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ASSESSING THE ROLE OF LABOUR MARKET POLICIES AND INSTITUTIONAL SETTINGS ON UNEMPLOYMENT: A CROSS-COUNTRY STUDY

Stefano Scarpetta

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INTRODUCTION

Unemployment varies greatly across OECD countries and over time. During the past two decades, it was relatively trendless, albeit subject to cyclical fluctuations, in Japan and the United States, while it rose dramatically in many European countries. In the latter, unemployment rates also showed a high persistence. After rising during cyclical downturns, they tended to remain at (or close to) new higher levels after subsequent recoveries, suggesting that most of these increases were translated into higher "equilibrium" unemployment For example, in EU countries,' the rate of unemployment consistent with stable wage inflation (NAWRU) rose, more or less steadily, from less than 5 per cent in the mid-1970s to almost 10 percent in the early 1990s, while in the United States, the rise in the 1970s was partially reversed thereafter and the NAWRU is currently around 5 per cent.

High unemployment levels in Europe were accompanied by a growing incidence of long-term unemployment (LTU), from less than one-third of total unemployment in the late 1970s to almost 45 per cent in the early 1990s. In contrast, the incidence of LTU has remained relatively constant in the United States and Japan at about 10 and 15-20 per cent, respectively. There are also major differences in participation rates The major European countries often have more than 40 per cent of their working-age population inactive (i e unemployed and not in the labour force). This compares with only a quarter in Japan and less than one-third in North America, Oceania and the Nordic countries

As stressed in the OECD *lobs Study* (1994*b*), an ensemble of factors – macroeconomic policies, trade and foreign direct investment, technology and innovation – interact with labour and product market policies and institutions, such as education and training, wage and price determination processes and welfare benefits, to determine the levels and dynamic behaviour of employment and unemployment rates across countries. The OECD work on the *Jobs Study* indicates that a number of these policy and institutional factors have played an important role in determining unemployment rates. This paper tries to assess the role of some of these factors.

The empirical analysis is conducted from two perspectives. Firstly, it examines the role that different policy and institutional settings have played in determining the marked differences in the level of structural or "equilibrium" unemployment

across the OECD countries during the past decade. Secondly, it looks at the role of these same policy and institutional factors in determining the persistence of unemployment

The results encompass most of the previous cross-country studies comparing labour market performance and, in particular, those of Layard *et al* (1991) and Bean and Symons (1989). They also offer new insights as to how policies and the mechanisms of wage determination may affect aggregate unemployment and other measures of labour market slack, such as youth and long-term unemployment rates and non-employment rates [2] The use of these other measures of labour market slack gives a better understanding of the mechanisms through which distortions in the labour market affect unemployment and gives a better identification of potential beneficiaries of reforms

The broad empirical conclusions suggest that policy variables and the institutional mechanisms of wage determination do matter for the **level** of structural unemployment as well as for the **speed of labour market adjustment** in the OECD countries. In particular, overly generous unemployment benefits and stringent employment protection regulations contribute to raise equilibrium unemployment and reduce the speed of labour market adjustment after an exogenous shock. The different facets of countries' wage bargaining systems interact strongly. Insofar as its effect can be isolated, the paper suggests that greater co-ordination amongst the social partners is always beneficial to labour market performance, regardless of the degree of unionisation. The relationship between the degree of centralisation of wage bargaining and unemployment is more complex. In general, the results support the *hump-shaped* hypothesis whereby both highly centralised and fully decentralised wage bargaining systems offer the best results.

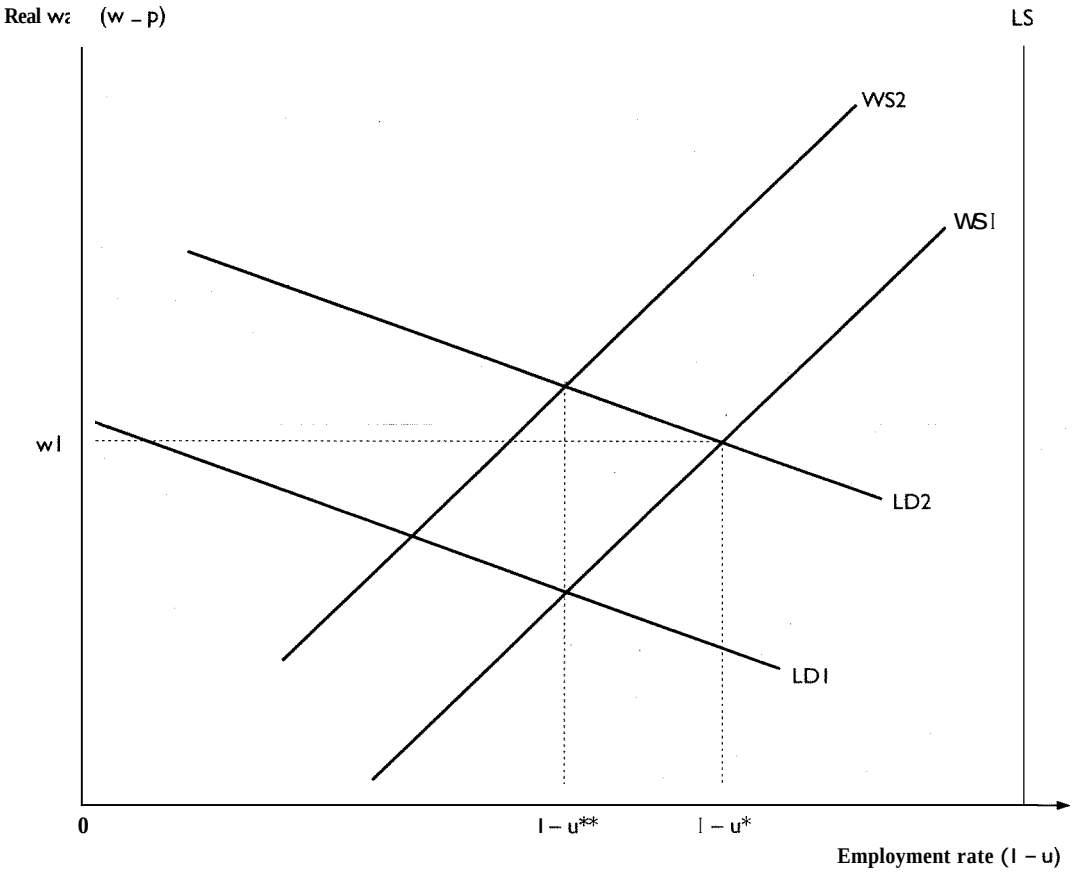
The paper is divided into four sections The first section presents briefly the theoretical framework underlying the study and discusses some methodological issues related to the empirical analysis The second section outlines the policy and institutional variables used, while the empirical results are discussed in the third section The final section summarises the main findings

THE THEORETICAL FRAMEWORK AND THE ESTIMATION PROCEDURE

The theoretical framework

Figure 1 presents a simple model of equilibrium in the labour market The model assumes an economy of imperfectly competitive profit-maximising firms, each facing exogenously determined product market conditions and predetermined capital and technology (see Layard *et al.*, 1991 and Bean, 1994) Moreover, wages are bargained between workers and firms, the latter deciding on the level of employment, output and prices once a wage agreement has been reached ("right-to-manage" model). Ignoring for simplicity labour force growth and trend productivity

Figure 1. ***Labour demand and wage-setting schedules***



Source: **OECD.**

effects, this simple model can be summarised on the basis of the following relationships:

– **labour demand schedule (LD):**

$$n = -\alpha(w - p) - \beta Z_n - w^u \qquad \alpha > 0 \qquad (1)$$

– where n, w and p are respectively the logarithms of employment, wages (including payroll taxes) and prices, Z_n is a vector of variables influencing labour demand, which may include a mark-up of prices over marginal costs, and w^u is unanticipated wages which account for expectational errors.

– **wage-setting schedule (WS):** real wages are assumed to be a decreasing function of unemployment and an increasing function of wage push factors ($\mathbf{Z_w}$),[3] allowing for unanticipated price changes p^u Thus

$$w - p = \delta_1 Z_w - \gamma_1 u - p^u \qquad \delta_1 \geq 0;\ \gamma_1 \geq 0 \qquad [2]$$

The $\mathbf{Z_w}$ vector should include factors such as the generosity of unemployment benefits, the relative strength of unions and the overall features of the wage bargaining process, as well as the tax wedge on the use of labour and the degree of mismatch between the skills and geographical location of job seekers on the one hand and those of the unfilled job vacancies, on the other The parameter γ_1 measures the impact of unemployment on wage setting and is likely to be affected by some of the factors included in $\mathbf{Z_w}$

– **labour supply (LS)** is assumed, for simplicity, inelastic to wages and a function of factors affecting participation decisions ($\mathbf{Z_p}$), including some of the elements of wage push **(Z,)**

$$l = \delta_2 Z_p \qquad \delta_2 > 0 \qquad [3]$$

where l is the logarithm of the labour force

Since $l - n \cong u$, equation [1] can be re-written as

$$l - u \cong -\alpha(w - p) - \beta Z_n - w^u \qquad [4]$$

The structural unemployment rate u^* is the value that solves equations [2], [3] and [4] when price and wage expectations are met (*i e* $p^u = w^u = 0$)

$$u^* = \frac{\alpha\delta_1 Z_w}{1 + \alpha\gamma_1} + \frac{\delta_2 Z_p + \beta Z_n}{1 + \alpha\gamma_1} \qquad [5]$$

which is illustrated in Figure 1 at the intersection of the labour demand and wage-setting curves in the $(1 - u,\ w - p)$ space

From equation [5] any factor that exogenously increases wage-push (Z,) or labour demand shifts (Z,) (*e g* an increase in the mark-up) would raise equilibrium unemployment In the first case, the raise in equilibrium unemployment will be accompanied by an increase in real wages, while in the second case, it will be accompanied by a fall in real wages As an illustration, a leftward shift in the WS schedule (from WS1 to WS2) could be the result of an increase in workers' power in wage bargaining By the same token, a leftward shift (from LDI to LD2) of the labour demand schedule may result from reduced competition in the product market which would lead to persistently higher price mark-ups In both cases, the equilibrium unemployment rate shifts to a higher level (u^{**} in Figure 1), and this increase would not be reversed by endogenous forces[4]

The policy and institutional factors which enter the wage-setting schedule [2] may influence not only the long-run equilibrium unemployment, but also the speed with which the labour market reacts to an exogenous shock. In the context of the bargaining model set up by equations [1] and [2], persistence mechanisms could be brought in by allowing wages to be a function of the change in unemployment as well as the level of unemployment. The rationale for this specification of the wage-setting schedule can be found in the behaviour of both firms and workers. High hiring and firing costs may introduce inertia in the firms' employment decisions. On the basis of the "insider-outsider" hypothesis (see below), it could also be argued that real wages may be more responsive to the threat of large-scale redundancy and rising unemployment than to the level of unemployment *per se*. Likewise, in the context of rising unemployment, the proportion of short-term unemployed (*i.e* those most likely to compete directly with the employed) generally increases and this could put more downward pressure on wages than a stable level of unemployment

The introduction of the change in unemployment in the process of wage determination yields a new wage-setting schedule [2'] and allows for the definition of a short-term equilibrium unemployment (su^*) as opposed to the long-term equilibrium defined by [5]

$$w - p = \delta_1 Z_w - \gamma_1 u - \gamma_2 \Delta u - p^u \qquad \gamma_2 \geq 0 \qquad [2']$$

The parameter γ_2 is likely to be affected by labour market policies, via their impact on the effectiveness of job search and on its intensity, as well as by institutional factors influencing the insiders' power in wage bargaining.

The long-run steady-state equilibrium u^* has not changed as $\Delta u = 0$ in equilibrium. However, in the short term, structural unemployment depends upon u_{t-1}. In particular,

$$su_t^* = -\frac{\alpha\delta_1 Z_w + \delta_2 Z_p + \beta Z_n}{1 + \alpha\gamma_1 + \alpha\gamma_2} + \frac{u_{t-1}}{1 + \dfrac{1 + \alpha\gamma_1}{\alpha\gamma_2}} \qquad [6]$$

or

$$su_t^* = \lambda u_{t-1} + (1 - \lambda)u^* \qquad [6']$$

and the adjustment speed

$$(1 - \lambda) = \frac{1 + \alpha\gamma_1}{1 + \alpha\gamma_1 + \alpha\gamma_2} \qquad [7]$$

The adjustment speed depends upon the flexibility of wages to the level (γ_1) and changes (γ_2) in unemployment. When the estimated coefficient $(1 - \lambda)$ lies

between 0 and 1, there is said to be partial hysteresis or slow adjustment (Elmeskov and MacFarlan, 1993), while a coefficient equal to 0 points to full hysteresis.

Estimation procedure

Equations [5] and [6] offer the basic framework for the analysis of cross-country variations of unemployment. In particular, two questions should be addressed. How do labour market policies and institutional factors affect the equilibrium unemployment rate u^*? Moreover, how do these factors influence the speed of adjustment $(1 - \lambda)$? To make the best use of the information available, these two questions are treated in turn.

To address the first question, we estimated the relative importance of policy and institutional variables in determining the wide disparities in structural unemployment and the potential effects of reforms, using a **static model** over the 1983-1993 period The period corresponds, more or less, to a full business cycle, over which structural unemployment has remained relatively stable in most OECD countries, at least compared with the dramatic increases of the 1970s and early 1980s. This is also the period for which most of the information is available on several institutional features of the labour market and on labour market policies.

Since the policy and institutional factors are likely to have different impacts on different groups of the unemployed population and on participation decisions, four different measures of labour utilisation were used as the dependent variable: i) the total unemployment rate; ii) the youth unemployment rate, iii) the long-term unemployment rate; iv) and the non-employment rate. Comparisons between the results of the four different equations may offer a more complete picture of the effects of labour market policies and institutional factors on the labour market and help the identification of potential beneficiaries of reforms. Nevertheless, the use of the same specification for all four measures implies that a portion of cross-country variation remains unexplained as certain specific factors – such as minimum wages in the youth equations – are omitted from the analysis.

Using cross-country and time-series data and adding an explanatory variable to account for the effects of aggregate demand fluctuations over the cycle, the actual unemployment rate and the other three measures of labour market slack can be modelled by a reduced-form equation with the following structure

$$u_{it} = \mu_0 + \mu_i + \Sigma_k \beta_k x_{kit} + \Sigma_j \tau_j z_{ji} + \phi g_{it} + \nu_{it} \qquad [8]$$

where i indexes countries, t the years, u_{it} is the unemployment rate (or one of the other measures of labour market slack), $\mathbf{x_{it}}$ is a $k \times 1$ vector of time-varying explanatory variables, $\mathbf{z_i}$ is a $j \times 1$ vector of variables which vary across countries but not over time,[5] μ_0 is a constant, μ_i is the country-specific effect not accounted for by the available explanatory variables and v_{it} is the usual error term Both $\mathbf{x_{it}}$ and $\mathbf{z_i}$

vectors consist of policy and institutional variables deemed likely to affect labour market conditions, while $g_{,,}$ is the output gap (see below) included to account for changes in the business cycle

To shed some light on the speed of labour market adjustment, a **dynamic** version of the unemployment rate equation is also estimated over the 1970-1993 period, which encompasses the upsurge in unemployment after the two oil shocks. In this case, actual unemployment rate (u_{it}) is expressed as the sum of the short-term equilibrium rate (su^*_{it}) – which, from equation [6'], is a function of lagged actual unemployment rate and the long-run steady-state equilibrium rate (u^*_i) – plus a cyclical component which is identified using the output gap variable. From equation [7] the coefficient on lagged unemployment rate (λ) mainly depends on the parameters γ_1 and γ_2 which, in turn, are functions of the labour market and institutional factors included in the $\mathbf{x_{it}}$ and $\mathbf{z_i}$ vectors The long-run steady-state equilibrium unemployment (u^*_i) is proxied by country-specificeffects μ_i and the few time-varying explanatory variables ($\mathbf{x_{it}}$) for which long time-series are available[6] Thus, the reduced-form unemployment equation can be written as

$$u_{it} = \mu_i + \left[\mu_0 + \Sigma_k \delta_k x_{kit-1} + \Sigma_j \varphi_j z_{ji}\right] u_{it-1} + \Sigma_k \beta_k x_{kit} + \phi g_{it} + \nu_{it} \qquad [9]$$

where the notation is the same as for equation [8] [7]

EXPLANATORY VARIABLES

Cyclical factors

At any point in time, countries can differ in their relative position in the business cycle and in the amplitude of the cycle around the long-run trend. These differences are likely to affect the size and dynamic behaviour of the cyclical component of actual unemployment rates. To account for these factors, we used a measure of the output gap (GAP) defined as the percentage difference between actual and the long-run trend output, the latter obtained using a GDP smoothing approach based on the Hodrick-Prescott filter[8] It should be stressed that, like any other index of the cycle, the output gap measure is not an exogenous variable, although it is reasonable to assume that it is economically predetermined (in the sense that changes in the cycle drive changes in employment and unemployment and not vice *versa)*

Policy variables

Active labour market policies

Active labour market policies (ALMP) encompass different measures, including training and re-training programmes, job-search counselling, job-brokerage services

and different forms of subsidised employment (OECD, 1993) These policies may reduce aggregate unemployment by shifting rightward the WS schedule of Figure 1[9] For example, raising the search effectiveness of job seekers could lead to greater efficiency in job matching and reduced real wage pressure,[10] which in turn would reduce the duration of Unemployment spells and raise employment (Layard and Nickell, 1986). Moreover, the enhanced qualifications of participants in training schemes are likely to raise their productivity once at work (OECD, 1993). On the other hand, the existence of generous active programmes may be taken by unions or employed workers as a signal of accommodation, which will raise wage pressure, shifting the WS schedule leftward and contributing to longer duration of unemployment spells and higher overall unemployment rates.

The government's commitment to active labour market policy is proxied by expenditure on active measures per unemployed person relative to output per capita (ALMPU) as in Layard *et al* (1991)[11] The per-capita measure takes into account a potential non-linearity in the relationship between active programmes and unemployment [12] However, the introduction of ALMPU in the unemployment equation is likely to lead to a simultaneity bias in the estimated parameters.[13] This would occur if governments react to changes in unemployment – or other signals of labour market conditions – with changes in total spending on ALMPs, which makes it difficult to disentangle the effect of active policy on the labour market We tried to minimise this problem by entering ALMPU as a fixed effect, using the average spending over the entire period for which data are available (1985-1993)

However, a further difficulty in determining the impact of ALMPs on unemployment arises if (some)programme participants are simply excluded from the count of unemployed job seekers although they are looking for work Under these circumstances, an obvious effect of increasing expenditures on – and participation in – ALMPs is to reduce "measured" unemployment without any change in "actual" unemployment Indeed, evidence indicates that in many OECD countries there is a positive correlation between unemployment dynamics and participation in active programmes [14] As unemployment rises, participation in ALMP increases, which suggests that the absolute number of "hidden" unemployed workers may increase when unemployment is high. For these reasons, when interpreting the impact of ALMP on measured unemployment, it is necessary to keep in mind this possible bias

Unemployment benefits

A large number of both macro and micro studies[15] (including the OECD *Jobs Study*) suggest that the level and especially the duration of unemployment benefits are likely to affect overall unemployment and its persistence Unemployment benefits may be expected to raise beneficiaries' reservation wages, thereby reducing

their search efforts and their willingness to accept job offers (*i.e.* leading to a leftward shift in the WS schedule) Moreover, generous benefits may reduce the insiders' (employed individuals) willingness to restrain their wage claims in the face of unemployment pressure (*i.e* a flatter WS schedule in Figure 1). On the other hand, unemployment benefits act as a subsidy to job search, helping to overcome an asymmetric-information externality and contributing to better job matching and, thus, lower unemployment (via a rightward shift in WS)

The full complexity of the unemployment benefit system (UB)[16] is approximated in this study by a summary index of benefit entitlements derived from the OECD *lobs Study* (Chapter 8) The UB index is based on a simple average of net (after-tax) replacement rates for individuals with different durations of the unemployment spell, different levels of earnings and different family situations.[17] In the overall unemployment equations and in the non-employment equations, the index includes all duration categories (1-5 years), while in the LTU equations the summary index (UB2) includes replacement rates for durations longer than 12 months and in the youth unemployment equations the index (UB3) includes only replacement rates for the first 12 months [18] These measures partially overcome the simplification involved in representing the unemployment compensation system by a crude replacement rate and/or by a measure of maximum duration (Atkinson and Micklewright, 1991). Nevertheless, since these indices summarise different situations, they are inevitably somewhat arbitrary and do not differentiate the role of each individual component of the UB system in explaining unemployment (Martin, 1996).

Employment protection legislation (EPL)

In many countries, especially in Europe, the freedom of firms to hire and fire workers is limited by a variety of "employment protection" regulations.[19] As stressed in the OECD *lobs* Study, these regulations, if binding, are likely to operate in two directions. On the one hand, they may reduce arbitrary dismissals; lower contracting costs by setting general rules and standards, encourage on-the-job training and human capital formation (thereby raising productivity and earnings of "insiders"), and, finally, provide for early warnings to allow workers to engage in job search prior to being laid off On the other hand, if firms feel that these regulations oblige them to retain workers who are no longer needed, they may become cautious in hiring and more selective in the choice of applicants, to the particular detriment of disadvantaged workers (often low-skilled, long-term unemployed and youth) Moreover, EPL may affect the structure of employment by indirectly promoting atypical (*i.e.* part-time and temporary) labour contracts which offer firms the work force flexibility they would not have otherwise enjoyed, but which may act to consolidate insider power (Bentolila and Dolado, 1994)

As a proxy for the strictness of employment protection regulations, this paper uses the average of two indices measuring the strictness of EPL rules for regular and fixed-term contracts (see OECD *lobs* Study; and Grubb and Wells, 1993). While a relatively crude measure, this index offers a more complete picture of the different factors affecting decisions to hire and fire workers than other measures used in the literature, such as those based on employer surveys alone, as in (Emerson, 1988).[20]

Non-wage labour costs

Taxes on labour use have often been identified as a factor shaping the wage formation process and factor utilisation. A tax wedge on the use of labour can be defined as the difference between gross labour costs to employers and the consumption wage (net of direct and indirect taxes) paid to employees. This difference is affected by several elements – which vary a great deal across countries – including employees' and employers' social security contributions, income taxes and indirect taxes.

The macroeconomic impact of a change in the tax wedge depends on the reactions of both firms and workers. For example, in a perfectly competitive environment, an increase in payroll taxes will have no long-run effects on unemployment, insofar as wages will adjust to whatever level is needed to clear the market. However, if markets are imperfect and workers are able to resist offsetting wage cuts, an increase in these taxes may result in lower employment (*i.e.* a leftward shift in the LD schedule).[21] The occurrence of the latter depends, among other things, on the relative bargaining strengths of trade unions and employers (in the Z_w vector of [2]), and on firms' ability to pay wages in excess of market-clearing levels, which may also depend upon the degree of competition in the product market (in the Z_n vector of [1]). Moreover, an increase in taxes may be particularly detrimental *to* the employment prospects of certain categories of workers, such as low-paid workers, but not for others. For example, in the case of low-paid workers, employers may not be able to reduce wages to compensate for an increase in social security contributions if binding wage floors are established by statutory minimum wages, negotiated wage floors or high reservation wages induced by social welfare provisions.

Given data availability, the tax wedge indicator (TWEDGE) used here is based on average tax rates for average production workers, including employers' and employees' social security contribution rates, personal income tax rates and, finally, indirect tax rates (See Annex A for details) However, a marginal tax wedge is also considered using a smaller sample of countries to test whether the impact on unemployment differs

Institutional factors

Unions and the wage bargaining process

The wage bargaining process can play a crucial role in determining labour-market conditions and the speed of adjustment For example, in the wage bargaining model set up in the previous section, wages may remain above market-clearing levels because the institutional system gives employees market power, thereby raising wages (*i.e* a leftward shift in the WS schedule of Figure 1). However, these effects may be moderated, or even reversed, in contexts of fully centralised wage bargaining or when there is a high level of co-ordination among employers and among unions

One common indicator of the character of industrial relations in a number of "insider-outsider models" is union density (the proportion of workers who are members of trade unions). Yet, a high degree of unionisation is not per *se* sufficient evidence of workers' market power In many countries, the administrative extension of wage agreements means that workers who are not union members are often covered by the terms and conditions of union contracts By the same token, high union power in one sector can lead to spillover effects in non-union sectors (Blanchard and Kiyotaki, 1987).

In an effort to accommodate these elements, a measure of union density is complemented by two alternative indicators of the nature of the wage formation process: i) the degree of centralisation of wage bargaining, and *ii)* a measure of the degree of co-ordination among employers and among employees in the wage bargaining process.

A highly centralised wage bargaining system may allow the economy to respond in a more consistent way to adverse shocks than decentralised systems in which different groups/sectors/companies negotiate separately over wages (Tarantelli, 1986; Bruno and Sachs, 1985) However, Calmfors and Driffill (1988) have stressed that the relationship between centralisation of wage bargaining and wage outcomes is not monotonic, but rather hump-shaped [22] The hump-shaped hypothesis suggests that both highly centralised (co-operative) bargaining structures – such as those in Austria and the Nordic countries – and fully decentralised (competitive) structures (United States) offer the best results.[23] In an intermediate *(ie* neither highly centralised nor highly decentralised) system – as in many €U countries – bargaining units are strong enough to generate dis-employment effects, but at the same time, each unit is vulnerable to other units' wage strategies without being able to influence these strategies (a sort of "prisoner'sdilemma").

Co-ordination refers to the extent to which decisions taken by trade unions and employers' associations at the different bargaining levels (national, sectoral or company) are concerted so as to foster a mutually beneficial strategy.

The different equations estimated in this paper include the degree of unionisation together with either the indices of centralisation of wage bargaining or co-ordination as separate explanatory variables [24] In the first case, the country ranking of the relative degree of centralisation suggested by Calmfors and Driffill (CLWB) and its square (CLWB2) are included to account for the hump-shaped hypothesis In the second case, the Layard *et al* (1991) indices of employers' co-ordination (ECOOR) and employees' co-ordination (UCOOR) are used, or, alternatively, a summary measure of overall co-ordination (COOR), which sums the ECOOR and UCOOR indices. In the unemployment and non-employment equations, one would expect: a positive sign on CLWB and a negative sign on its square CLWB2 (the measure of corporatism is based on rankings in which lower numbers refer to higher levels of centralisation); a negative sign for both the index of employers' co-ordination and the index of unions' co-ordination

Exposure to trade as a proxy for product market competition

The lack of competition in the product market may have direct as well as indirect effects on the labour market In the presence of market power, profit-maximising firms will set prices above the marginal cost of production and consequently labour demand will be lower than otherwise would have been the case Moreover, employers may share product-market rents with their employees (insiders) (Geroski *et al.*, 1996) thereby raising wages above competitive levels and reducing employment levels. The combination of wage premia and low employment in non-competitive sectors may have spillover effects on other sectors of the economy in different ways, As stressed above, the automatic extension of wage agreements may also distort the balance between costs and productivity in more competitive sectors; the unemployed may prolong their search in the hope of acceding to highly paid jobs; and, finally, dismissed workers from "high-wage'' firms may have very high reservation wages, especially in countries with earning-related unemployment benefits (OECD *lobs Study,* Chapter 5)

Unfortunately no direct measure is available on the overall degree of product market competition in OECD countries. Indirect information can, however, be gathered from trade data In particular, measures of openness to foreign trade may shed some light on the degree of competitiveness to which domestic firms are exposed As a proxy for the pervasiveness of trade restrictions, a summary index was calculated on the basis of sectoral data on tariff rates and the frequency of non-tariff barriers (see Annex B for details) The larger the trade restrictions index (TRESTR), the more protected the domestic economy is However, insofar as countries differ a great deal in the relative importance of trade in national income (not least because of their size), the TRESTR index by itself may not necessarily offer an accurate picture of the effects of different trade policies on competition and resource allocation For example, two countries starting with the same levels of trade restrictions

but having different overall degrees of exposure to foreign trade may experience different output and employment effects by implementing the same trade reform package Thus, an additional variable was introduced (INTER) which measures the interaction between TRESTR and an index of exposure to foreign competition (COMP). The latter combines an index of export intensity and an index of import penetration (see Annex A for details).

Other factors

Real interest rates

Several recent studies suggest that the significant increases in real interest rates during the 1980s, driven by increases in the public debt of many OECD countries, might have been among the driving factors behind the upsurge in unemployment, at least in countries where persistence mechanisms are at work In particular, Phelps (1992, 1994) put forward several models in which real interest rates may affect unemployment. For example, in his "customer market" model of pricing, Phelps suggests that a reduction in real interest rates increases the incentives to invest in expanding market shares Thus, the reduction in marginal production costs resulting from a fall in interest rates is likely to be followed by a reduction in price mark-ups which, in turn, should have positive effects on employment Moreover, in an inter-temporal model, if workers have non-wage income, an increase in the rate of interest may reduce the expected utility of being employed Along the same lines, Manning (1991) suggested that a higher interest rate – which in his model proxies the discount factor that workers apply to the value of potential future employment – reduces the opportunity cost of being unemployed in the future and makes workers more aggressive in their current wage claims.

Given the highly integrated world capital market, the paper uses a measure of the world real interest rate based on a CDP-weighted average of domestic long-term rates [25]

The terms of trade

It has also been argued that the deterioration of the terms of trade following the two oil shocks might have affected equilibrium unemployment insofar as it created a wedge between value-added prices and consumer prices.[26] This would then affect unemployment through much the same mechanisms as discussed above for the tax wedge Since the potential impact depends on each country's exposure to trade, the terms-of-trade variable (TERMS) was weighted by the average of the COMP index which, as described above, measures the degree of exposure to foreign trade

EMPIRICAL RESULTS

The structural determinants of unemployment

Equation [8] was used to assess the role of policy and institutional factors in determining cross-country variations in structural unemployment The analysis is based on annual data over the 1983-1993 period for a group of OECD countries (from 15 to 17 countries depending upon data availability under the different specifications)[27] Since the precise structure of the models was not known, Hendry's "general-to-particular" estimation approach was used to maximise the efficiency of estimates while allowing for a parsimonious specification 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 [28] When the null hypothesis of cross-country equality of the constant term was rejected at conventional significance levels, error-components models using Feasible Generalised Least Squared (FGLS)were considered The assumption that country-specific effects are random was tested using Honda's (1985) 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, as suggested by Hausman and Taylor (1981)[29]

Regression results

Table 1 presents the results of the reduced-form regressions on the total unemployment rate Tables 2 to 4 present the results for youth unemployment rates, LTU rates and non-employment rates, respectively The statistical tests discussed above are reported at the bottom of each table. Two basic specifications are used for the wage bargaining system one with the two co-ordination variables (COOR) (see columns 1 to 7), and another with CLWB and its square replacing COOR (columns 8 to 10). In both cases, union density (UDENS) enters as well Columns 3 to 5 report estimates incorporating the tax wedge, the terms of trade and the real interest rate, respectively However, these variables have been omitted in the following steps if their coefficients were not statistically significant. The number of observations used in each equation and the number of countries included in the panel are reported at the bottom of each table [30]

As expected, the F-tests reject strongly the hypothesis of no country-specific effects in all equations Moreover, in all equations, the hypothesis of randomness of the country-specific effects cannot be rejected by the Honda test at standard statistical levels Finally, the Hausman tests suggest possible problems of specification in only a few equations, at the 1 per cent critical level In these cases, the value of the Hausman test is reported in bold [31]

Table 1 **Estimates of reduced-form unemployment rate equations 1983-1993**[1]

Feasible generalised least-squares

Explanatory variable[2]	Equation version number									
	1	2	3	4	5	6	7	8	9	10
	Estimated coefficients									
ALMPU	**–0.04***	**–0.05***	**–0.05'**	**–0.05***	**–0.06***	**–0.05***	**–0.05***	**–0.04**	**–0.05**	**–0.05**
	–1 65	*–1 67*	*–1 72*	*–168*	*–1 83*	*–165*	*–1 65*	*–1 17*	*–1 40*	*–1 19*
UB	**0.14*****	**0.13*****	**0.13*****	**0.13*****	**0.13*****	**0.13**'**	**0.13**'**	**0.13"****	**0.12*****	**0.13*****
	745	*696*	*678*	*701*	*699*	*635*	*701*	*618*	*591*	*612*
EPL	**0.31****	**0.37*****	**0.37*****	**0.37*****	**0.39*****	**0.27***	**0.37*****	**0.12**	**0.10**	**0.13**
	242	*264*	*264*	*268*	*274*	*1.75*	*266*	*062*	*057*	*064*
UDENS	**0.10**'**	**0.11*****	**0.11**'**	**0.11*****	**0.13*****	**0.11*****	**0.11*****	**0.12*****	**0.12*****	**0.12*****
	466	*494*	*465*	*474*	*516*	*481*	*488*	*475*	*468*	*471*
ECOOR	**–4.75*****									
	–4 57									
UCOOR	**–0.80**									
	–0 61									
COOR		**–3.08*****	**–3.07*****	**–3.07*****	**–3.18*****	**–2.62*****	**–3.08*****			
		–5 74	*–595*	*–586*	*–586*	*–424*	*–589*			
CLWB								**2.19*****	**0.76**	**2.19*****
								263	*075*	*263*
CLWB2								**–0.08***	**0.01**	**–0.08***
								–1 75	*–0 12*	*–1 75*
GAP	**–0.52*****	**–0.52**'**	**–0.52*****	**–0.52*****	**–0.51*****	**–0.52*****	**–0.52*****	**–0.51*****	**–0.51*****	**–0.51*****
	–1650	*–1640*	*–16 10*	*–1600*	*–1620*	*–1640*	*–1630*	*–16 10*	*–16 10*	*–16 10*
TWEDGE			**0.01**							
			0 12							
TERMS				**–0.36**						
				–0 24						
IRL					**–0.12**					
					–1 44					
TRESTR						**0.03**			**0.06****	
						142			*2 16*	
INTER							**–0.43**			**0.72**
							–0 11			*0 18*
Adj R^2	095	095	095	095	095	095	095	095	095	095
SEE	092	091	091	091	090	091	091	091	091	091
N of observations	181	181	181	181	181	181	181	181	181	181
N of countries	17	17	17	17	17	17	17	17	17	17
F-test	53.7***	74.0***	67.0***	69.0***	76.0***	68.7***	68.5***	1229"""	99.7***	121.6***
Honda test	20.8***	23.3***	23.0***	22 1***	23.4***	234"**	22.0***	26.0***	25.3***	25.8***
Hausman test	111**	71	110**	104**	**14.1**""**	66	9.1*	38	*41*	39

Each coefficient indicates the expected change (in percentage points) in U resulting from a one unit increase in the independent variable
* Statistically significant at 10% level ** at 5% level *** at 1% level

1 All regressions contain a constant t-statistics in italics

2 Details on each explanatory variable are in Annex A

Note ALMPU = active labour market spending per unemployed UB = the average of different replacement rates EPL = index of the strictness of employment protection legislation UDENS = union density CLWB = index of corporatism CLWB2 = square of CLWB ECOOR UCOOR and COOR = indexes of co-ordination CAP = output gap TRESTR = index of pervasiveness of trade restrictions INTER = the product between TRESTR and the index of exposure to foreign competition TERMS = the terms of trade index IRL = the long-term interest rate TWEDGE = tax wedge index See Annex A for details

Source See Annex A

Table 2. **Estimates of reduced-form youth unemployment rate equations, 1983-1993**[1]

Feasible generalised least-squares

Explanatory variable[2]	Equation version number									
	1	2	3	4	5	6	7	8	9	10
	Estimated coefficients									
ALMPU	**–0.05**									
	–1 03									
UB3	**0.16*** **	**0.15*** **	**0.17*** **	**0.16*** **	**0.16*** **	**0.17*** **	**0.15*** **	**0.18*** **	**0.18** '**	**0.16*** **
	390	*347*	*364*	*349*	*356*	*365*	*326*	*372*	*362*	*328*
EPL	**1.57*** **	**2.05*** **	**2.18*** **	**2.04*** **	**2.09*** **	**2.41*** **	**2.02*** **	**1.33*** **	**1.25** **	**1.41*** **
	5 76	*558*	*5 79*	*556*	*562*	*528*	*558*	*267*	*254*	*283*
UDENS	**0.20*** **	**0.26*** **	**0.28*** **	**0.26*** **	**0.29*** **	**0.26** '**	**0.26** '**	**0.34**	**0.33** '**	**0.32*** **
	392	*475*	*486*	*451*	*486*	*476*	*455*	*517*	*511*	*479*
ECOOR	**–11.8*** **									
	–7 20									
UCOOR	**0.78**									
	0 30									
COOR		**–9.21*** **	**–9.26*** **	**–9.13*** **	**–9.46*** **	**–10.65*** **	**–9.20*** **			
		–725	*–745*	*–721*	*–732*	*–620*	*–685*			
CLWB								**5.66*** **	**4.20***	**4.67** **
								308	165	240
CLWB2								**–0.16***	**–0.09**	– 0.11
								–1 65	–0.73	–107
GAP	**–1.16*** **	**–1.13*** **	**– 1.11*** **	**–1.12*** **	**–1.12*** **	**–1.14** '**	**–1.13** '**	**–1.12*** **	**–1.12** '**	**–1.11** '**
	–138	*–1351*	*–128*	*–13 13*	*–1336*	*–1353*	*–1366*	*–13 19*	*–13 14*	*–1329*
TWEDGE			**–0.10**							
			–1 13							
TERMS				**–2.12**						
				–0 52						
IRL					**–0.22**					
					–0 98					
TRESTR						**–0.07**			**0.06**	
						–1 27			0 79	
INTER							**0.00**			**0.49**
							001			1 49
Adj R^2	082	093	093	093	093	093	093	093	093	093
SEE	4 06	25	253	254	252	253	254	25	251	249
N of observations	165	165	165	165	165	165	165	165	165	165
N of countries	15	15	15	15	15	15	15	15	15	15
F-test	234'**	51 5***	48.7***	50.01***	53.27***	47 1***	50.3***	95.4***	89.8***	95.7***
Honda test	8 1***	17.5***	21 03***	9.21***	8.93***	10.4***	94** '	14.5***	13.8***	14***
Hausrnan test	**18.9*** **	11 2**	132**	12 34'''	**15.24*** **	11 2**	**16.3** '**	72*	72'	92'

Each coefhcient indicates the expected change (in percentage points1 in youth U resulting from a one unit increase in the independent variable

* Statistically signihcant at 10% level ** at 5% level *** at 1% level

1 All regressions contain a constant t-statistics in italics

2 Details on each explanatory variable are in Annex A

Note ALMPU = active labour market spending per unemployed UB3 = the average of different replacement rates EPL = index of the strictness of employment protection legislation UDENS = union density CLWB = index of corporatism CLWB2 = square of CLWB ECOOR UCOOR and COOR = indexes of co-ordination GAP = output gap TRESTR = index of pervasiveness of trade restrictions INTER = the product between TRESTR and the index of exposure to foreign competition TERM5 = the terms of trade index IRL = the long-term interest rate TWEDGE = tax wedge index See Annex A for details

Source See Annex A

Table 3. **Estimates of reduced-form LTU rate equations, 1983-1993**[1]

Feasible generalised least-squares

Explanatory variable[2]	Equation version number									
	1	2	3	4	5	6	7	8	9	10
	Estimated coefficients									
ALMPU	**–0.01**	**–0.02**	**–0.03**	**–0.02**	**–0.03**	**–0.02**	**–0.03**	**–0.02**	**–0.02**	**–0.02**
	–045	*–056*	*–1.00*	*–093*	*–1 15*	*–108*	*–1 19*	*–065*	*–083*	*–088*
UB2	**0.05*****	**0.05*****	**0.03***	**0.04****	**0.04****	**0.03**	**0.02**	**0.03**	**0.02**	**0.02**
	290	*2 74*	*192*	*202*	*2 14*	*146*	*109*	*138*	*120*	*078*
EPL	**0.46*****	**0.49*****	**0.38*****	**0.36*****	**0.4*****	**0.28****	**0.33*****	**0.13**	**0.12**	**0.15**
	366	*386*	*316*	*306*	*332*	*238*	*289*	*095*	*1.00*	*124*
UDENS	**0.06*****	**0.07*****	**0.05****	**0.04***	**0.06*****	**0.05****	**0.03**	**0.05****	**0.05****	**0.03**
	285	*304*	*209*	*166*	*263*	*218*	*1.50*	*200*	*212*	*1.41*
ECOOR	**–2.93*****									
	–2 87									
UCOOR	**–1.10**									
	–0 84									
COOR		**–2.15*****	**–2.14*****	**–2.11*****	**–2.26*****	**–1.64*****	**–1.76*****			
		–452	*–49*	*–500*	*–5 10*	*–347*	*–401*			
CLWB								**2.06*****	**1.20***	**1.48*****
								368	*173*	*267*
CLWB2								**–0.08*****	**–0.04**	**–0.05***
								–287	*–1 22*	*–1 94*
GAP	**–0.17*****	**–0.17*****	**–0.20*****	**–0.19*****	**–0.19*****	**–0.19*****	**–0.20*****	**–0.20*****	**–0.19*****	**–0.20*****
	–521	*–5 18*	*–599*	*–582*	*–5 73*	*–589*	*–603*	*–601*	*–589*	*–607*
TWEDGE			**0.11*****	**0.12*****	**0.11*****	**0.10*****	**0.10*****	**0.12*****	**0.11*****	**0.11*****
			399	*419*	*387*	*350*	*365*	*418*	*36*	*387*
TERMS				**–1.80**						
				–1 16						
IRL					**–0.15**					
					–1 47					
TRESTR						**0.03***			**0.04***	
						1 94			*184*	
INTER							**0.21****			**0.23****
							2 33			*2 49*
Adj R^2	092	092	092	092	092	092	092	092	092	092
SEE	094	093	0 9	0 9	089	0 9	089	0 9	091	0 9
N of observations	177	177	177	177	177	177	177	177	177	177
N of countries	17	17	17	17	17	17	17	17	17	17
F-test	4747***	53.43***	47.15***	43.18***	4891	3771***	40.67***	53.34***	44.76***	43.07***
Hausman test	604'	472'	2.64**	6.9**	5 58*	3 38	34	56*	6*	7 1

Each coefficient indicates the expected change (in percentage points) in LTU rate resulting from a one unit increase in the independent variable

* Statistically significant at 10% level ** at 5% level *** at 1% level

1 All regressions contain a constant t-statistics in italics

2 Details on each explanatory variable are in Annex A

Note ALMPU = active labour market spending per unemployed UB2 = the average of different replacement rates EPL = index of the strictness of employment protection legislation UDENS = union density CLWB = index of corporatism CLWB2 = square of CLWB ECOOR UCOOR and COOR = indexes of co-ordination GAP = output gap TRESTR = index of pervasiveness of trade restrictions INTER = the product between TRESTR and the index of exposure to foreign competition. TERMS = the terms of trade index IRL = the long-term interest rate TWEDGE = tax wedge index See Annex A for details

Source See Annex A

Table 4 **Estimates of reduced-form non-employment rate equations, 1983-1993**[1]

(Sum of inactive and the unemployed divided by the working age-population in per cent)
Feasible generalised least-squares

Explanatory variable?	Equation version number									
	1	2	3	4	5	6	7	8	9	10
	Estimated coefficients									
ALMPU	**–0.12***	**–0.13***	**–0.12****	**–0.13***	**–0.13'**	**–0.12***	**–0.12****	**–0.11**	**–0.12'**	**–0.11***
	–1 65	*–1 67*	*–1 96*	*–1 74*	*–1 68*	*–1 84*	*–224*	*–1 35*	*–1 67*	*–1 78*
EPL	**1.50*****	**1.52*****	**1.48*****	**1.55*****	**1.53*****	**1.11*****	**1.37*****	**0.79****	**0.76****	**0.88**'**
	398	*4 14*	*478*	*422*	*4 15*	*334*	*5 13*	*199*	*222*	*288*
UDENS	**0.12*****	**0.12*****	**0.11*****	**0.14*****	**0.13*****	**0.11*****	**0.08**	**0.12*****	**0.11*****	**0.08****
	319	*322*	*290*	*354*	*303*	*306*	*219*	*305*	*295*	*218*
ECOOR	**–5.39***									
	–1 75									
UCOOR	**–4.24**									
	–1 08									
COOR		**–4.90*****	**–4.89*****	**–5.04*****	**–4.94*****	**–3.20*****	**–4.11*****			
		–3 76	*–446*	*–385*	*–3 76*	*–260*	*–426*			
CLWB								**5.41*****	**2.19**	**3.90**'**
								3 17	*1.13*	*284*
CLWB2								**–0.24*****	**–0.08**	**–0.16****
								–2 75	*–085*	*–226*
GAP	**–0.65*****	**–0.65*****	**–0.66*****	**–0.66*****	**–0.64*****	**–0.65*****	**–0.66*****	**–0.65*****	**–0.65*****	**–0.66*****
	–1280	*–1280*	*–12.60*	*–1300*	*–1250*	*–1290*	*–1320*	*–1280*	*–1280*	*–13 10*
TWEDGE			**0.03**							
			069							
TERMS				**3.64**						
				1 44						
IRL					**-0.05**					
					–0 35					
TRESTR						**0.12*****			**0.14****	
						2 78			*2 51*	
INTER							**0.62*****			**0.60*****
							3 75			*3 41*
Adj R^2	097	097	097	097	0.97	0.97	0.97	0.97	0.97	0.97
See	I52	I52	155	1.51	152	153	1.53	1.53	153	154
N of observations	187	I87	187	187	187	187	I87	187	187	I87
N of countries	17	17	17	17	17	17	17	17	17	17
F-test	179***	182.5***	125.8***	184.7***	1818***	122 1***	95.4***	187.9***	138***	111 1***
Honda test	28.6***	28.6***	26.8***	28.6***	28.6***	27.7***	26.5***	285"**	27.9***	26.9***
Hausman test	3 4	31	10.2**	5 6	3 4	3 2	9.6**	6.4**	48'	99"'

Each coefhcient indicates the expected change (in percentage points) in NE rate resulting from a one unit increase in the independent variable

* Statistically significant at 10% level ** at 5% level *** at 1% level

1 All regressions contain a constant t-statistics in italics

2 Details on each explanatory variable are in Annex A

Note ALMPU = active labour market spending per unemployed UB = the average of different replacement rates EPL = index of the strictness of employment protection legislation UDENS = union density CLWB = index of corporatism CLWB2 = square of CLWB ECOOR UCOOR and COOR = indexes of co-ordination GAP = output gap TRESTR = index of pervasiveness of trade restrictions INTER = the product between TRESTR and the index of exposure to foreign competition TERMS = the terms of trade index IRL = the long-term interest rate TWEDGE = tax wedge index See Annex A for detaiis

Source See Annex A

Drawing from the results of a detailed diagnostic analysis (Box 1 and Annex C), the estimates are based on a panel which excludes data for Finland 1992-1993, Portugal 1983-1984, Italy 1983 and Spain 1993 which appear to influence significantly the estimated parameters. Moreover, two estimates of the ALMPU coefficients are reported in the text, one including Sweden and the other excluding it from the sample as this country strongly influences the estimated parameters of ALMPU.

Box 1. The identification of outliers and influential observations

Even after controlling for unobservable country-specific components, any inferences from the empirical results of models using a small panel data set and including qualitative variables should be made with care. Annex C reports the results of regression diagnostics based on the identification of observations which significantly increase the standard error of the regression and/or affect the estimated coefficients. It is worth mentioning at the outset that, after controlling for country-specific effects, there are only a few observations which significantly affect the regression results.

In particular, data for Finland for the early 1990s increase the standard errors of regressions significantly as the explanatory variables are not able to fully account for the rapid increase in Finnish unemployment rates during that period. Moreover, the diagnostic analysis points to the Portuguese data for 1983 – and to a lesser extent 1984 – as potential outliers. This comes as no surprise since unemployment rates dropped from almost 8 per cent in the early 1980s to 4-5 per cent in the 1985-1993 period in Portugal without any major change in the labour market policy and institutional stance (see Blanchard and Jimeno, 1995). Indeed, the indices summarising the labour market institutional settings in the late 1980s classify Portugal as the country with the most rigid employment protection legislation, with wages prevalently set at the sectoral level and with low employers' and workers' coordination in wage bargaining, all features which should be associated with higher unemployment. One possible explanation for this apparent contradiction is that labour market regulations in Portugal may be poorly enforced with little or no effects on wage and employment determination. The diagnostic checking also reveals that both the 1983 observation for Italy and the 1993 observation for Spain have a significant impact on the standard error of the regressions.

The results reported in Annex C also suggest that the inclusion of Sweden in the panel, albeit not affecting the overall performance of the regression, influences significantly the estimated coefficient for ALMPU. In particular, the exclusion of this country implies a stronger (and statistically significant) negative impact of ALMPU on unemployment. This result is not entirely surprisingly as Sweden has been characterised by both extremely high expenditures for active labour market programmes (four times the OECD average) in the 1983-1993 period and by levels of unemployment which, albeit low, are comparable with those of countries which spent much less on ALMPs.

As shown in Table 1, the estimated impacts of **active labour market programmes (ALMPU)** on the unemployment rate are small and in some cases not statistically significant These results contrast with previous macro-based studies (Layard *et al.*, 1991, Layard and Nickell 1992) but seem consistent with a number of studies based on micro data, which indicate that active programmes have generally a limited impact on worker employability However, if Sweden is excluded from the panel, the magnitude and statistical significance of the estimated coefficient for ALMPU increases (the estimated coefficient becomes –0 23 in equation 2 in Table 1)

The coefficients in Table 1 make it possible to shed some light on the potential impact of active programmes on regular (*i e* non subsidised) employment – *e.g* correcting for the influence of ALMP participants on the measurement of unemployment, on the assumption that participants are not counted as employed Under the hypothesis of a constant labour force, and assuming an ALMP participation rate (p) of 3 per cent of the labour force and a measured unemployment rate (u) of 8 per cent, the results of Table 1 imply a derivative of measured unemployment rates with respect to ALMP participation rates of about –045 in the panel including Sweden, and –1 48 excluding Sweden In other words, an increase in the number of ALMP participants of 1 percentage point of the labour force reduces measured unemployment by 0 45 to 1 48 percentage points of the labour force. As a consequence, the effect on the rate of regular employment (100 – u – p) is either negative (–0.55 percentage points of the labour force) or positive (048 percentage points) but still implying significant substitution effects [32]

High levels of **unemployment benefits** increase structural unemployment significantly (Table 1). The implicit average elasticity of unemployment to the UB index is close to 0.5. These results suggest that disincentive effects and increased wage pressures dominate those affecting search effectiveness through income support Reducing benefit entitlements may therefore reduce unemployment via lower reservation wages and higher exits from the unemployment pool

The estimated results give some support to the hypothesis that stringent **employment protection legislation** contributes to high unemployment and non-employment rates [33] As such, they are consistent with Lazear (1990) who indicated a negative (albeit weak) association between the unemployment rate and EPL These results conflict, however, with those of Bertola (1992) who was unable to find any relationship between unemployment levels and employment adjustment costs

Tables 2 to 4 clearly indicate that employment protection rules have a more significant effect on the structure of employment and unemployment, putting upward pressure on youth and long-term Unemployment The estimated effects of EPL on unemployment in both the youth unemployment and the LTU equations are larger and more significant than those observed in the total unemployment equations [34] These results are consistent with an insider-outsider explanation of

LTU and youth unemployment Higher firing costs may cause firms to change their hiring strategies towards increased "screening" of job applicants This is likely to work to the detriment of inexperienced workers and the long-term unemployed whose long absence from work may have caused a deterioration of their skills or be interpreted by firms as indicating low expected productivity. However, turnover costs are only a necessary and not a sufficient condition allowing insiders to bid for higher wages at the expense of employment opportunities for outsiders. The way in which wages are bargained may also contribute Indeed, the sensitivity analysis discussed in Annex C suggests that the explanatory power of the EPL index changes significantly if explicit account is taken of its likely interaction with the wage bargaining system, that is, with union density and the centralisation of co-ordination variables

There is also evidence in Table 1 (equation 2) that **worker bargaining power** (proxied by union density) may lead to higher Unemployment, unless it is accompanied by a well co-ordinated bargaining process (COOR)[35] In corporatist countries, **co-ordination among employers** (see equation 1 in Table 1) can significantly reduce structural unemployment insofar as such co-ordination provides a mechanism by which labour market pressures can be internalised into wage formation, increasing the sensitivity of wages to aggregate events In the alternative specification, **the degree of centralisation/decentralisation of wage bargaining** is also important. The estimated coefficients of both CLWB and its square (equation 8 in Table 1) have the expected signs (although they are not always significantly different from zero). Albeit weak, these results confirm the hump-shaped hypothesis described above, whereby both highly centralised systems and fully decentralised systems help to restrain the wage claims of insiders and thereby contain unemployment [36] The sensitivity analysis (Annex C) also reveals that there are close interactions between union density, co-ordination and centralisation. The analysis suggests that higher co-ordination seems to be always associated with lower equilibrium unemployment rates, regardless of the level of unionisation. The relative performance of centralised systems depends more importantly on the degree of unionisation. Highly centralised systems seem to be associated with lower unemployment outcomes as long as unionisation is not too high Decentralised systems are also associated with lower unemployment, although the overall impact is of a smaller scale

Institutional factors affecting the wage bargaining system are found to have an even stronger impact on youth unemployment, LTU and non-employment (Tables 2-4). In the case of youth unemployment, the results provide further support to the insider-outsider thesis, whereby young workers and new entrants into the labour market are particularly affected by the strong position of insiders (asproxied by UDENS) who may set wages above market-clearing levels. Similarly, high union

density, if accompanied by low co-ordination, may increase the average duration of unemployment (LTU)

It is also noticeable that the **two indices of foreign "competition"** (TRESTR and INTER) in Table 1 generally have a positive sign, as predicted, although the coefficients have large standard errors. Given the expected links between a lack of product market competition, rents, and rent-sharing behaviour, it is not surprising that the LTU and non-employment equations (Tables 3 and 4) suggest that the lack of foreign competition has a significant effect on the most vulnerable job seekers, if not on all the unemployed

Table 1 does not give support to any effect of the **tax wedge** on overall unemployment, in contrast to previous results (Pichelmann and Wagner, 1986; Layard and Nickell, 1986). The use of a marginal tax wedge instead of the average tax wedge does not alter this result noticeably Despite the negligible effect on overall unemployment, Table 3 reveals that high non-wage labour costs may affect significantly long-term unemployment rates Since the long-term unemployed are often low-paid workers, this result seems consistent with the idea a high tax wedge may affect their employment prospect, especially in those countries where binding wage floors prevent taxes to shift fully on wages Further investigation is, however, needed in this area especially to assess the links between binding wage floors (such as minimum wages) and tax wedges.

Finally, there is no evidence in Table 1 that over the 1983-1993 period changes in the **terms of trade** (equation 4) or changes in the **long-term interest rates** (equation 5) have significantly affected labour market conditions

The persistence of unemployment

Let us now turn to the persistence of unemployment and to its possible determinants This requires, as stressed in the previous section, the extension of the period of analysis to the 1970s and early 1980s The first two columns of Table 5 show the degree of persistence in unemployment for 17 OECD countries over the period 1970-1993 for which data are available They report the probability of accepting the unit-root hypothesis, *i.e* full hysteresis, against the alternative of a stationary process with a constant (column 1) and with a constant and a trend (column 2) The results point to highly persistent unemployment rates in many OECD countries, although in several cases it is difficult to discriminate between the notion of full hysteresis and that of slow adjustment, as also reported in Elmeskov and MacFarlan (1993)

Recalling equation [9] in the previous section, the actual unemployment rate can be expressed as the sum of the short-term equilibrium rate and a cyclical component. The short-term equilibrium rate is a function of lagged unemployment and those factors affecting the long-run equilibrium unemployment, namely the

Table 5. **Unemployment dynamics in OECD countries, 1970-1993**

	Probability of unit root[1] against a stationary process with		Regression results					
			Standard errors of regressions			Persistence (λ)		
	Constant	Constante and drift	Equation 11	Equation 12	AR(1) model with constant and drift[3]	Equation 11	Equation 12	AR(1) model with constant and drift[3]
United States	0 21	0 12	0 53	0 51	1 00	0 64	0 63	0 63
Japan	0 60	0 53	0 50	0 51	0 19	0 64	0 73	0 82
Germany	0 51	0 05	0 47	0 48	0 72	0 84	0 84	0 86
France	0 97	0 34	0 42	0 43	0 56	0 79	0 85	0 83
Italy	0 99	0 02	0 50	0 52	0 51	0 90	0 88	0 65
United Kingdom	0 69	0 37	0 57	0 57	1 15	0 77	0 77	0 86
Canada	0 69	0 12	0 64	0 59	1 04	0 74	0 79	0 71
Australia	0 87	0 14	0 59	0 61	1 02	0 73	0 77	0 63
Belgium	0 89	0 22	0 79	0 77	0 90	0 90	0 89	0 94
Denmark	1 00	0 38	0 61	0 60	0 96	0 72	0 73	0 78
Finland	0 85	0 01	1 36	1 36	1 70	0 80	0 81	1 17
Ireland	0 56	0 20	0 91	0 94	1 22	0 79	0 79	0 82
Netherlands	1 00	0 29	0 56	0 57	0 90	0 81	0 82	0 91
Norway	0 87	0 20	0 36	0 35	0 55	0 75	0 67	0 79
Portugal[2]	0 35	–	0 92	0 92	0 94	0 87	0 89	0 90
Spain	0 93	0 01	1 19	1 20	1 53	0 87	0 87	0 87
Sweden	0 79	0 01	0 80	0 83	0 74	0 77	0 72	0 52

1 Probability of unit root against hypotheses of a stationary process with constant (column 1) or constant and time trend (column 2) The unit root test is based on augmented Dickey-Fuller test using the following specihcatiohs Column 1 $du_t = C_0 + C_1 u_{t-1} + C_i du_{t-1} + e_t$ Column 2 $du_t = C_0 + C_1 u_{t-1} + C_2 du_{t-1} + C_3 \text{Time} + e_t$ where u is the unemployment rate and d is the first difference operator See Campbell and Perron (1991)

2 Higher probability of unit root using a model with constant and drift

3 The model has the form $du_t = A + B_1 u_{t-t} + B_2 \text{Time}$

Source See Annex A

policy and institutional factors – as well as the real interest rates and the terms of trade – considered in the previous section. Furthermore, the coefficient for lagged unemployment *(h)*can be expressed as a function of labour market policy and institutional factors – namely the UB index, the EPL index and the wage-setting variables [37] As for the static specification, two alternative equations are considered, one where union density is complemented by the co-ordination index and another where union density is complemented by the index of centralisation of wage bargaining and its square Equation [9] can therefore be specified as follows

$$u_{it} = \mu_i + \left\{ \begin{array}{l} \alpha_0 + \beta_1 UB_{it-1} + \beta_2 EPL_i + \beta_3 UDENS_{it-1} + \\ \beta_4 (COOR_i, \text{ or, } CLWB_i \text{ and } CLWB2_i) \end{array} \right\} u_{it-1} +$$

$$+ \beta_5 UB_{it} + \beta_6 UDENS_{it} + \beta_7 IRL_t + \beta_8 TERMS_{it} + \beta_9 GAP_{it} + v_{it} \qquad [10]$$

where i indices countries and t the years, μ_i is the country-specific constant and the other acronyms have the same meaning as above

Using non-linear Seemingly Unrelated Regression (SUR) estimators, equation [10] with the co-ordination index yields

$$\begin{array}{llllll} u_{it} = \mu_i + [& -0.69 & +0.002UB_{it-1} & +0.021EPL_i & +0.002UDENS_{it-1} & -0.045COOR_i \;] \; u_{it-1} + \\ & (1934) & (4\,74) & (9\,56) & (3\,56) & (-8\,66) \\ & +0.01UB_{it} & +0.01UDENS_{it} & +0.07IRL_{it} & -0.27TERMS_{it} & -0.32GAP_{it} \\ & (5\,73) & (2\,12) & (9\,70) & (-1543) & (-3252) \end{array} \qquad [11]$$

μ_i = country dummy, No of observations = 391, t-statistics are in parentheses and are computed from heteroscedastic-consistent standard errors

Alternatively, using the indices of centralisation of wage bargaining

$$\begin{array}{llllll} u_{it} = \mu_i + [& -0.36 & +0.001UB_{it-1} & +.0012EPL_i & +0.001UDENS_{it-1} & +0.061CLWB_i \quad -0.003CLWB2_i \;] \; u_{it-1} + \\ & (686) & (279) & (6\,40) & (1\,88) & (8\,37) \quad (-731) \\ & & +0.02UB_{it} & +0.02UDENS_{it} & +0.81IRL_{it} & -0.24TERMS_{it} \quad -0.32GAP_{it} \\ & & (8\,15) & (3\,74) & (10\,12) & (-1333) \quad (-3247) \end{array} \qquad [12]$$

μ_i = country dummy, No of observations = 391, t-statistics are in parentheses and are computed from heteroscedastic-consistent standard errors

Despite their simplicity, the two versions of equation [10] explain a significant fraction of the variation in unemployment rates over a 24-year period. All coefficients are correctly signed and generally significantly different from zero. To assess the quality of these estimates, the third and fourth columns of Table 5 compare the regression standard error for each country based on equations [11] and [12] with those from a simple autoregressive model with constant and drift estimated for each country in isolation The two cross-country structural equations outperform the autoregressive model in 13 cases and only in two cases (japan and Sweden) does the AR model clearly offer better results The last three columns of Table 5 report the estimated degree of persistence which is particularly high in several European countries, *e.g* Belgium, Italy, Portugal, Spain and Germany

These results complement those from the static analysis In addition to affecting equilibrium unemployment, generous unemployment benefits reduce the adjustment speed, which is in line with the observed effect on the duration of unemployment spells, as shown in the LTU equations above Consistent with the insider-outsider hypothesis, strict employment protection legislation as well as high unionisation seem to increase the persistence of unemployment, presumably by raising real wage rigidity. Moreover, the adjustment speed is increased by a higher degree of co-ordination/centralisation in the wage bargaining process. In addition, the parameters for the degree of centralisation of wage bargaining provide further support to the hump-shaped hypothesis Both highly centralised or decentralised systems significantly increase the adjustment speed, suggestive of reduced real wage rigidity containing the build up of persistent unemployment There is also some evidence that both the increase in real interest rates[38] during the 1980s and the deterioration of the terms of trade in the aftermath of the two oil shocks served to raise structural unemployment

Accounting for the differences in level and evolution of structural unemployment

Table 6 summarises the results presented in the previous two subsections Panel A breaks down the difference between each country's structural unemployment rate and the OECD average into its constituent parts, namely differences in ALMPU, unemployment benefits and institutional settings plus a residual which accounts for unobserved country-specific factors The parameters referring to institutional factors include the joint impact of wage bargaining setting and employment protection regulations on unemployment without attempting a further breakdown given the close interactions among these factors The results confirm that differences in the ALMPU stance explain only a small proportion of unemployment differentials, while a marked role is played by the different generosity of the unemployment benefits In particular, in countries like Denmark, Belgium, the Netherlands and France, the UB system may explain as much as 3 to 5 percentage points of the unemployment rate differential In some European countries, high unionisation combined with a lack of co-ordination in the wage bargaining process and stringent employment protection legislation contribute to explain their high unemployment rates These latter results should, however, be evaluated carefully as these variables are defined on the basis of subjective evaluations and do not represent precise estimates of the magnitude of these effects.

The estimated country-specific effects – or unexplained residuals – are presented in the last column of Panel A[39] A positive value means that the included explanatory variables would predict a lower-than-observed unemployment rate, and that other missing variables are needed to explain the remaining unemployment. Along the same lines, a negative estimated value implies that unobserved factors

Table 6. Accounting for the level and rise in structural unemployment

	A Structural unemployment – 1983-1993 (equation 2 in Table 1)						B Rise in structural unemployment (1971-1993) equation 1					
	Estimated structural unemployment rate (u_i)[1]	explaining the difference ($u_i - u_{OECD}$)					Observed change in u_1	explaining the change in structural unemployment (Δu_i)				
		Difference $u_i - u_{OECD}$	ALMPU[3]	UB	Institutional factors[2]	Country-specific effect		UB	Union density	Interest rate	Terms of trade	Country-specific effect
United States	6 7	–0 5	0 3	–1 3	0 7	–0 2	1.1	– 03	– 06	0 8	0 6	0 6
Japan	2 6	–4 5	0 2	–1 6	–3 2	0.1	0 8	–0 2	–0 4	0 8	0 2	0 5
West Germany	5 9	–1 3	–0 6	2 7	–2 5	–0 9	4 6	0 3	0 1	1.7	0 2	2 3
France	9 8	2 7	–0 1	3 0	–2 7	2 4	7 7	1.9	0 1	1.9	0 6	3 1
Italy	8 5	1.3	0 0	–2 8	5 3	– 12	4 2	0 5	0 7	2 5	1.0	– 06
United Kingdom	9 9	2 8	0 0	0 2	4 0	–1 4	4 8	–1 8	–1 5	1.4	0 9	5 8
Canada	9 7	2 5	0 1	1.2	3 2	–2 0	4 4	0 8	0 8	18	0	1.0
Australia	8 5	1.3	0 2	0 9	1.3	–1 0	7 6	1.0	0	1.7	16	3 3
Belgium	9 7	2 5	–0 3	3 6	2 0	–2 8	6 4	1.9	2 1	3 1	– 02	– 04
Denmark	9 7	2 6	–0 3	5 6	–4 8	2 0	9 3	1.5	1.5	1.4	0 5	4 4
Finland	5 7	–1 4	–0 7	2 3	–2 1	–0 9	11 0	3 9	3 3	1.8	–0.1	2 0
Ireland	15 4	8 3	–0 2	1.8	5 2	1.5	9 7	4 9	2 7	1.8	0 2	0.1
Netherlands	9 1	1.9	–0 4	4 5	–1 8	–0 4	5 3	0 8	– 04	2 0	0	2 9
Norway	3 9	–3 2	–0 7	2 2	–4 0	–0 7	4 2	2 4	0 7	1.5	–0.1	– 03
Portugal	6	–1 1	–0 3	1.3	1 2	–3 3	2 2	3 6	– 14	3 1	0 7	– 37
Spain	18 6	11 5	0 3	2 6	1.3	7 3	15 4	6 1	1.7	2 1	0 6	5 0
Sweden	3 1	–4 0	[4]	1.3	–1 8	[4]	3 7	1.1	1.00	1.3	0 1	0.1
OECD-17[5]	7 1						3 6	0 68	–0 23	1.3	0 4	1.5

1 Actual unemployment minus the cyclical component estimated from the coefficient of the output gap
2 Union density (UDENS) the degree of co-ordination (COORI and the index of employment protection legislation (EPI)
3 Based on the estimated coefficients of the equation including Sweden
4 The contribution of ALMPU on the unemployment differential cannot be assessed as Sweden is an outlier in terms of spending for active programme per unemployed person
5 Labour force weighted averages
Source See Annex A

contribute to lower the true unemployment rate. It should be stressed that, overall, only a small portion of the cross-country unemployment rate differentials is left unexplained, the major exceptions being Spain and Portugal where unobserved components account for 40-50 per cent of the total unemployment rates. Other European economies such as Belgium, France and Denmark also have relatively large unexplained residuals In the first case, the model predicted unemployment rates higher than those observed, while in the case of France and Denmark the omitted factors seem to raise unemployment above the predictions of the model The positive country-specific effects of Spain and France can partly be explained by the underestimation of the role of unions in wage bargaining. In both countries union density is very low, yet collective bargaining coverage rates are very high (70 to 90 per cent, respectively) and, in the case of France, they have been growing during the past two decades Moreover, in these two countries, and particularly in France, the effects of binding minimum wage regulations – not considered in this paper – may also account for part of the unexplained residuals

Panel B on the right-hand side of Table 6 gives a breakdown of the rise in structural unemployment from 1971 to 1993 into its constituent parts For each country, the estimated parameters of equation [11] and the actual values of the exogenous variables were used to compute the changes in unemployment that we would expect from the changes in each of the explanatory variables.[40] Hence, Panel B presents Spain, Ireland and Denmark as the economies with the highest increases in structural unemployment, while only negligible increases occurred in Japan and the United States The rise in UB generosity explains a great deal of the increases in structural unemployment, especially in Spain and Ireland. High UB replacement rates have a direct impact on unemployment, as shown in the static analysis, and also a severe impact on the speed of labour market adjustment Falling unionisation rates in many countries lowered unemployment, but the overall effect has been generally limited Higher real interest rates contributed between 1 and 3 percentage points to the increase in structural unemployment, with particularly severe effects in countries such as Portugal, Belgium, Italy and Spain with powerful persistence mechanisms Moreover, the deterioration of the terms of trade affected unemployment only to a limited extent, the main exception being Australia where it accounted for 1.6 percentage point increase in unemployment. As before, country-specific effects are significant, particularly in some European economies where other omitted factors contributed to push up unemployment above the levels predicted by the model For these latter countries further work is needed to explain the rise in structural unemployment over the past two decades

CONCLUDING REMARKS

This paper has offered a number of explanations for the differences in labour market performance across OECD countries over the past two decades. In particular,

it has estimated the relative importance of various labour market policy and institutional factors on both the level and dynamic behaviour of unemployment It will always remain impossible to measure and model, in an entirely satisfactory manner, the wide variety of institutional, cultural and historical factors that influence labour market performances In this paper, unexplained differences and country-specific measurement errors are identified through a country-specific error term, making the estimated impact of *observable* variables on unemployment more accurate and thus offering a better guidance for the assessment of policy reform

The main conclusions of this paper can be summarised as follows

- High levels of **unemployment benefit entitlements** are likely to lead to higher levels of unemployment and reduce the speed of labour market adjustment after an exogenous shock The rise in the replacement rates over the past two decades in several OECD countries is estimated to have accounted on average for 1 to 3 percentage points increase in structural unemployment, although in some cases the effect ha5 been greater
- Strict **employment protection regulations** are likely to raise equilibrium unemployment rates significantly, they appear to have stronger positive effects on youth and long-term unemployment. Likewise, the dynamic analysis points to a significant positive impact of these regulations on the persistence of unemployment.
- The impact of different systems of wage determination on labour market performance is more difficult to assess, not least because of the complexity of the interactions among the different components of each system, and difficulties in measuring them precisely As previous studies have shown, worker bargaining power – proxied by **union density** – seems to be associated with higher unemployment, although the relationship is often weak Reinforcing the notion that youth unemployed are often "outsiders", union density seems to have a particularly strong impact on youth unemployment
- However, union density *per se* offers a very incomplete picture of the wage bargaining system The **co-ordination** among the social partners at the different levels of the bargaining process as well as the level at which wages are negotiated (centralisation/decentralisation) should also be taken into account In particular, co-ordination among employers seems to reduce unemployment levels and increase employment insofar as it offers a mechanism by which labour market pressures are internalised into wage formation, increasing the sensitivity of real wages to unemployment The estimated effects of different degrees of **centralisation of wage bargaining** on unemployment are less clear-cut. Both highly centralised and decentraiised bargaining systems appear to outperform intermediate, semi-centralised bargaining systems These results confirm previous studies and support the idea

that the worst possible organisation of bargaining systems is the *"in-between"* solution of semi-sectoral or sectoral wage bargains where unions compete with each other without internalising the economy-wide costs of higher wages and higher unemployment

- **Active labour market programmes** (ALMPs) appear to have a negative impact on unemployment However, the evidence suggests that increases in spending on ALMPs do not translate into equi-proportional falls in unemployment since the programmes give rise to large substitution and displacement effects on employment. The empirical findings also suggest a robust correlation between ALMPs and non-employment rates, confirming that these policies could have a positive effect of labour force participation, keeping otherwise discouraged workers in the labour force

NOTES

1. Here and in the rest of this paper, we refer to EU-12 and data for Germany refer to Western-Germany.
2. The non-employment rate is the sum of unemployed workers and inactive divided by the total working age population.
3. For simplicity, the impact of unemployment on (log) wages is assumed to be linear in [2]. As often stressed, however, the relationship may be concave insofar as the downward pressure of unemployment on real wages may be decreasing at the margin as unemployment rises.
4. For simplicity, in this example we have assumed that the factors which shifted the WS and LD schedules did not influence either wage flexibility (γ_1) or the elasticity of labour demand (a). Relaxing these assumptions implies that changes in these factors will not only shift the WS and LD schedules but also affect their slopes. Moreover, if participation decisions are also affected, the full-employment schedule (LS) will also shift, thereby affecting the measured level of structural unemployment.
5. As stressed below, several variables proxying policy and institutional factors are not available on a time-series basis but only on a cross-sectional basis (see Annex A).
6. The direct extension of the static equation *[8]* to account for lagged unempioyment effects is not suitable for empirical analysis. The use of OLS would yield biased results in the presence of country-specific effects μ_i (Hsiao, ***1986).*** The common methods of either using dummy variables (as pursued in this paper), or taking first-differences (Nickell, ***198*** 1; Anderson and Hsiao, ***198*** 1) make it impossible to include time-invariant variables (z_i) to account for cross-country differences in u^*_i.
7. 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 the GAP variable produced similar results.
8. The use of a different measure of the GAP based on "potential" output (see Giorno et ***al., 1995)*** did not significantly affect the estimates of the coefficients of the other explanatory variables.
9. Calmfors and Lang ***(1995)*** offer an analytical framework for analysing the macroeconomic effects of active programmes.

10. Heylen (1993) found that increased expenditures for active labour market programmes per unemployed person (as well as a larger share of active spending in total spending) tended to increase the wage responsiveness to changes in open unemployment.

11. A similar approach was also used by Zetterberg (1993) who considered the share of active measures in total labour market expenditures; and by Heylen (1991) who used active expenditures (in purchasing power dollar values) per unemployed.

12. This would occur if active programmes are more effective when unemployment is higher than when it is low, because the risk of raising insiders' strength in wage bargaining is reduced and the possibility of improving the matching process is enhanced (Calmfors, 1994).

13. If active expenditures increase less than proportionally with unemployment, as often observed, the use of per-unemployed measures leads to simultaneity bias that tends to overestimate the impact of ALMP on unemployment. However, no alternative proxy of the active policy stance seems capable of dealing satisfactorily with this problem. For example, the use of a ratio of total spending on ALMP over the labour force (or the wage bill), as in OECD (1993), is likely to lead to simultaneity bias in the opposite direction, as total expenditures *do* increase – albeit less than proportionally – with unemployment. A different strategy would be to use instrumental variables (IV). However, it is generally difficult to find suitable instruments for ALMPU. An attempt was made using total government spending as the instrument for ALMPU, but the approach was not pursued because of the very limited power of the instrument in explaining variations in ALMPU. See also Jackman (1995) and Calmfors and Skedinger (1995).

14. Over the period from mid-1980s to 1993, the correlation between the rate of inflow into active programmes and the unemployment rate was positive in France (0.76), Canada (0.75), Australia (0.66), Denmark (0.93), Ireland (0.73) and Sweden (0.98) and negative only in Germany (–0.70) and the Netherlands (–0.18).

15. At the macro level, studies by Bean (1989), Layard *et al.* (1991) and Layard and Nickell (1992) found a positive association between unemployment and the UB replacement ratio (Bean) on the one hand, and the duration of benefits (Layard and Nickell; Layard *et al.)* on the other. At the micro level there is an extensive literature which mainly points to a significant effect of benefits on unemployment duration; some of the most recent references are reported in OECD (1994*b*, Chapter 8). Pedersen and Westergård-Nielsen (1993) also offer a comprehensive survey.

16. There are at least four key features of any given unemployment benefit system which may have effects on aggregate unemployment and its structural components: *i)* the replacement rates of both "insurance-based" benefits (if available) and social assistance benefits; *ii)* the maximum duration of both types of benefits; *iii)* the iinkages between unemployment benefits and other income support schemes; and finally *iv)* the eligibility conditions and screening procedures for obtaining the benefits. For example, Layard et *al.* (1991) suggest that the fall in British unemployment after 1986 could be partiatiy due to the stricter conditions introduced in the benefit scheme in that year (see Chapter I). By the same token, Abbring *er al.* (1995) found that in the Netherlands transition rates from unemployment to employment were significantly raised by the imposition of

sanctions eg. benefit reductions designed to make the recipient comply with certain rules on search behaviour.

17. The index takes into account three family situations – single worker, married worker with spouse at work and with spouse not at work. However, it does not consider the presence of children in the household nor does it consider housing benefits.

18. The rationale for using U63 in the youth equations is that the duration of unemployment insurance benefits is often related to the previous work experience and many young unemployed workers may not qualify for benefits over the maximum duration.

19. Employment protection regulations include rules governing unfair dismissals, lay-offs for economic reasons, severance payments, minimum notice periods and administrative authorisation for no-fault dismissals.

20. As stressed by Grubb and Wells (1993), all such surveys may offer results which are sensitive to details of wording and interview methods used. See Section IV in their study where several examples of changes in the perception of the strictness of EPL were found even in the context of unchanged regulations.

21. Among others, see Tyrvainen (1995) for empirical simulations of the effects of tax increases under alternative assumptions about the degree of competition in labour markets.

22. However, the hump-shaped hypothesis has also been criticised. In particular, Soskice (1990) claims that Japan and Switzerland were wrongly classified as decentralised by Calmfors and Driffill, ignoring the role of powerfully co-ordinated employer organisations and networks in these countries. If these two countries are re-classified as centralised, Soskice demonstrated – on the basis of only 11 countries – that unemployment will be a monotonic decreasing function of centralisation.

23. In a cross-country study, Rowthorn (1992) confirmed the hump-shaped association between centralisation and unemployment for the 1980s but not for the 1970s. See also Calmfors (1993) for an up-to-date survey of the studies in this field.

24. The collective bargaining coverage rate (the number of workers covered by the terms of collective agreements) is not included because of lack of data for the 1970s and also because of its high correlation with the centralisation index. Evidence suggests, in fact, that the coverage rate is often lower in countries characterised by single-employer bargaining compared with those where wage agreements are set at the sectoral or nation-wide level. See OECD (1994*a*), Chapter 5.

25. The choice of the world real interest rate instead of the domestic rates is also justified by the difficulty in interpreting the very low (or negative) domestic rates prevailing in the 1970s in some OECD countries without considering the concomitant distortions in their capital markets.

26. See for instance, Bruno and Sachs (1985); and Layard and Nickell (1986).

27. The full set of 17 countries includes: United States, japan, Western Germany, France, Italy, United Kingdom, Canada, Australia, Belgium, Denmark, Finland, Ireland, Netherlands, Norway, Portugal, Spain, and Sweden. In the youth unemployment equations, the panel does not include Belgium and Denmark for which data are not available.

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

29. Error-component models assume that the effects of omitted variables reflect individual time-invariant differences. These effects are treated as random variables, in line with the assumption on other components of the random disturbance term (v_{it}). In this context, the overall error term could be written as:

$$\varepsilon_{it} = \mu_i + v_{it}$$

The error-components model offers unbiased and efficient (with respect to fixed-effect) estimators under the assumption that the unobservable elements of the individual component μ_i are not correlated with the observable regressors included in the model. The Hausman (1978) test has the null hypothesis that $E(\mu_i \mid Xi, Zi) = 0$ against $E(\mu_i \mid Xi, Zi) \neq 0$. Under the null hypothesis, Hausman's test statistic is distributed asymptotically as a central chi-square with P degrees of freedom, where P is the number of time-varying regressors. Hausman notes that, under Ho, the GLS achieves the Cramer-Rao lower bounds, but under H1 the GLS estimators are inconsistent and the fixed-effects estimators should be used instead. See also Arellano (1993) for the treatment of correlation of unobsewable individual effects with right-hand-side variables.

30. Details about the statistical information used and data sources are in Annex A.

31. Since the estimated statistics were not too far from the 1 per cent limit, the FGLS estimators were still used because the alternative of using country dummies or *within-group* estimators did not permit to estimate the coefficients of time-invariant explanatory variables. However, since there is a (weak) indication of a possible mis-specification, these results should be evaluated with care.

32. Equation [2] in Table 1 yields u = –0.05 ALMPU + other explanatory variables or, alternatively, u = -0.23 ALMPU + other explanatory variables, if Sweden is excluded from the sample. The ALMPU variable can also be written as (Ep*p)/(u*y), where Ep = expenditures per participant; p = programme participants relative to labour force (in per cent); u = unemployment rate (in per cent); and y = GDP per capita. if u = 8, ALMPU = 22 per cent (or 13 per cent without Sweden) and assuming that p = 3, expenditure per participant as a share of GDP per capita is Ep/y = 58 per cent (or 34 per cent excluding Sweden). Under the additional assumption that all ALMP participants are in the labour force, the implicit differentiation would yield $du/dp \cong -0.45$ {or $\cong -1.48$ without Sweden). Assuming that the labour force is constant and defining *n* as the *regular* employment rate ($n = 100 - u - p$), then $dn/dp = d(100 - u - p)/dp \cong -0.55$ (or $\cong$ 0.48 without Sweden). See also Calmfors (1994) for similar calculations using the results of Layard. *et al.* (1991) and those of Zetterberg (1993).

33. A negative correlation between the employment/population ratio and indices of the "strictness" of EPL is also confirmed in Chapter *6* of the *Jobs Study* (Table 6.9) and, on a more qualitative basis, in a survey by the EC Commission. This latter survey reports that in countries which have relatively strict employment protection (e.g. Italy and Spain), more than half of the firms surveyed reported hiring and firing costs as one of the reasons for not hiring more workers. See EC *Ad Hoc* Survey: Commission of the European Communities, European Economy, No. 47, March 1991.

34. The results for LTU confirm previous findings by Heylen (1991) and **OECD** (1993, Chapter 3).

35. Similar results were obtained by Layard and Nickell (1992) and Layard *et al.* (1991).

36. The estimated coefficients suggest a peak at a CLWB value of 12, which corresponds to the United Kingdom. For Italy, Japan, the United States and Canada, increased decentralisation would lower unemployment, whilst for the other countries increased centralisation would reduce unemployment.

37. ALMPU has not been included because of lack of data for the 1970s and early 1980s.

38. It should be stressed, however, that the real interest rate variable is likely to play the role of a shift variable in equations [11] and [12], as it was very low in the 1970s and significantly higher in the 1980s, when structural unemployment was also higher. Therefore, the estimated positive impact of interest rates on unemployment may be partially spurious as it may simply reflect a change in regime which depends upon other omitted factors such as e.g. productivity growth.

39. The country-specific effects (μ_i) can be derived as follows:

$$\hat{\mu}_i = \left(\frac{\sigma_\mu^2}{\sigma_\varepsilon^2} \right) j'_T \, (y_i - X'_i \, \hat{\beta} - Z'_i \, \hat{\gamma})$$

where $j'_T = (1, 1, \ldots 1)$; σ_μ^2 is the variance of μ, and $\sigma_\varepsilon^2 = T\sigma_\mu^2 + \sigma_v^2$; μ is the random country-specific effect and v is the usual error term.

40. Equation [11] was simulated dynamically over the entire period, with each exogenous variable in turns taking its actual value while the others were kept constant. The 1970 initial condition for each country's unemployment rate was set equal to the long-run steady state equilibrium rates, as derived from the parameters of equation 11 and the observed values of the exogenous variables in 1970.

Annex A

DESCRIPTION OF THE VARIABLES

Descriptive statistics of the variables used in this paper are included in Table A.1. The text below presents the methods used to derive the variables and information on the data sources.

Table A 1 **Characteristics of the annual data of the OECD countries**

Variables	(average values for the 1983-1993 period)				(average values for the 1970-1993 period)			
	Mean	Standard deviation	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum
UNST	8 41	4 81	1 46	22 40	601	4 07	0.03	22.39
NER	35 60	9 92	18 25	56 51				
YUR	16 55	10 43	3 20	43 80				
LTU	3 50	3 24	0 08	12 52				
ALMPU	22 0Q	26 46	5 13	107 29				
UB	31 45	15 01	0 75	60 91	31 10	16 20	0.77	69.60
UB2	19 00	1300	0 00	47 00				
UB3	55 00	24 00	2 30	93 00				
EPL	7 14	4 45	0 36	14 25	7 14	4 45	0 36	14 25
UDENS	38 23	20 82	8 24	83 36	43 53	17 73	8 24	83 36
ECOOR	1.81	0 86	1 00	3 00	1.81	086	1 00	3 00
UCOOR	1 90	0 73	1 00	3 00	1 90	0 73	1.00	300
COOR	3 71	152	2 00	6 00	3 71	152	200	6 00
CLWB	10 14	4 74	2 00	1700	10 14	4 74	2 00	17-00
GAP	–0 01	2 10	–4 88	7 07	0 13	2 00	–6.23	7 07
TWEDGE	41 05	10 72	16 32	59 07				
COMP	5 64	2 83	137	14 27	5 30	266	1.22	2.74
TRESTR	0 94	0 35	0 37	1 62				
INTER	0 45	0 25	0 09	107				
IRL	5 11	0 87	3 43	6 76	3 10	2 59	–0.76	6.76
TERMS	5 25	2 63	132	11 84	5 29	265	1.22	2.74

Source See text in Annex A

UNST = For all but Denmark, standardised unemployment rates are from Labour Force Surveys (LFS). Since LFS data were not available for the 1970s, the unemployment rates for Denmark refer to registered unemployed and are from the OECD Economic Outlook (various issues). The unemployment rates have been adjusted in order to reduce the number of breaks in the series for the different countries.

Source: OECD, Directorate for Education, Employment, Labour and Social Affairs (DEELSA).

YUR = Youth unemployment rate; individuals from 15/16 to 24 years of age. Data are from Labour Force Surveys.

Source: OECD-DEELSA

LTU = Long-term unemployment rate; individuals with unemployment spell longer than 12 months to the labour force. Data are from Labour Force Surveys.

Source: OECD-DEELSA.

NER = Non-employment rates. The share of the working-age population which is either unemployed or inactive.

Source: OECD-DEELSA

GAP = output gap;

$$GAP = \left(\frac{Ao}{To} - 1 \right) * 100$$

where:

Ao = actual output; see OECD ADB database

To = trend output. It is based on a GDP smoothing approach using an Hodrick-Prescott Filter. A value of $\lambda = 25$ was used for most of the countries. See Giorno *et al.* (1995) for more details

Source: OECD Analytical Database (ADB).

ALMPU = expenditures for active labour market programmes per unemployed person relative to GDP per capita (in per cent);

$$ALMPU = \frac{\frac{ALMPex}{U}}{\frac{GDP}{Pop}}$$

ALMPex = expenditures on active labour market programmes (see *OECD Employment Outlook – 1993,* Annex 2.B, for details).

Pop = working age population

U = total registered unemployed

Source; OECD, *Employment Outlook,* various issues and OECD ADB.

UB = the average of the unemployment benefit replacement rates for two earnings levels, three family situations and three duration categories of unemployment Information on replacement rates in the OECD database is only available for odd-numbered years. Even-numbered years were calculated using linear interpolation. After-tax replacement rates were obtained from the OECD *lobs Study* (Annex 8.B) interpolating the ratios (net/gross rates) for 1971, 1981, 1991. After-tax replacement rates for 1992 and 1993 were calculated using the 1991 ratios (net/gross rates)

Source: OECD *Database on Unemployment Benefit Entitlements and Replacement Rates;* and OECD *lobs Study,* Annex 8.B.

UB2 = as UB but including only replacements rates for spells longer than one year.

UB3 = as UB but including only replacement rates for the first year of unemployment.

EPL = index of the "strictness" of employment protection legislation. The index is the average of two rankings for regular and fixed-term contract workers, respectively The index refers to 1989

Source: OECD (1994), *The OECD lobs Study,* Table 4.7, second column.

ECOOR = extent of inter-firm co-ordination in the process of wage bargaining. The index varies from 1 to 3, with 3 referring to maximum co-ordination, both here and in UCOOR.

Source: Layard *et al.* (1991), Chapter 1

UCOOR = extent of inter-union co-ordination in the process of wage bargaining. It is also graded from 1 to 3.

Source: see ECOOR.

COOR = ECOOR + UCOOR

CLWB = ranking of the degree of centralisation of wage bargains. The lower the position in the ranking, the higher is the degree of centralisation.

Source: Calmfors and Driffill (1988), Table 11.

UDENS = the proportion of workers who are members of trade unions. Available observations refer to 1970, 1980 and 1990 (see footnote to Table 5.7 of the OECD *Employment Outlook – 1994* for country details). Missing observations were calculated by a linear interpolation.

Source: OECD Employment Outlook – 1994, Chapter 5, Paris.

TWEDGE = the ratio between the total value of employers' social security contributions, employees' social security contributions and personal income tax plus the amount of consumption tax typically paid if all post-tax income is consumed and gross earnings plus employers' social security contributions

Source: OECD (1995), *The Tax/Benefit Position of Production Workers*, Paris; Tyrvainen (1996).

COMP = index of exposure to foreign competition:

COMP = Xi + (1 – Xi) MP

where:

Xi = index of export intensity (ratio of exports to GDP);

MP = index of import penetration (ratio of imports to apparent consumption, that is, domestic production minus exports plus imports).

Source: OECD (1995*a*), The OECD ADB.

TRESTR = the index of pervasiveness of trade restrictions reported in Table B.1 in Annex B.

INTER = (COMP * TRESTR)/100

IRL = GDP-weighted average of real long-term interest rates. The latter were estimated as the difference between nominal long-term interest rates and expected inflation. Nominal long-term interest rates are yields on benchmark public sector bonds of around 10 years maturity. Expected inflation are generated using the low-frequency component of the annual percentage change in the GDP deflator using a Hodrick-Prescott filter In the filtering process, a lambda value of 1600 was used

Source: OECD ADB.

TERMS = weighted terms of trade. The terms of trade are calculated as the ratio of export unit value and import unit value; data are multiplied by the average (1970-1993) value of COMP.

Source: OECD ADB.

Annex B

INDICATORS OF THE PERVASIVENESS OF TRADE RESTRICTIONS

A number of summary indicators reflecting the level, pattern and pervasiveness of tariffs and non-tariff barriers (NTBs) have recently been computed by the OECD Three indicators have been used in this paper to define our measure of the pervasiveness of trade restriction (TRESTR).

To capture the main features of each country's tariff structure, we used:

- The overall simple average ad *valorem* Most Favoured Nation (MFN) tariff rate.
- The overall standard deviation (SD) for all tariff lines

To capture the pervasiveness of NTBs we used

- The overall frequency ratio of "core" NTBs.

The simple MFN tariff rate captures the average *level* of protection afforded to specific groups of domestic products and thus sheds some light on the potentially distorting effects on domestic resource allocation, particularly between tradeable and non-tradeable sectors The *dispersion* of tariff rates across all products and within specific groups of products sheds some further light on the potential distortions in economic efficiency [1] For any given level of average tariff, the greater the overall and particularly the within groups (of similar, and consequently substitutable products) variability, the greater the likelihood that resources are mis-allocated due to distorted consumers' and producers' decisions.

The frequently ratio for "core" NTBs indicates the proportion of national tariff lines that are affected by this particular group of NTBs [2] Thus, it indicates the *existence* of NTB measures, without providing any indication of their actual restrictiveness or impact on prices and economic efficiency Nevertheless, the NTBs indicator can be used to shed some light on the patterns of NTBs within OECD countries and to highlight the sectors in which they are concentrated

THE SUMMARY INDEX

Columns 1 to 3 in Table B.1 report the 1988 country averages of tariff rates, the variability of tariffs and NTBs, respectively. These averages have been calculated from sectoral data involving a breakdown of the manufacturing sectors in 36 (ISIC) branches plus agriculture.[3]

The simple country-averages of tariffs and NTBs may not be an accurate indicator insofar as the relative importance of the different sectors affected by tariffs and NTBs vary greatly across OECD countries. To assess the overall protection afforded by both tariffs and NTBs, columns 4 to 6 in Table B.1 report weighted tariff averages and NTB coverage ratios based on each sector's share in value-added.[4] EU countries

Table B.1. **Summary indicators of the pervasiveness of tariff and non-tariff trade barriers in a selected group of OECD countries**

	1	2	3	4	5	6	7
	Most favoured nation tariffs		Core Non-tariffs barriers	Weighted average[1]			Summary index (%)[2]
				Most favoured nation tariffs		Core Non-tariff barriers	
	Mean	Standard deviation	Frequency ratio	Mean	Standard deviation	Frequency ratio	
United States	6 6	9.2	25 5	1.0	0 8	14 5	94 6
Japan	6 9	8.8	14 7	1.6	0 7	3 2	57 3
Germany	7 5	6.1	25 4	2 8	0.8	16 1	125 7
France	7 5	6.1	25 4	1.9	0 6	16 1	107 8
Italy	7 5	6.1	25 4	2 1	0 6	16 9	113 2
United Kingdom	7 5	6.1	25 4	1.9	0 6	15 9	105 1
Canada	9 1	8.8	8 9	1.7	0 6	5 5	62 4
Belgium	7 5	6.1	25 4	1 7	0 5	16 2	101 8
Denmark	7 5	6.1	25 4	1 6	0 6	15 9	100 2
Finland	7 7	10.1	10 3	1 4	0 4	6 8	56.0
Ireland	7 5	6.1	25 4	3 6	1.3	18 5	61 6
Netherlands	7 5	6.1	25 4	2 2	0 8	15 9	15 6
Norway	5 7	6.8	8 7	0 7	0 2	5 6	36 8
Portugal	7 5	6.1	25 4	2 9	0 8	18 9	37 3
Spain	7 5	6.1	25 4	2 7	0 9	17 2	31 0
Sweden	4 7	4.8	20 6	0 7	0 2	12 4	62 0
Australia	11 0	10.1	15 9	2 1	0 6	9 5	83.5

1 industry average tariffs and NTBs weighted by each sectors share of total value added
2 The weighted average of the normalised values of colums 4-6 where the weights for the MFN tariff and SD were 0 5 and the weight for NTBs was 1 Data were normalised by setting the cross-country average equal to 100
Source See text in Annex B

differ in the weighted averages, despite the common EU trade policy, because of the different sectoral composition of their economy.

The final step of our exercise was to extract from the weighted averages of tariffs and NTBs a summary index which could account for the overall potentially distorting effects of trade policy. This summary index is presented in column 7 of Table B.1: it is a weighted average of the normalised values of columns 4 to 6. It is obviously difficult to assess on a *priori* grounds the relative importance to tariffs and NTBs on prices and economic efficiency. Our choice of the weights assigns equal importance to tariffs and NTBs (*e.g.* weight = 1 in both cases). For tariffs, however, both the level and variability are considered *(e.g.*each of the two measures receive a weight of 0.5).

NOTES

1. It should be stressed that a uniform nominal tariff (or uniformly restrictive NTB) minimises the net welfare cost of such protection only if import demand elasticities are uniform across commodities, there are not intermediate inputs and cross-price effects are negligible.
2. See OECD (1996) for more details on the definitions of "core" NTBs.
3. The estimation of value-added-weighted tariffs and NTBs required: *i)* the establishment of concordances between the commodity-based Harmonised System (HS) in which data were originally available and the production-based ISIC code; *ii)* the aggregation of the resulting data at the level of the 36 manufacturing branches for which detailed information is available in the OECD-STAN database plus agriculture; and, iii) the computation of value-added weights for the 36 + 1 sectors.
4. Value-added weigths avoid the downward bias inherent in import-weighted indicators, although they may imply that highly-protected sectors are over represented. See **OECD** (1996).

Annex C

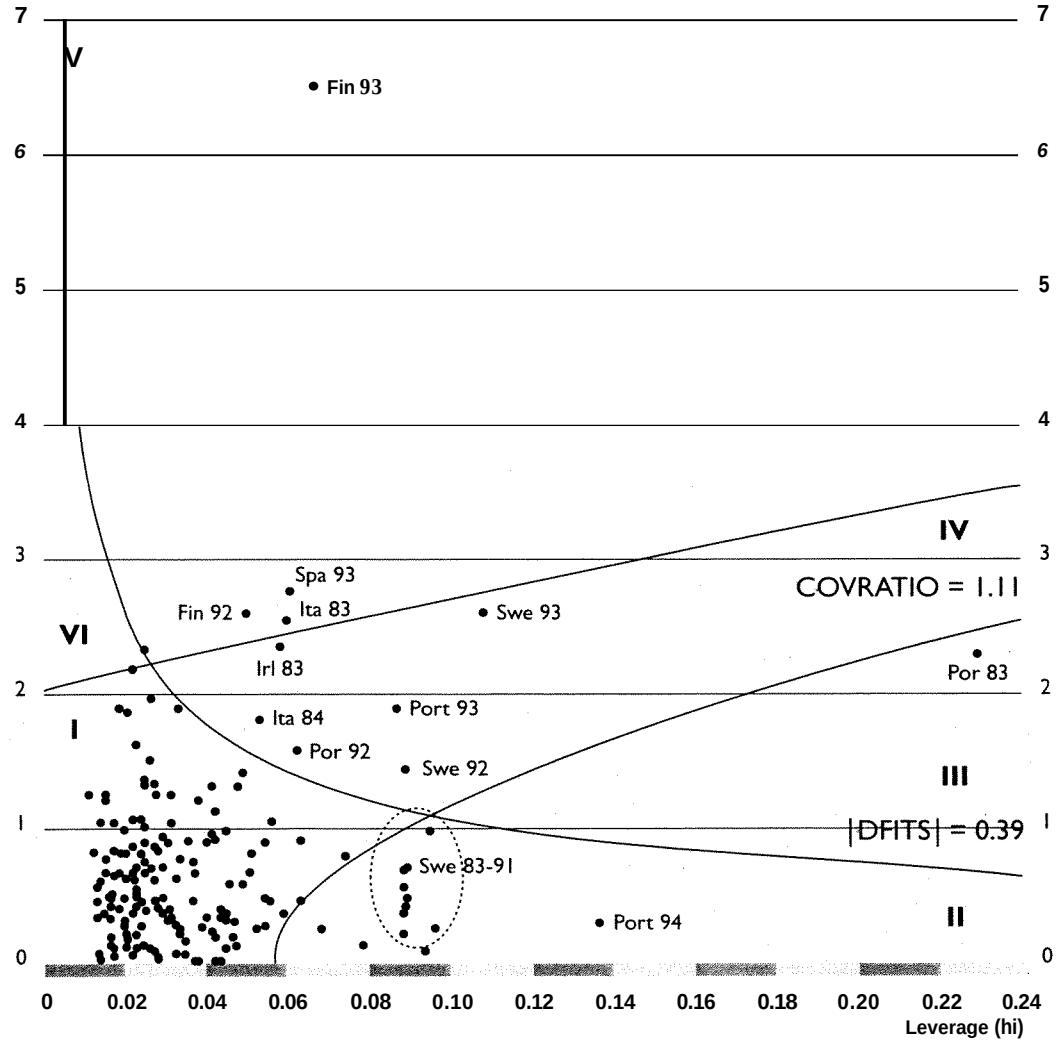
SENSITIVITY ANALYSIS

OUTLIERS AND INFLUENTIAL DATA

In any empirical investigation – and particularly those based on a small panel of cross-section time-series data – it is important to identify subsets of the data that appear to have a disproportionate influence on the estimated equation The objective of this section of the annex is to identify these data points and assess their impact on the estimated parameters. As suggested by Fiebig (1987), a distinction should be made between outliers and influential data The first group includes those observations which appear to be inconsistent with the remainder of the data set and are generally identified by large standardised residuals Influential points are those that affect significantly the inference drawn from a data set [1] Two indicators are used to identify outliers and influential observations (see Belsley *et* al, 1980; Fiebig 1987):

- To identify outliers we used the *studentised residuals* (r_i). This is obtained by considering a mean-shift outlier model in which the basic equation is augmented by a dummy variable d, that has the ith element equal to one and all other elements zero The studentised residual r_i is the t-statistics of the dummy variable and values above 2 indicate possible outliers
- To identify influential observations we used the *leverage points* (h_i) identified by the diagonal elements of the least-squared projection matrix, also called the hat matrix -The leverage points h, proxies the distance between the ith observation and the centre of the data. Belsley *et al* (1980)suggest a size-adjusted cut-off value at 2p/nobs, where p is the number of explanatory variables and nobs is the total number of observations

Using the results of equation 2 in Table 1 as a benchmark, Figure C 1 plots the magnitude of r_i against h,, the so called leverage-residual plot, (Fiebig, 1987) Points which are not outliers nor influential are clustered around the origin of the axes while disparate observations are characterised by large residuals or large leverage or a combination of both factors In order to isolate better these observations two regression diagnostics are also superimposed on the LR plot, namely the DFITS (in absolute values) and the COVRATIO which can both be expressed as a function of r,



Source: OECD

and h_i. DFITS measures the influence of an individual observation on the predicted dependent variable or fitted values When the deletion of a single observation causes a significant change (see below) in the predicted value, it deserves further attention COVRATIO is the ratio of the covariance matrix of the estimated coefficients obtained when the ith row has been deleted and the covariance matrix obtained with all the data. Therefore, COVRATIO measures the effect of an individual observation on the efficiency of the coefficient estimation A COVRATIO value

lower than unity indicates a reduction in the efficiency, while a value greater than unity indicates increased efficiency.

The size-adjusted cut-off value for |DFITS| is $2\sqrt{p/nobs}$ (equal to 0 39 in our case), while the size-adjusted cut-off values for COVRATIO are $1 \pm 3p/nobs$ (equal to 0 89 and 1 11 in our case), see Belsley *et al* (1980) The iso-influence contours for DFITS and COVRATIO in Figure C I identify six regions Region I contains points which are neither influential for DFITS nor for COVRATIO This is the region where most of the observations are concentrated Region II comprises points which have high leverage but small residuals These points improve the efficiency even if they may affect significantly the estimates of specific parameters (see below) Region III includes points with high leverage but not too large residuals For points in Region IV, residual and leverage are both relatively large but in terms of COVRATIO the two effects tend to offset each other They are worth further examination, even if they are not likely to affect significantly the estimated parameters Region V comprises points with a high residual, while Region VI identifies points which are characterised by a high residual but low leverage Points in this region are important for COVRATIO but not for DFITS

Within this framework, Figure C.1 indicates 6 data points as particularly influential: Port83, Port84, Fin92, Fin93, Ita83 and Spa93. In particular, the Portuguese data for I983 seem to be disparate because of both large residuals and leverage; the Portuguese data for 1984, on the contrary, have small residuals but significant leverage; the Finnish data for 1993 have very large residuals but low leverage; and, finally, the data for Finland 1992, Spain 1993 and Italy 1983 have all significant residuals but are not particularly influential for the efficiency of the coefficient estimates Furthermore, data for Sweden for the 1983-1991 period have all COVRATIO exceeding the cut-off The latter, however, have low residuals and thus do not affectthe overall results of the regression significantly

Since our interest is mainly on the influence of each of these data points on the estimated individual coefficients, Table C 1 reports several diagnostics, including the DFBETAS which measure the change in each individual coefficient resulting from the deletion of each of these data points

Data for Finland for the 1992-1993 period have a significant impact on most of the coefficients This is due to the very sharp increase in unemployment rates during these two years when unemployment rose by 10 percentage points to 17.7 per cent The Portuguese data also affect some of the estimated coefficients, albeit for the opposite reason to that of Finland In Portugal, the unemployment rate declined during the 1980s to 5-6 per cent, despite the relatively stable labour market and institutional setting there and the growing unemployment rates in the most of the other European economies. It is also noticeable that the Swedish data, albeit not effecting the overall fit, do affect the estimated coefficient for ALMPU,

Table C 1. **Regression diagnostics**

Observation	hi	|ri|	DFBETAS					
			almpu	ub	epl	udens	coor	gap
Italy 1983	0 06	2 54'	0 12	0 112	−0469'	−0 361*	0 307'	0 053
Finland 1992	0 05	2 59'	−0 162*	0 14	0 056	0 151'	0 168*	-0415'
Finland 1993	0 07	651'	−0.401*	0266'	0 12	0.316*	0 476'	−1375*
Ireland 1983	0 06	2 33'	−0014	−0 366*	−0036	−0416'	0 405'	0 054
Portugal 1983	0 229'	2 308'	−0287'	−0.995*	0305'	0 49'	0 048	0 266'
Portugal 1984	0 136*	0 297	−0023	−0085	0 033	0 035	0 003	−0 026
Spain 1993	0 062	2 775'	0 095	0 327*	0 22*	−0 359'	−0 129	−0 336'
Sweden 1983	0 095*	0 982	−0282'	−0013	0 026	0 057	0 032	0 084
Sweden 1984	0 089'	0 233	−0 065	0 003	0 006	0 01	0 007	0 003
Sweden 1985	0 09'	0 49	−0 136	0015	0 013	0 023	0.012	0 01
Sweden 1986	0 088'	0 701	−0 193'	0006	0015	0 023	0 024	0012
Sweden 1987	0 088'	0 564	−0 153*	−0006	0 009	0 006	0 026	−0014
Sweden 1988	0 089*	0 435	−0 117	0 003	0 007	0 002	0019	−0 02
Sweden 1989	0 094*	0 09	−0 024	0 002	0 001	0 000	0 004	−0 008
Sweden 1990	0 097*	0 254	0067	−0006	−0003	0 003	−0012	0 026
Sweden 1991	0 089'	0 356	0094	−0005	−0005	0 003	−0 016	0013
Sweden 1992	0 089*	1436	0382'	−0045	−0026	−0 008	−0 053	−0 048
Sweden 1993	0 108'	2 605'	0721'	−0 114	−0.063	−0 073	−0 071	-0 388*

The estimates are based on equation 2 in Table 1 See the text for details on the calculation of the different indices
* Exceeds cutoff values $|ri| > 2\,0$, $hi > 0\,0749$ $(2p/nobs)$; $|DFBETAS| > 0\,146$ $(2/\sqrt{(nobs)})$ *Nobs = number of observations. p = number of explanatory variables*
Source See text in Annex C

which is no surprise since this country spent almost four times as much on active programmes as the OECD average.

INTERACTIONS BETWEEN EXPLANATORY VARIABLES

Table C 2 reports the changes in the estimated coefficients obtained by deleting one explanatory variable in turn This exercise is useful to see whether the effect of each variable on unemployment is enhanced (reduced)by the omission of other regressors. In broad terms, the table suggests that the omission of one aspect of the bargaining process reduces the significance of the others Moreover, the estimated effect of EPL on unemployment is strongly affected by the inclusion/exclusion of the unemployment benefit variable and the wage bargaining variables

Table C.3 sheds some further light on the interactions between the different factors characterising the wage bargaining process Two equations are used. one considering the co-ordination index and three indexes accounting for the interactions between union density and the different levels of co-ordination, alternatively, the index of centralisation is used together with three indexes accounting for the

Table C.2. **Changes in estimated coefficients due to changes in model specification**[1]

Panel A

	Excluded variables					
	ALMPU	ALMPU + UB	EPL	UDENS	COOR	COOR + UDENS
ALMPU			NC	NC	HC HS	HC HS
UB	NC		NC	NC	NC	LC LS
EPL	NC	LC LS		LC LS	LC LS	LC LS
UDENS	NC	LC LS	NC		LC LS	
COOR	HC	HC HS	HC LS	LC LS		
CAP	NC	NC	NC	NC	NC	NC

	ALMPU	ALMPU + UB	EPL	UDENS	CLWB + CLWB2	CLWB + UDENS
ALMPU			LC LS	NC	HC HS	HC HS
UB	NC		NC	NC	NC	NC
EPL	NC	LC LS		LC LS	LC LS	LC LS
UDENS	NC	LC LS	NC		LC LS	
CLWB	NC	NC	NC	LC		
CLWB2	NC	NC	NC	LS		
GAP	NC	NC	NC	NC	NC	NC

interaction with the union density In this second case, the original CLWB ranking of countries is replaced by a simpler index which identifies low, medium and high centralisation (CORP1, CORP2 and CORP3, respectively)[2] The co-ordination variables seem to have a strong role to play in the bargaining process, regardless of the level of union density The interaction between union density and the degree of

Table C 3 **Estimates of reduced form unemployment rates equations *1983-1993*[1]**

(interactions between union density and co-ordination
and between union density and the centralisation of wage bargaining)
Feasible generalised least squares

Explanatory variable	Equation version number	
	1	2
ALMPU	**–0.08****	**–0.09****
	–2 06	*-2 02*
UB	**0.11*****	**0.14*****
	5 08	*6 09*
EPL	**0.39***	**0.09**
	1.9	*0 49*
COOR2	**–1.59**	
	–0 49	
COOR3	**–9.75***	
	–1 81	
INTER1	**0.16*****	
	2 97	
INTER2	**0.08*****	
	2 74	
INTER3	**0.13***	
	195	
CORP2		**–4.12**
		–1 4
CORP3		**–18.37****
		–2 02
INTER4		**0.03**
		0 7
INTER5		**0.15*****
		4 79
INTER6		**0.24****
		2 **03**
GAP	**–0.52*****	**–0.52*****
	–16 1	*–16 14*
Adj R^2	0 95	*0* 95
SEE	0 92	0 91
N of observations	181	181
N of countries	17	17

1 t-statistics in italics
The dummies are as follows COOR2 = intermediate level of co-ordination COOR = 2 COOR3 = high co-ordination COOR = 3 CORP2 = intermediate level of centralisation of wage bargaining CORP3 = high level of centralisation of wage bargaining INTER1 = UDENS * COOR1 INTER2 = UDENS * COOR2 INTER3 = UDENS * COOR3 INTER4 = UDENS * CORP1 INTERS = UDENS * CORP2 INTER6 = UDENS * CORP3
Source see Annex A

centralisation of the bargaining process is more complex, as also suggested by the hump-shaped hypothesis discussed in the main text. Intermediate levels of bargaining, *(i.e.* at the level of industry) seem to be always associated with higher unemployment. High centralisation seems to contribute to contain unemployment pressure: taking into account the estimated coefficient for CORP3 and the interaction

factors (INTER1 to INTER3), the impact of greater centralisation is negative, that is, it will reduce unemployment until unionisation is below 60 per cent. After this limit is passed (only Denmark, Finland and Sweden have more than 60 per cent of the work force unionised), worker bargaining power tends to offset the benefits accruing from centralisation Decentralised systems too, are associated with lower unemployment.

NOTES

1. It should be stressed that the concepts of outliers and influential data do not overlap: an observation may be an outlier but not overly influential or may be influential even if associated with a small standardised residual.
2. Following Calmfors and Driffil (1988) and the OECD *Employment Outlook – 1994* (Table 5.1), the 17 countries of the panel have been classified as follows: low centralisation (CORP1) United States, Japan, Italy, United Kingdom, Canada; medium centralisation (CORP2) Germany, France, Belgium, Ireland, Netherlands, Portugal, Spain and Australia; high centralisation (CORP3) Denmark, Finland, Norway and Sweden.

BIBLIOGRAPHY

ABBRING, J.H., G.J. VAN DEN BERG and J.C. VAN OURS (1995), "The effect of unemployment insurance sanctions on the transition rate from unemptoyment to employment", mimeo, January.

ALOGOSKOUFIS, G., C. BEAN, G. BERTOLA, D. COHEN, J. DOLADO and G. SAINT-PAUL (1995), "Unemployment: Choices for Europe", CEPR, *Monitoring European Integration,* No. 5.

ANDERSON, T.W. and C. HSIAO (1981), "Estimation of dynamic models with error components", *journal of American Statistical Association,* Vol. *76.*

ARELLANO, M. (1993), "On the testing of correlated effects with panel data", *journal of Econometrics,* No. *59.*

ATKINSON, A.B. and J. MICKLEWRIGHT (1991), "Unemployment compensation and labour market transitions: a critical review", *journal of Economic Literature,* No. **4,** Vol. XXIX, December.

BEAN, C. and J.S. SYMONS (1989), "Ten years of Mrs. T.", *NBER, Macroeconomics* – Annual *1989,* MIT Press.

BEAN, C. (1994), "European unemployment: a survey", *journal of Economic Literature,* No. **2,** Vol. XXXII, June.

BELSLEY, D.A., E. KUH, and R.E. WELSCH (1980), *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity,* New York, John Wiley & Sons.

BENTOLILA, S. and J.J. DOLADO (1994), "Labour flexibility and wages: lessons from Spain", *Economic Policy,* No. *18,* April.

BERTOLA, G. (1990), "Job security, employment and wages", *European Economic Review,* No. *34.*

BERTOLA, G. (1992), "Labour turnover costs and average labour demand", *journal of Labour Economics, No. 4.*

BLANCHARD, O. and N. KIYOTAKI (1987), "Monopolistic competition and the effects on aggregate demand", *American Economic Review, Vol. 77.*

BLANCHARD, O. and J.F. JIMENO (1995), "Structural Unemployment: Spain versus Portugal", *American Economic Review, Papers and Proceedings,* Vol. *85.*

BRUNO, M. and J. SACHS (1985), *Economics of Worldwide Stagflation,* Basil Blackwell, Oxford.

CALMFORS, L. (1993), "Centralisation of wage bargaining and macroeconomic performance: a survey", *OECD Economic Studies,* No. **21,** Paris.

CALMFORS, L. (1994), "Active labour market policy and unemployment – a framework for the analysis of crucial design features", *OECD Economic Studies,* No. **22,** Spring.

CALMFORS, L. and J. DRIFFILL (1988), "Bargaining structure, corporatism and macroeconomic performance", *Economic Policy,* April, No. **6.**

CALMFORS, L. and H. LANG (1995), "Macroeconomic effects of active labour market programmes in a union wage-setting model", *The Economic Journal,* May.

CALMFORS, L. and R. NYMOEN (1990), "Real wage adjustment and employment policies in the Nordic countries", *Economic Policy,* No. 11.

CALMFORS, L. and P. SKEOINGER (1995), "Does active labour market policy increase employment? Theoretical considerations and some empirical evidence from Sweden", *Oxford Review of Economic Policy,* No. 1.

CAMPBELL, J.Y. and P. PERRON (1991), "Pitfalls and opportunities: what macroeconomists should know about unit roots", NBER *Macroeconomics.*

ELMESKOV, J. and M. MACFARLAN (1993), "Unemployment persistence", *OECD Economic Studies,* No. **21,** Paris.

EMERSON, M. (1988), "Regulation or deregulation of the labour market: policy regimes for the recruitment and dismissal of employees in the industrialised countries, *European Economic Review,* No. **32.**

FIEBIG, D.G. (1987), "Diagnostic checking in practice: the case of outliers and influential data", University of Sydney, Australia.

GEROSKI, P., P. GREGG and J. VAN REENEN (1996), "Market imperfections and employment", *OECD .Economic Studies,* No. **26,** Paris.

GIORNO, C., P. RICHARDSON, D. ROSEVEARE and P. VAN DEN NOORD (1995), "Estimating potential output, output gaps and structural budget balances, OECD, *Economics Department, Working Papers,* No. 152.

GRUBB, D. and W. WELLS (1993), "Employment regulation and patterns of work in EC countries", *OECD Economic Studies,* No. 21.

HAUSMAN, J.A. (1978), "Specification tests in econometrics", *Econometrica,* Vol. 46, No. 6.

HAUSMAN, J.A. and W.E. TAYLOR (1981), "Panel data with unobservable individual effects", *Econometrica,* Vol. **49,** No. **6.**

HEILEN, F. (1991), "Long-term unemployment in the OECD countries – insiders, outsiders and labour market policy", paper for EALE Conference in Madrid.

HEILEN, F. (1993), "Labour market structures, labour market policy and wage formation in the OECD", *Labour,* Vol. **7.**

HOLMLUND, B. (1991), "Unemployment persistence and the insider-outsider forces in wage determination", *OECD Economics Department Working Paper* No. **92.**

HONDA, Y, (1985), "Testing for error components model with non-normal disturbances", *Review of Economic Studies,* Vol. LII.

HSIAO, C. (1986), Analysis of Panel Data, Cambridge University Press, Cambridge.

JACKMAN, R. (1995), "What can active labour market policy do?", Centre for Economic Performance, London School of Economics, Discussion Paper No. 226.

JACKMAN, R., R. LAYARD and S. NICKELL (1996), "Structural aspects of OECD unemployment", paper presented at the OECD Conference on "Interactions Between Structural Reform, Macroeconomic Policies and Economic Performance", 18-19 January, Paris.

LAYARD, R. and S. NICKELL (1986), "Unemployment in Britain", *Economica*, Vol. 53.

LAYARD, R., S. NICKELL, and R. JACKMAN (1991), Unemployment: Macroeconomic Performance and the Labour Market, Oxford University Press, Oxford.

LAYARD, R. and S. NICKELL (1992), "Unemployment in the OECD countries", LSE, Centre for Economic Performance, Discussion Paper No. 81, June.

LAZEAR, E. (1990), "Job security provisions and employment", *Quarterly* Journal *of* Economics, Vol. CV.

LINDBECK, A. and D.J. SNOWER, (1986), "Wage-setting, unemployment and insider-outsider relations", American Economic Review, May.

MANNING, A. (1991), "Productivity growth, wage setting and the equilibrium rate of unemployment", paper presented at the NBER Conference on "Unemployment and Wage Determination", October.

MARTIN, J.P. (1996), "Measures of replacement rates for the purpose of international comparisons: a note", *OECD* Economic Studies, No. 26.

MEYER, B.D. (1995), "Lessons from the US unemployment insurance experiments", Journal *of* Economic Literature, March.

NICKELL, S. (1981), "Estimating dynamic models with fixed effects", Econometrica, Vol. 49.

OECD (1989), Economies in Transition: Structural Adjustment in the *OECD* Countries, Paris.

OECD (1990), Labour Market Policies for the *1990s*, Paris.

OECD (1991), Employment Outlook, Paris.

OECD (1993), Employment Outlook, Paris.

OECD (1994*a*), Employment Outlook, Paris.

OECD (1994*b*), The OECD Jobs Study, Paris.

OECD (1995*a*), *The* OECD STAN Database for Industrial Analysis, Paris.

OECD (1995*b*), Industry and Technology: Scoreboard *of* Indicators, Paris.

OECD (1996), *Indicators* of Tariffs and Non-Tariff Barriers to Trade in *OECD* Countries, forthcoming, Paris.

PEDERSEN, P.J. and N. WESTERGARD-NIELSEN (1993), "Unemployment: a review of the evidence from panel data", OECD Economic Studies, No. 20.

PHELPS, E.S. (1992), "Consumer demand and equilibrium unemployment in a working model of the customer-market incentive-wage economy", The Quarterly journal *of Economics*, August.

PHELPS, E.S. (1994), *Structural Slumps: A Modern Equilibrium Theory of Unemployment, Interest and Assets,* Harvard University Press, Cambridge Massachusetts.

PICHELMANN, K. and M. WAGNER (1986), "Labour surplus as a signal for real wage adjustment: Austria 1968-1984", *Economica*, Vol. *53.*

ROWTHORN, R.E. (1992), "Centralisation, employment and wage dispersion", *The Economic Journal, Vol. 102.*

SOSKICE, D. (1990), "Wage determination: the changing role of institutions in advanced industrialised countries", *Oxford Review of Economic Policy,* Vol. *6,* No. *4.*

TARANTELLI, *E.* (1986), "The regulation of inflation and unemployment", *Industrial Relations,* No. *25.*

TYRVAINEN, T. (1995), "Wage determination in the long run: real wage resistance and unemployment: multivariate analysis of cointegrating relations in 10 OECD economies", *OECD jobs Study Working Papers,* forthcoming.

ZETTERBERG, J. (1993), "Arbetsloshet, Arbesmarknadspolitik Och Löneförhandlingssystem", *in Politik mot Arbetsloshet, Betänkande av EFA,* SOU 1993:43, Stockholm.