correlation coefficient -0.53

Correlation coefficient -0.61

EPL, summary index

Product market regulation, summary index

Product market regulation, time series index
There is also a significant correlation between the share of self-employed and a measure of excess regulation for the creation of corporate firm versus the creation of sole proprietor enterprise (Figure 9): in countries where regulations for corporations are stricter than those for sole proprietor firms, there is a higher incidence of self-employed. The rationale for the use of a measure of excess regulation instead of a simple indicator of regulation for sole proprietorship is that ceteris paribus, within a country, the choice between the type of firm to create does not necessarily depend upon the absolute degree of stringency of regulations but rather on the relative degree of stringency vis à vis the alternative.

Figure 9 Share of self-employment and product market regulations

Figure 10 sheds light on the potential effects of EPL regulation on temporary employment. As in the previous case we have used a concept of excess regulation: the difference in the stringency of EPL regulations for permanent versus temporary employment. The figure gives only a partial support to the idea that stricter regulations for permanent employment relative to those for temporary employment lead to a higher share of temporary employment in the economy. There is indeed a positive association between the excess regulation and the incidence of temporary employment but it is not statistically significant. There are two clear outliers, Spain and to some extent Australia. In the latter case, we have already stressed that the interpretation of temporary employment is somewhat different that that of most European countries. In the case of Spain the excess regulation for permanent workers has had a disproportionate impact on the development of temporary employment. Spain has very tight regulations on both permanent and temporary employment and the difference in stringency between the two has de facto produced a very strong impact on employers’ preference for temporary employment. This may suggest the existence of non linear effects stemming from regulations: in countries with very stringent EPL, a relative small difference in EPL between temporary and permanent employment may lead to more significant shifts towards one or the other than in countries with less restrictive overall regulatory stances.

Belgium is a clear outlier in this figure, combining relatively more strict regulations for the creation of sole proprietor enterprises with a fairly large share of self employment in the business sector.
3.2 An empirical investigation of the determinants of the non-agricultural employment rate

The analysis in the previous section suggests that regulations on the product and labour markets can play a significant role on the level and composition of employment. However, many other factors are likely to affect employment over and above regulations. In this section, we move away from simple bivariate correlations and estimate a structural model of employment including a number of explanatory variables in addition to EPL and product market regulations. In particular, we focus on the structural determinants of the non-agricultural employment rate across countries and over time.

The reduced-form model

The theoretical framework for the analysis follows the familiar Layard-Nickell-Jackman (1991) bargaining model. The essential features of this model are an upward sloping wage-setting schedule, based on the assumption that real wages are the results of a bargaining process between employers and employees, who are able to exert some market power, combined with a downward sloping labour demand schedule. The labour demand schedule is influenced by product market conditions, while the wage-setting schedule is influenced by wage push factors, including labour market policies, the strength of workers in the wage bargaining process and, more generally, the institutional framework of the labour and product markets. This simple model leads to the identification of a reduced-form equation for the employment rate as follows:
\[ er_{it} = \mu_0 + \mu_i + \alpha \text{erg}_{it} + \sum_k \beta_k \text{x}_{kit} + \gamma \text{epl}_{it} + \sum_s \delta_s \text{pmr}_{sit} + \varphi g_{it} + v_{it} \]  

where \( i \) indexes countries, \( t \) the years, \( er_{it} \) is the non-agricultural employment rate, \( \text{erg}_{it} \) is the share of public employees in the working-age population (the public employment rate), \( \text{x}_{it} \) is a \( k \times 1 \) vector of variables describing labour market policies and institutions, \( \text{epl}_{it} \) is the summary measure of EPL, \( \text{pmr}_{sit} \) is a vector of indicators of product market regulations, \( g_{it} \) is the output gap included to account for changes in the business cycle, \( \mu_0 \) is a constant, \( \mu_i \) is the country-specific effect not accounted for by the available explanatory variables, and \( v_{it} \) is the usual error term. All explanatory variables are time-varying, except when static in-depth product market indicators are used.

55. A number of structural elements have been identified in the literature (for an exhaustive review see: OECD Jobs Study, 1994; Nickell and Layard, 1997) as contributing to the equilibrium level of employment (unemployment). Here we consider those for which data exist for a significant number of countries over time: i) an indicator of the average unemployment benefit replacement rate (average of different duration and family conditions of the unemployed person); ii) the system of wage bargaining including the union density (the proportion of workers who are members of trade unions) and the form of bargaining; iii) the level of taxes on the use of labour; iv) the summary indicator of EPL; and v) different indicators of the stringency of product market regulations.

56. The summary indicator of the bargaining system combines two aspects: the level of bargaining, being centralised, intermediate (at sector or regional), or decentralised (firm level); and the degree of co-ordination amongst, on the one hand, employers’ associations and, on the other hand, trade unions. This combined variable allows considering cases where co-operation between employers and unions in an industry bargaining setting (e.g., Germany and Austria and, more recently, Italy, Ireland, the Netherlands with the income policy agreements) may be an alternative, or functionally equivalent, to centralised systems, thereby mimicking their outcomes.

57. The dependent variable of our equations is the non-agricultural employment rate. However, we include the public employment rate as an additional explanatory variable to test for the hypothesis that only business-sector employment rate is affected by policy institutions and labour and product market regulations. In other words, a unitary coefficient on the public employment rate would fully justify the focus on the business sector employment rate for the study of the effects of institutions and regulations on employment.

58. The high correlation between the static (1998) in-depth indicator of product market regulation and the indicator of EPL makes it difficult to identify their respective contribution to employment.

28. The gap variable is defined as the proportional difference between actual and potential output, where the latter is from the OECD Economic Outlook. The assumption of an identical parameter for the gap variable across all cross-sectional units does not affect significantly the estimated coefficients for the other explanatory variables. An alternative equation with country-specific coefficients for this variable produced similar results. Results remained unchanged also in another specification where the gap variable was instrumented with its lagged value to account for potential endogeneity problems induced by the simultaneous determination of employment and output along the business cycle.

29. The tax wedge on the use of labour is the ratio of (employers’ and employees’) social security contributions and income taxes over total labour costs (employers’ social security contributions plus gross wages). It should be stressed that the taxes on labour may have an impact on equilibrium employment only in the presence of market imperfections. For example, workers may be able to resist offsetting wage cuts in a collective bargaining framework; unemployment benefits are in some cases fixed or subject to floors and ceilings which weaken their relationship with earnings; and non-labour income effects may be important (Phelps, 1994; Pissarides, 1996).
outcomes (see below). On the other hand, the time-varying product market indicator has a more limited coverage and may not fully grasp the details of the complex set of product market regulations. Thus, we opt for three separate estimations procedures. We first estimate a random effects model including the static in-depth product market indicators. Second, we use a two-stage approach: we estimate a reduced-form equation using a panel of cross-country, time-series variables and then correlate the estimated country-specific fixed effects with the static indicators of product market regulation. The country-specific effects are already purged of the effects of EPL on employment rates, and thereby their correlation with PM regulations should reflect additional effects of these regulations on employment. This approach does not solve completely the multicollinearity problem, since the first stage estimates of the EPL coefficient may partially reflect the effects of the omitted product market regulation variable, affecting the estimates of the country-specific fixed effects as well as their correlation with the product market indicators. The third approach uses the time-varying indicator of product market regulations as discussed above in a standard panel data estimation procedure.

The empirical results

59. Table 4 presents the results of our reduced-form non-agricultural employment rate equation, which was estimated using a panel of 20 OECD countries over the 1982-1998 period. A sequential approach was used to identify the appropriate estimation technique: each equation was first estimated using OLS and the presence of unobservable country-specific effects was verified by a conventional F-test. When the null hypothesis of cross-country equality of the constant term was rejected at conventional significance levels, fixed-effects models were considered. However, in specifications including time-invariant variables (for product market regulations), the random-effect model was used and the assumption that country-specific effects are random was tested using the Breush-Pagan test. If the null hypothesis of non-randomness of country-specific effects was rejected, Hausman’s (1978) orthogonal test was used to test for the correlation between the random country-specific effects and the other regressors. Moreover, a detailed diagnostic analysis revealed the presence of significant outliers in the data set which consistently affected the standard error of the regression and/or on the estimated coefficients. The first specification (1) includes outliers, while all the other exclude these observations.

30. In the table, the two variables referring to the centralisation/co-ordination of the wage bargaining indicate the effects of intermediate or high centralisation/co-ordination with respect to that of decentralised systems. The distribution of countries according to the different aspects of collective bargaining and changes over time is presented in Elmeskov, Martin and Scarpetta (1998).

31. In the presence of country-specific effects, OLS estimates are biased and the direction of the bias cannot be identified a priori.

32. The outliers have been identified using the DFITS statistics and the COVRATIO statistics, which, in turn, are based on the studentised residuals and the leverage values. The outliers are those annual observations for a given country that significantly increase the standard error of the regression or affect the estimated coefficients. The observations removed from the sample are: 1985 for Spain; 1998 for Ireland and Japan; 1988 for Norway; 1994 for New Zealand. See Scarpetta (1996) for details on the tests used to identify outliers in the data set.
Table 4. Labour and product market determinants of the non-agricultural employment rate, 1982-1998

Panel regressions (20 countries, 1982-1998)

<table>
<thead>
<tr>
<th>Regressors</th>
<th>Basic specification</th>
<th>Augmented specification</th>
<th>Two-stage regressions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) (2) (3)</td>
<td>(4) (5) (6) (7)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>67.95 67.62 70.13</td>
<td>67.75 63.94 65.85 65.85</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(41.23) (43.48) (40.84)</td>
<td>(14.44) (12.49) (32.03) (32.03)</td>
<td></td>
</tr>
<tr>
<td>Output gap</td>
<td>0.52 0.50 0.52</td>
<td>0.52 0.52 0.52</td>
<td>0.52 0.52</td>
</tr>
<tr>
<td>Public employment rate</td>
<td>0.90 0.93 0.78</td>
<td>0.88 0.90 0.78</td>
<td>0.78 0.78</td>
</tr>
<tr>
<td></td>
<td>(7.29) (8.01) (6.29)</td>
<td>(7.72) (7.80) (6.29)</td>
<td>(6.29) (6.29)</td>
</tr>
<tr>
<td>Tax wedge</td>
<td>-0.04 -0.03 -0.01</td>
<td>0.00 0.00 0.00</td>
<td>-0.01 -0.01</td>
</tr>
<tr>
<td></td>
<td>(-1.04) (-0.90) (-0.17)</td>
<td>(0.00) (0.13) (0.17)</td>
<td>(-0.17) (-0.17)</td>
</tr>
<tr>
<td>Union density</td>
<td>-0.23 -0.22 -0.22</td>
<td>-0.21 -0.20 -0.22</td>
<td>-0.22 -0.22</td>
</tr>
<tr>
<td></td>
<td>(-10.84) (-11.38) (-11.30)</td>
<td>(-10.86) (-10.74) (-11.30) (-11.30)</td>
<td></td>
</tr>
<tr>
<td>High corporatism</td>
<td>0.76 0.68 0.66</td>
<td>0.65 0.62 0.66</td>
<td>0.66 0.66</td>
</tr>
<tr>
<td></td>
<td>(1.56) (1.48) (1.41)</td>
<td>(1.38) (1.31) (1.41)</td>
<td>(1.41) (1.41)</td>
</tr>
<tr>
<td>Medium corporatism</td>
<td>-0.50 -0.83 -0.60</td>
<td>-0.75 -0.81 -0.60</td>
<td>-0.60 -0.60</td>
</tr>
<tr>
<td></td>
<td>(-1.06) (-1.86) (-1.34)</td>
<td>(-1.67) (-1.80) (-1.34)</td>
<td>(-1.34) (-1.34)</td>
</tr>
<tr>
<td>Unemployment benefit</td>
<td>-0.06 -0.07 -0.05</td>
<td>-0.04 -0.04 -0.05</td>
<td>-0.05 -0.05</td>
</tr>
<tr>
<td></td>
<td>(-2.10) (-2.41) (-1.58)</td>
<td>(-1.38) (-1.44) (-1.58)</td>
<td>(-1.58) (-1.58)</td>
</tr>
<tr>
<td>EPL (or EPL*low corp)</td>
<td>-2.20 -2.22 -0.93</td>
<td>-0.70 -1.18 -0.93</td>
<td>-0.93 -0.93</td>
</tr>
<tr>
<td></td>
<td>(-5.03) (-5.42) (-0.68)</td>
<td>(-0.69) (-1.13) (-0.68)</td>
<td>(-0.68) (-0.68)</td>
</tr>
<tr>
<td>EPL*medium corp</td>
<td>-4.08 -3.66 -3.71</td>
<td>-4.08 -4.08 -4.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-5.89) (-6.16) (-6.26)</td>
<td>(-5.89) (-5.89) (-5.89)</td>
<td></td>
</tr>
<tr>
<td>EPL*high corp</td>
<td>-1.13 -0.82 0.05</td>
<td>-1.13 -1.13 -1.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-2.11) (-1.66) (-1.72)</td>
<td>(-2.11) (-2.11) (-2.11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.11) (-1.29) (-1.29)</td>
<td>(-1.11) (-1.29) (-1.29)</td>
<td>(-1.29) (-1.29)</td>
</tr>
<tr>
<td>State control</td>
<td>-3.37 -3.46 -3.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.92) (-1.82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barriers to entrepreneurship</td>
<td>4.05 5.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.40) (1.65)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barriers to trade</td>
<td>-0.48 -3.04 -3.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.17) (-0.97)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N. of observations:</td>
<td>340 335 335</td>
<td>335 335 335</td>
<td>335 335</td>
</tr>
</tbody>
</table>

Specification tests:

- RESET (F-statistic): 3.57 3.85 3.84 3.84 3.84
- Heteroskedasticity ($\chi^2$): 0.07 1.02 0.30 0.30 0.30
- Fixed effects (F-statistic): 177.9 196.1 172.4 172.4 172.4
- Random effects: 1477.6 1297.5
- Hausman: 30.5 27.7

T-statistics are in brackets.
Equations from 2 to 7 exclude outliers.
The random effects in tested using the Brensch and Pagan test.
60. The null hypothesis of a unitary coefficient on the public-employment rate cannot be rejected at the conventional level, suggesting that the analysis can be conducted with reference to the non-agricultural business sector. Table 4 suggests that income support systems affect employment outcomes. In particular, higher average replacement rates lead to lower employment rates (and higher unemployment rates, see Scarpetta, 1996). These findings corroborate the idea that the effects of overly generous benefits on the reservation wage of unemployed job-seekers may dominate the positive impact on search effectiveness through income support, thereby leading to lower equilibrium employment rates. Moreover, different collective bargaining arrangements affect labour market outcomes. The estimated coefficients for the measures of centralisation/co-ordination (decentralised countries are the reference group) give some support to the hump-shaped hypothesis (Calmfors and Driffill, 1988), whereby both highly centralised/co-ordinated systems and fully decentralised systems help to restrain the wage claims of insiders and raise employment. It is also interesting to note that the tax wedge effect appears to be negatively signed, even if it is not statistically significant. These results confirm previous findings by Nickell and Layard (1997), Elmeskov et al. (1998) and Nicoletti et al. (2001).

61. The table also suggests a significant impact of stringent employment protection regulations on employment rates. Compared with previous results, the estimated impact of EPL on employment rates has a higher statistical significance and is robust to different specifications. Moreover, the results (specifications 3 to 7) suggest that different collective bargaining arrangements influence the way in which EPL affects employment rates. The negative impact on employment is stronger and statistically more significant in countries with an intermediate degree of centralisation/co-ordination -- i.e. where sectoral wage bargaining is predominant without co-ordination -- while it is not statistically significant in either highly centralised/co-ordinated or decentralised countries. These results are consistent with the hypothesis that when insiders have strong bargaining power, they may more easily resist attempts by employers to reflect high turnover costs (due to strict EPL) in lower wages, even if this works to the detriment of outsiders.

62. Specifications 4 to 7 are different attempts to assess the role of product market regulations using the static in-depth measures of regulation. Specifications 4 and 5 use a random-effect model and consider either the overall indicator of regulation or the three sub-components (state control, barriers to entrepreneurship and barriers to trade). As expected, the significant correlation found in the previous bivariate analysis above is weakened once controlling for several factors affecting cross-country differences in employment rates. However, the coefficients on most of these product market indicators are negatively signed (with the exception of barriers to entrepreneurship), as expected, albeit with limited statistical significance. Moreover, these estimates suffer from a possible mis-specification as indicated by the Hausman test. The last two specifications use a two-stage approach in which the employment-rate equation is first estimated without product market regulations and the country-fixed effects are then used as the dependent variable in a second stage which includes on the right-hand-side the product market indicators. We use a weighted cross-section regression, using the inverse of the standard errors of the fixed effects, to take into account the precision with which these effects are estimated in the first stage. The results from the two-stage regressions are qualitatively similar to those obtained with the single stage: the overall indicator of product market regulation is negatively signed but not statistically significant, while the index of state control is negative and marginally significant but is accompanied by a positively-signed coefficient on barriers to entrepreneurship, which is difficult to interpret. Both the single-stage and two-stage results must be interpreted in the light of the strong cross-section correlation between the EPL and

33. The coefficient for intermediate level of bargaining is even larger and more significant if time-varying groupings of centralisation/co-ordination are replaced by fixed groupings (late 1980s). This can be explained by the fact that moves towards higher centralisation/co-ordination occurred in the eighties, while moves towards further decentralisation occurred only in the late eighties/early nineties and, consequently, there has been less time for their beneficial effects to surface in the labour market.
product market indicators. The marginal significance of product market regulations in the two regressions may simply be a reflection of an upward bias in the coefficient of EPL due to an omitted variable (or omitted time dimension) problem. To test for this we now turn to panel regressions in which both EPL and product market regulations have a time dimension.

Table 5 shows the results of fixed-effects panel regressions in which product market regulation is represented by the time-varying indicator described in Table 3 above. In all specifications, product market regulations have a negative and highly significant impact on the employment rate. The significance and coefficient estimates of the other variables are little affected by the inclusion of the indicator of regulatory reform, with two exceptions: the coefficient of EPL which is halved relative to results shown in Table 4; and the coefficient on the tax wedge which is now statistically significant. The first result tends to confirm our earlier claim that, in the earlier model specifications, the effects of static in-depth indicators of product market regulation on employment were partially absorbed by the EPL indicator due to an omitted variable (or omitted time dimension) problem. The second result points to the importance of properly specifying the equation due to important interactions between the different explanatory factors. Nevertheless, taken jointly, the results in Tables 4 and 5 strongly suggest that regulatory reform in both the product and labour markets are needed to raise significantly the employment rates in many OECD countries where product and labour market regulations are excessively severe. In particular, they lend indirect support for theoretical analyses implying positive employment effects of increased product market competition. Finally, it is noteworthy that product market regulations curbing competition appear to be less harmful for employment in situations characterised by corporatist labour market regimes (equation 4 in Table 5), where product market rigidities can be partially compensated by coordination/centralisation of bargaining mechanisms.
Table 5  Labour and product market determinants of the non-agricultural employment rate, the effects of regulatory reform, 1982-1998

Fixed effects panel regressions (20 countries, 1982-1998)

<table>
<thead>
<tr>
<th>Equations</th>
<th>Basic specification</th>
<th>Without outliers</th>
<th>With interaction terms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td><strong>Regressors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>67.82</td>
<td>67.8</td>
<td>68.36</td>
</tr>
<tr>
<td></td>
<td>(31.58)</td>
<td>(33.00)</td>
<td>(32.76)</td>
</tr>
<tr>
<td>Output gap</td>
<td>0.50</td>
<td>0.49</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>(12.35)</td>
<td>(12.90)</td>
<td>(13.33)</td>
</tr>
<tr>
<td>Public employment rate</td>
<td>1.00</td>
<td>1.01</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td>(8.12)</td>
<td>(8.64)</td>
<td>(6.97)</td>
</tr>
<tr>
<td>Tax wedge</td>
<td>-0.15</td>
<td>-0.14</td>
<td>-0.12</td>
</tr>
<tr>
<td></td>
<td>(-3.19)</td>
<td>(-2.95)</td>
<td>(-2.52)</td>
</tr>
<tr>
<td>Union density</td>
<td>-0.19</td>
<td>-0.20</td>
<td>-0.19</td>
</tr>
<tr>
<td></td>
<td>(-8.43)</td>
<td>(-9.29)</td>
<td>(-9.18)</td>
</tr>
<tr>
<td>High corporatism</td>
<td>1.08</td>
<td>0.78</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>(2.23)</td>
<td>(1.70)</td>
<td>(1.54)</td>
</tr>
<tr>
<td>Medium corporatism</td>
<td>0.03</td>
<td>-0.32</td>
<td>-0.04</td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td>(-0.68)</td>
<td>(-0.09)</td>
</tr>
<tr>
<td>Unemployment benefit</td>
<td>-0.05</td>
<td>-0.06</td>
<td>-0.04</td>
</tr>
<tr>
<td></td>
<td>(-1.77)</td>
<td>(-2.10)</td>
<td>(-1.47)</td>
</tr>
<tr>
<td>EPL</td>
<td>-1.22</td>
<td>-1.33</td>
<td>-1.92</td>
</tr>
<tr>
<td></td>
<td>(-2.34)</td>
<td>(-2.80)</td>
<td>(-4.12)</td>
</tr>
<tr>
<td>Time-varying regulation</td>
<td>-0.77</td>
<td>-0.70</td>
<td>-0.76</td>
</tr>
<tr>
<td></td>
<td>(-3.78)</td>
<td>(-3.56)</td>
<td>(-3.86)</td>
</tr>
<tr>
<td>EPL*low corp</td>
<td>-0.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-3.78)</td>
<td>(-3.56)</td>
<td>(-3.86)</td>
</tr>
<tr>
<td>EPL*medium corp</td>
<td>-3.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-2.34)</td>
<td>(-2.80)</td>
<td>(-4.12)</td>
</tr>
<tr>
<td>EPL*high corp</td>
<td>0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulation*low corp</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Regulation*medium corp</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Regulation*high corp</td>
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<td>N. of observations:</td>
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<td>Specification tests:</td>
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<td></td>
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<tr>
<td>RESET (F-statistic):</td>
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<td></td>
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</tr>
<tr>
<td>no regulation</td>
<td>3.57</td>
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<tr>
<td>no EPL</td>
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<tr>
<td>complete model</td>
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<tr>
<td>Fixed effects (F-statistic)</td>
<td>68.8</td>
<td>68.8</td>
<td>59.7</td>
</tr>
</tbody>
</table>

T-statistics are in brackets.
Equations from 2 to 4 exclude outliers.
5. Tentative conclusions

64. This paper uses a novel set of indicators of regulation in the product and labour markets to shed some light on cross-country differences in the level and composition of employment and to discuss the likely effects of regulatory reforms on the OECD labour markets. Indicators of employment protection legislation (EPL) and of various dimensions of product market regulation suggest that, despite the widespread regulatory reforms, OECD countries remain characterised by widely different approaches to regulating product and labour markets. Overall, we find that countries tend to adopt similar regulatory approaches in the labour and product markets: where product market regulations restrict competition and state interference in the business sector is high, labour markets tend as well to have tight legislation protecting workers, especially those under permanent contracts. Therefore, clear country clusters can be identified according to the degree of strictness of regulations in the two markets:

65. Even controlling for a number of policy and institutional factors affecting the labour market, it is possible to detect significant effects of the summary indicators of both EPL and product market regulation on the level and the composition of employment rates of OECD countries. In particular, countries with tight EPL and restrictive product market regulation tend to have lower employment rates in the non-agricultural business sector. These effects also interact in predictable ways with bargaining institutions, with stronger effects of EPL in intermediate corporatist regimes and stronger effects of product market regulation in intermediate and low corporatist regimes. These results suggest that product market competition has beneficial effects for employment, at least in the long-run. Therefore, employment rate differentials between continental Europe and the United States may depend as much on product market rigidities as on a relative lack of flexibility of labour markets. Reforms in both the labour and product markets are needed to bring employment rates to best practice levels.

66. At the same time, biases in the regulatory environment will tend to distort the composition of employment. For instance, a more restrictive EPL for regular workers relative to temporary employment tends to increase the proportion of workers moving from one temporary contract to another. Similarly, higher regulatory and administrative burdens for corporations relative to sole proprietor companies tend to increase the proportion of self-employed in the non-agricultural business sector.


