WAGES AND PRODUCTIVITY: THE ROLE OF LABOUR MARKET INSTITUTIONS IN OECD COUNTRIES*

Juan Carlos Duque[a], Raúl Ramos[b, **], Jordi Suriñach[c]

[a] Regional Analysis Laboratory (REGAL) Dept. Geography, San Diego State University.
5500 Campanile Drive, San Diego, CA 92182-4493 (USA)
Tel +1 619 594 8032. Email: jduque@rohan.sdsu.edu

[b] Grup d'Anàlisi Quantitativa Regional (Universitat de Barcelona)
Dept. of Econometrics, Statistics and Spanish Economy. Avda. Diagonal, 690. 08034 Barcelona (Spain)
Tel. + 34 934021984. Fax. +34 934021821. Email: rramos@ub.edu

[c] Grup d'Anàlisi Quantitativa Regional (Universitat de Barcelona)
Dept. of Econometrics, Statistics and Spanish Economy. Avda. Diagonal, 690. 08034 Barcelona (Spain)
Tel. + 34 934021980. Fax. +34 934021821. Email: jsurinach@ub.edu

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** Correspondent author

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Abstract: In the context of a monetary union, to keep a territorial equilibrium in terms of economic activity and employment, the relationship between real wages and productivity is crucial. In this paper, empirical evidence about the response of wages to productivity is obtained for 20 OECD countries and the role of labour market institutions to explain differences in this response is analysed.

Keywords: Wages, Productivity, Labour Market Institutions, Monetary Union.

JEL Codes: J50, J24, F33.

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I. Introduction and objectives

Surely, the common place of last years' economic literature is that the European Monetary Union will modify deeply the main mechanisms of the European Economy. In fact, still in 1990, "One Market, One Money" (European Commission, 1990) pointed out the advantages and disadvantages of introducing a single currency. Apart from the microeconomic advantages highlighted there - suppression of transaction costs, reduction of information costs and uncertainty -, the vast literature on macroeconomic real convergence points out the important role of external aperture (Edwards, 1993), price stability (Landau, 1986) and the reduced relevance of public consumption (Landau, 1983) as the main conditioning factors of relative income levels to converge. The increasing integration caused by the existence of a single currency, the higher price stability achieved by an independent European Central Bank (ECB) and the resizing of the public sector after the Stability Pact, is expected to create the conditions for a higher growth and a higher long-run real convergence level, whose effects on employment would be necessarily positive.

Concerning the disadvantages, the lost of competence in terms of nominal exchange rates, the centralisation of monetary policy, and the scarce possibilities to act using fiscal policies limit the capacity of countries to react against recessive asymmetric shocks. A part of the existing literature has questioned the relevance of these shocks due to the high importance of intra-industry trade among European Union countries (European Commission, 1990). However, the opposite can be found in several empirical studies. Bayoumi and Eichengreen (1992), using structural VAR models, first proposed and applied by Blanchard and Quah (1989), detect a high cyclic asymmetry between a Central European core and the Atlantic and Mediterranean periphery. Also, Decressin and Fatás (1995) relate a greater proportion of dynamics in European employment growth to region-specific factors than in the United States, deducing that the creation of the Monetary Union will generate a higher degree of regional specialization and, as a result, a higher probability of asymmetric shocks. In fact, an important asymmetric behaviour of regional output has been detected in Europe in recent times (De Grauwe and Vanhaverbeke, 1991 and De Nardis *et al*., 1996).

The presence of specific shocks in the past and their future probability highlight the importance of adjustment mechanisms to these shocks. Following Mundell (1961) and later works on optimum

currency areas (Kenen, 1969), there are three possible adjustment mechanisms: factor mobility, fiscal transfers and wage flexibility.

As capital is already highly mobile, factor mobility is mainly concerned with the possibility of labour factor emigrating from these regions towards those not affected by the perturbation. Available studies usually detect a low mobility of the labour force among the European regions, both at a national level (Padoa Schioppa, 1991) and Europe as a whole (European Commission, 1990; De Grauwe and Vanhaverbeke, 1991; Decressin and Fatás, 1995; among others). However, the inter-territorial equilibrium and the social cohesion (and even the maintaining of the environment and political coexistence) advise against a high mobility in Europe.

A second adjustment mechanism to regional shocks is related to fiscal transfers from central budget to regions in recession. Optimum currency areas literature has pointed out the theoretical importance of fiscal transfers, and also the available empirical evidence has highlighted their quantitative importance and their relevance, mainly for the United States (Sala i Martin and Sachs, 1992; Bayoumi and Masson, 1995). In fact, the lack of this fiscal mechanism of regional stabilisation in the EU has enabled different authors to predict obstacles to the performance of the European economy. However, a high flexibility to adjust labour costs and productivity could facilitate regional competitiveness and employment without the costs of labour mobility.

The analysis of regional developments has shown that, in the case of the United States, asymmetric shocks cause permanent effects on employment and temporal reductions of labour force participation and wages, together with a transitory increase of unemployment, being migration the main adjustment mechanism from the first year on (Blanchard and Katz, 1992). On the contrary, in Europe the main adjustment mechanism refers to a decline in labour force participation and a rise in unemployment, while migrations start three years after the shock (Decressin and Fatás, 1995).

The work of Creel (1994) detects a relatively higher mobility, especially for German regions, with Spain in an intermediate position and Italy in the lowest. However, a similar analysis limited to the Spanish case (Jimeno and Bentolila, 1995) highlights the low regional mobility as an explanatory factor for the strong response of unemployment to regional shocks, which represents a third part of the impact, even after three years.

Moreover, the economic implications of adopting the fiscal objective of zero budget balance in the medium term (as required by the Stability and Growth Pact –SGP-) for the different countries of the

Euro area implies that with a given interest rate and a fixed nominal exchange rate again the adjustment mechanism comes down to the prescription of "wage flexibility" (see Allsop and Artis, 2003).

As pointed out by Pissarides (2003), labour market flexibility has been discussed widely and most empirical studies that have focused in the analysis of the elasticity of wages to unemployment in a macroeconomic context. However, in this paper we consider a different concept of labour market flexibility: the elasticity of wages to productivity. From our point of view, this concept is also relevant to describe and understand how labour markets function and it has not been explicitly considered in the literature. At the competitive equilibrium, real wages should be equal to labour productivity. Although this rule will support a stable employment level, it is not sufficient to improve the chances of the unemployed to find work. In order to reduce unemployment, nominal wages have to increase by less than the sum of price inflation and productivity growth. Excess wage increases can contribute to a rise in inflation or a slowdown in employment growth, or both.

The relationship between wages and productivity is even more relevant in the context of a Monetary Union as it is expected that market competition and the introduction of the euro could remove wage differentials between European countries without taking into account the evolution of productivity differentials (see Calmfors, 1998). However, other factors can also influence wages at the national level such as the extent of centralized wage bargaining between unions and employers. The experience of the United States shows that, in a first stage, unions tried to reduce geographical wage differentials. Only the pressure of external competitors has changed this trend towards a higher wage differentiation. In the case of Germany reunification, the trend has been similar (Reder and Ulman, 1993). However, the European case could be different, as recent contributions have pointed out the role of labour market institutions to explain the different response of wages to shocks in the United States and European countries (Blanchard and Wolfers, 2000 and Bertola et al., 2001). For the case of the wage-productivity relationship, the only work to our knowledge that has considered the role of institutions is Millea (2002). She finds that the interrelationships between wages and productivity vary across several industrialized countries and that institutional differences explain part of these differences. In particular, country differences are related to the extent of bargaining coverage and the generosity of unemployment benefits.

Taking this into account, the objective of this paper is twofold: first, to obtain a quantitative measure of the reaction of wages to productivity in a sample of countries formed by the old European Union members and other OECD countries; and, second, to extent the previous research

in the literature about the role of different labour markets institutions as a mechanism to limit wage increases to productivity gains in these countries. With this aim, wage equations are estimated in order to quantify the responses of wages to productivity and, in a second stage, these responses are related to labour market characteristics in the different considered countries. The following section provides empirical evidence on the relationship between wages and productivity and the role of institutions to explain country differences and, next, the paper concludes summarising the main findings and policy implications.

II. Empirical evidence on the relationship between wages and productivity and the role of labour market institutions

According to different wage determination theories, the evolution of wages is not only influenced by productivity but also influenced by other factors, such as inflation and unemployment. As Broersma and Den Butter (2002) highlight, traditional empirical studies on wage formation consider different variables (inflation, unemployment, productivity) to explain the determinants of the change in the wage rate (Phillips curve specification) or to explain the wage level (wage curve specification). While the Phillips curve specification is based on the theoretical model of Phelps (1968), where wages are set by firms, in the wage curve approach, wages are the outcome of a bargaining process between firms and unions. From a theoretical perspective, nowadays there is some preference among economists to use a wage curve specification rather than the Phillips curve. However, some recent works such as Hsing (2001) or European Commission (2003) prefer to use a Phillips curve specification.

In order to obtain a quantitative measure of the reaction of wages to productivity, these two specifications can be used a starting point:

- *The wage curve specification*

  In the general static specification of the aggregate wage equation (Bell *et al.*, 2002 or Broersma and Den Butter, 2002), the wage level of country *i* at time *t* is explained using the following expression:

$$\log(W_{i,t}) = c_0 + c_1 \cdot \log(P^e_{i,t}) + c_2 \cdot \log(U_{i,t}) + c_3 \cdot \log(PR_{i,t}) + u_{i,t} \qquad (1)$$

  where

$log(W_{i,t})$ is the logarithm of the level of nominal wages in country *i* at time *t*,
$log(P^{e}_{i,t})$ is the logarithm of the expected level of prices in country *i* at time *t,*
$log(PR_{i,t})$ is the logarithm of productivity in country *i* at time *t,*
$log(U_{i,t})$ is the logarithm of the unemployment rate in country *i* at time *t*, and,
$u_{i,t}$ is a random error term which is supposed to follow a normal distribution.

In this equation, the estimates of c_3 would approximate the effect on wages of changes in productivity, taking also into account the evolution of other economic factors in the different countries while the coefficient c_2 informs about the reaction of wages due to an increase in unemployment (the usual way of analysing "wage flexibility"). The above equation can be augmented in several ways, depending on the data availability, by taking into account additional explanatory variables, which prove useful in explaining the wage behaviour. Among them, a usual variable in the literature is related to the market power of firms to translate cost increases to product prices and it is defined as the difference between the inflation rate and the GDP deflator growth rate.

- *The Phillips curve specification*

  In the Phillips curve specification, the endogenous variable and the explanatory variables are similar to those in the wage curve specification, but both are included in *differences* instead of in *levels* (see, for example, European Commission, 2003).

Both approaches, the wage curve approach as well as the Phillips-curve approach, have some obvious disadvantages: with respect to the wage curve, it is not clear what this equation really stands for. It neither is a structural equation nor is it a reduced form equation. Therefore, it is somewhat difficult to attribute the shock to the demand side or to the supply side of the labour market. With respect to the Phillips-curve, if the equation is estimated with a measure of expected inflation, it should be vertical in the long run; thus, there is no place for analyzing long-term effects using the expectation augmented Phillips curve.

Whether measures of labour market flexibility are derived from level or first difference specifications is mainly an empirical question. However, it should be kept in mind that a level specification is often favourable from an economic point of view. In particular, the labour demand equation is obtained in levels from optimization behaviour of firms. In contrast, the first difference

specification could be only justified by statistical and econometric arguments. One possibility of taking into account the short run and long run relationships between the considered variables will be to specify error correction models for each of the considered countries. In order to analyse if this specification is appropriate, the time series properties of each variable should be analysed. Unit root tests can be conducted for individual countries or for a panel of countries. However, it has been widely acknowledged that standard unit root tests may have a low power against stationary alternatives in several cases (Campbell and Perron, 1991). As an alternative, recently developed panel unit root tests can be applied. Since the time series dimension is enhanced by the cross section, the results rely on a broader information set. Gains in power are thus expected, and more reliable evidence will be obtained.

As previously mentioned, we have considered the following 20 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom, Australia, Canada, Japan, Switzerland and the United States. Wages have been proxied by data on compensation per employee while the lagged level of prices has been used to proxy the expected level of prices as in Hsing (2001), among others and the Gross Domestic Product is expressed in real terms for the year 2000. Following the literature, the market power of firms to translate cost increases to product prices in the short term will be considered as an additional explanatory variable and it has been proxied by the difference between the inflation rate and the GDP deflator growth rate. Data from 1970 to 2004 for these variables have been obtained from the OECD National Accounts, the OECD Economic Main Indicators and the OECD Economic Outlook.

Table 1 shows the results of computing different panel unit root tests to the considered data expressed in levels[1]. In particular, the Levin et al. (2002) test, the Im et al. (2003) test and Fisher type tests using ADF and PP tests (Maddala and Wu, 1999) have been computed. The results from the Levin et al. (2002) test do not permit to reject the null hypothesis of a common unit root process at the usual significance levels for all variables. The results from the Im et al. (2003) test are also very similar to the previous ones although now the null hypothesis assumes individual unit root processes. However, the conclusions from the Maddala and Wu (1999) panel ADF and PP tests are opposite to the previous ones in most cases. In this sense, the results from a simulation study by Hlouskova and Wagner (2005) show that the power of the Levin et al. (2002) is much better than the Im et al. (2003) or Maddala and Wu (1999).[2]

TABLE 1

Taking these results into account, it seems that an error specification model will be appropriate to analyse the relationship between wages and productivity. In particular, the chosen specification will be the following:

$$\Delta \log(W_{i,t}) = c_0 + c_1 \cdot \Delta \log(P^e_{i,t}) + c_2 \cdot \Delta \log(U_{i,t}) + c_3 \cdot \Delta \log(PR_{i,t}) + c_4 \cdot \Delta \log(MP_{i,t}) + c_5 \cdot \left[\log(W_{i,t-1}) - c_6 \cdot \log(P^e_{i,t-1}) - c_7 \cdot \log(U_{i,t-1}) - c_8 \cdot \log(PR_{i,t-1})\right] + u_{i,t} \quad (2)$$

In this equation, the estimates of c_8 would approximate the long run relationship between wages and productivity (our measure of labour market flexibility), taking also into account the evolution of other economic factors in the different countries. In order to obtain these estimates, non-linear least squares have been applied and instrumental variables estimation procedures have also been considered to deal with the possible bidirectional relationship between wages and productivity. In particular, lagged values of the different explanatory variables have been used as instruments. Detailed results of the estimation procedure are shown in table 2.

TABLE 2

The explained proportion of the variance of wages is very high for all countries and the estimated coefficients have the expected sign and magnitude both for short and long run elasticities. As expected, the values of the adjustment parameter in the error correction model are negative and its values are below unity in all cases. As this parameter is significant, the long run relationship between the considered variables holds for all countries. The values of the Durbin-Watson statistics also reject the presence of first order autocorrelation in the residuals. The stability of the estimates has also been checked using sequential Chow tests and the CUSUM and CUSUM-Q residuals tests.

The estimates for the short and long run elasticities of wages to prices are close to unity in most countries, although it is considerably higher in Switzerland, a country with highly coordinated collective bargaining. Country differences in this coefficient show that in the presence of a common negative supply shock, inflationary pressures would be of different intensities.

Regarding the results for the coefficient associated to the unemployment rate, the obtained results are in line with the ones obtained by Blanchflower and Oswald (1994), who found a negative relationship between unemployment and wages, but their empirical regularity of a value of the elasticity close to –0.1 is not found in our results. However, it is worth mentioning that the analysis

of Blanchflower and Oswald (1994) is based in the use of micro data while here we are using macroeconomic data.

Focusing on the estimates of the long run coefficient associated to productivity, we have found a positive and significant relationship between wages and productivity. The countries where the response of wages to productivity is higher are Greece, Japan, Sweden and Switzerland while the country with a lower response is France. The estimate of the elasticity for Greece is twice the estimate for France. However, what explains these differences in the response of wages to productivity? In other words, which factors can determine that wages evolution is in line with productivity? Modern theories of wage setting highlight the role of factors related to insiders bargaining power (Lindbeck and Snower, 1988) making firms to pay efficiency wages to their workers above the equilibrium level, even in competitive labour markets (Stiglitz, 1986; Weiss, 1991) or the existence of implicit contracts (Azariadis and Stiglitz, 1983). However, efficiency wage or insiders premia are not directly observable, and the share of implicit contracts in actual contracts is hard to identify. Only indirect evidence can be obtained, as certain implications of the rules can be tested. Research on wage determination has therefore directed its interest towards the institutional settings of the economy in order to obtain better approximations to the actual wage bargaining processes (Checchi and Lucifora, 2002)

In order to examine the institutional impact on wages, a set of variables has been developed in the literature, covering various aspects of the institutional set-up. In particular, the structure of wage determination and, especially, the role of trade unions are considered. The main sources with a higher coverage of the considered period are the Layard *et al.* (1991) institutional database and different works by the OECD.

Trade unions are highly important in the structure of the wage bargaining process. Greater union power tends to raise wages above the competitive equilibrium, implying that the wage level may be too high compared to productivity growth. This effect may be boosted in countries with strict employment protection schemes and extensive measures in favour of the unemployed. Union power is reflected in both union membership (union density), and in the degree of coverage of unionised contracts, i.e. the extent to which salaried workers are subject to union-negotiated conditions.

A further aspect of the wage setting process refers to bargaining co-ordination and centralisation. These variables focus on the level at which collective contracts are negotiated and formally set in the economy, either at firm, sector, regional or national level. Opening (opt-out) clauses or company

employment agreements allow firms to deviate from centralised agreements to the detriment of employees. For example, the bargaining parties might agree on downward pay variations. The use of these clauses (especially in Germany) introduces more decentralisation in the wage-finding process, although their adaptability is limited by the favourability principle - in general, deviations from collective contracts should be in favour of the employees.

Tanking these into account, we have used the estimates of the elasticity of wages to productivity as the endogenous variable of a regression analysis where three different groups of explanatory variables have been considered (see table 3 for the exact definition and sources):

- *Labour market institutions*: factors related to collective bargaining such as trade union density, the bargaining level, the coverage, the degree of coordination between unions and between firms, the synchronization, among others could explain the differences of the translation of productivity improvements to wages.

- *Economic factors* such as the proportion of big and small firms in every country and the sectoral structure could also have influence on the intensity of the relationship between wages and productivity.

- *Other variables* approximating the different technological levels of the different economies and the different capital endowments or capital intensities could have also influenced the considered endogenous variable.

TABLE 3

One aspect that should be considered in this second step of the analysis is the problem of generated regressors on the left hand side of the models relating the elasticity of wages to productivity to labour market institutions. Taking this into account, we have estimated the different models by weighted least squares using as weights the standard error of the estimates of the long-run elasticity of wages to productivity.

Another issue that needs to be highlighted is the existence of collinearity. The high correlation of the institutional variables and the small number of observations could imply imprecise parameter estimates. For this reason, the number of explanatory variables in the different models has been

reduced to avoid problems derived from collinearity. Simplification starts from different points to get a robust picture. The preferred equations are shown in table 4.

TABLE 4

From these results[3], we can conclude that the intensity of the relationship between wages and productivity is lower in countries with a lower union density and a higher coordination between firms in the collective bargaining process. On the contrary, other factors such as the bargaining coverage and a higher synchronization affect positively the response of wages to productivity. The bargaining level also matters and the results show that in countries with more decentralization in collective bargaining, the response of wages to productivity increases. Moreover, it is worth mentioning that not only institutions matters, in countries with a higher presence of small firms or higher levels of technology, productivity gains are more easily translated into wage increases. Summarising, the obtained results are in line with the predictions by wage determination theories and highlight the role of institutions in the functioning of the labour market.

III. Final remarks

It is expected that, after introducing the euro, wage differentials will shrink due to a "demonstration" or "fair wage" effect among other reasons. If this reduction is not in line with the evolution of productivity, competitiveness in some countries will be damaged and the exchange rate could not be used to restore it.

Using a specification based in a Phillips curve augmented with expectations where long run and short run relationships are considered, a quantitative measure of the intensity of the relationship between wages and productivity is obtained. Differences in the reaction of wages to productivity increases are explained by some factors related to labour market institutions and with the bargaining power of trade unions such as, trade union density, the coverage, the level of collective bargaining, or the degree of firm coordination.

In this context, there are some policy options that should be taken into account: the collective wage bargaining systems should be more decentralised, the level of collective bargaining should be closer to the firm and it should be possible to apply opt-outs at the regional or at the firm level. The idea is that workers, unions and firms should take into account regional, sectorial and firm conditions when

negotiating wages[4]. Although, it could be seen as "unfair", wage divergence can have better long-term economic effects than wage convergence.

IV. Endnotes

[1] First differences were also considered but the results of the tests, which are available from the authors on request, rejected this hypothesis.

[2] Another conclusion from this study is that the panel stationarity tests of Hadri (2000) and Hadri and Larsson (2005) perform very poorly, being this the reason for not having considered them in this paper.

[3] When interpreting these results, it is important to take into account that the way the qualitative variables have been coded establishes a particular metric over the different categories that could affect the results. A possible solution would consist in using *k-1* dummy variables for the different *k* categories of each variable. However, the low number of degrees of freedom has made impossible to apply this solution.

[4] In line with the proposal of Davies and Hallet (2001) analysing the situation of German, Italian and Spanish regions.

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VI. TABLES

Table 1. Pool unit root tests of wages, prices, unemployment productivity and the market power variable

Sample: 1970 2004

21 cross-sections

Exogenous variables: Individual effects, individual linear trends

4 lags included (but similar conclusion in most cases with lags 0 to 4)

	Wages		**Expected Prices**		**Unemployment**		**Productivity**		**Market power**	
Method	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
Null: Unit root (assumes common unit root process)										
Levin, Lin & Chu t*	-0.10	0.46	-1.30	0.10	-1.11	0.13	-0.12	0.75	-0.25	0.15
Null: Unit root (assumes individual unit root process)										
Im, Pesaran and Shin W-stat	-1.69	0.97	-2.32	0.08	-2.26	0.22	-1.55	0.99	-2.39	0.12
ADF - Fisher Chi-square	55.62	0.08	33.53	0.82	31.82	0.87	33.24	0.83	67.14	0.01
PP - Fisher Chi-square	68.27	0.06	9.05	1.00	23.77	0.98	53.81	0.10	70.24	0.00

Table 2. Error correction models for the growth rate of compensation per employees 1972-2004 (continues)

	Short run elasticities					Long run elasticities					
	Intercept	Δ expected prices	Δ unemployment	Δ productivity	Market power	Adjustment	Expected prices	Unemployment	Productivity	Adj. R^2	DW
Australia	0.01	0.85			-0.68	-0.15	0.80	-0.10	0.78	0.78	1.85
	(2.76)	(7.61)			(-1.94)	(-1.82)	(4.70)	(-2.25)	(3.57)		
Austria	-0.00	1.72	-0.06		-0.84	-0.21	0.92	-0.04	0.82	0.81	1.92
	(-0.40)	(9.26)	(-2.35)		(-2.46)	(-3.65)	(1.77)	(-1.88)	(5.86)		
Belgium	0.00	0.62	0.09	0.85		-0.19	0.86	-0.04	0.81	0.83	1.90
	(1.57)	(4.22)	(3.91)	(4.22)		(-2.61)	(3.44)	(-1.62)	(5.34)		
Canada	-0.01	1.35				-0.37	0.85	-0.10	0.79	0.81	1.82
	(-1.86)	(11.1)				(-5.75)	(3.87)	(-3.58)	(5.38)		
Denmark	-0.00	0.89	0.09	1.06	0.73	-0.41	0.92	-0.05	0.88	0.89	1.92
	(-0.61)	(12.4)	(3.41)	(3.82)	(2.71)	(-3.23)	(9.01)	(-4.11)	(2.33)		
Finland	0.00	1.30	-0.04	0.30		-0.49	1.02	-0.06	0.87	0.90	1.99
	(0.26)	(10.1)	(-2.28)	(1.82)		(-6.01)	(4.14)	(-4.29)	(8.97)		
France	-0.01	1.08	-0.06	0.67		-0.15	0.83	-0.21	0.71	0.90	1.89
	(-0.72)	(8.75)	(1.37)	(1.99)		(-2.04)	(2.44)	(-3.63)	(2.54)		
Germany	-0.00	1.00		0.89	-0.50	-0.14	0.78	-0.05	0.82	0.89	1.82
	(-0.73)	(4.76)		(27.1)	(-1.76)	(-1.83)	(1.96)	(-2.29)	(5.78)		
Greece	-0.01	1.18		0.62	-0.66	-0.30	0.92	-0.15	1.50	0.60	1.84
	(-0.36)	(5.30)		(2.17)	(-1.76)	(-1.87)	(1.98)	(-1.82)	(4.13)		

Table 2. Error correction models for the growth rate of compensation per employees 1972-2004 (continuation)

	Short run elasticities				Long run elasticities						
	Intercept	Δ expected prices	Δ unemployment	Δ productivity	Market power	Adjustment	Expected prices	Unemployment	Productivity	Adj. R^2	DW
Ireland	0.01	1.19	-0.06		0.19	-0.37	0.93	-0.01	0.78	0.88	1.98
	(0.02)	(12.8)	(-1.73)		(1.11)	(-4.09)	(4.42)	(-2.37)	(13.34)		
Italy	-0.02	1.44	-0.22		1.18	-0.30	0.99	-0.07	0.83	0.92	1.71
	(-3.92)	(18.7)	(-4.90)		(7.02)	(-5.75)	(3.13)	(-2.86)	(15.66)		
Japan	0.01	1.36	-0.18			-0.59	0.98	-0.12	0.95	0.94	1.57
	(5.66)	(13.7)	(-5.55)			(-6.22)	(1.81)	(-4.81)	(25.44)		
Netherlands	-0.00	1.67	-0.02	-0.63	-1.12	-0.37	0.81	-0.02	0.82	0.88	1.64
	(-1.29)	(8.52)	(-1.39)	(-2.23)	(-4.07)	(-4.87)	(2.81)	(-2.99)	(8.15)		
Norway	-0.00	1.22	-0.03		0.41	-0.49	0.89	-0.10	0.89	0.76	1.98
	(-0.60)	(8.71)	(-1.54)		(1.46)	(-4.38)	(4.24)	(-4.86)	(16.73)		
Portugal	0.04	0.67	0.11	0.23	0.46	-0.44	0.97	-0.02	0.77	0.82	1.79
	(4.91)	(9.33)	(2.05)	(1.56)	(2.04)	(-4.32)	(7.96)	(-2.63)	(3.56)		
Spain	-0.00	1.13	-0.08	1.09		-0.18	1.00	-0.03	0.84	0.87	1.78
	(-0.79)	(8.36)	(-1.93)	(4.29)		(-1.96)	(5.76)	(-2.21)	(3.82)		
Sweden	0.03	0.72	-0.04	-0.50		-0.21	0.98	-0.10	0.93	0.73	2.20
	(4.07)	(6.06)	(-2.04)	(-2.44)		(-2.99)	(4.60)	(-5.27)	(15.03)		
Switzerland	0.00	1.24	-0.01			-0.33	1.12	-0.00	0.90	0.67	2.00
	(0.68)	(7.74)	(-3.93)			(-3.21)	(2.80)	(-2.24)	(30.35)		
United Kingdom	0.02	0.87		-0.50		-0.43	0.95	-0.02	0.85	0.91	1.76
	(4.60)	(10.1)		(-2.20)		(-5.02)	(5.47)	(-2.36)	(8.64)		
United States	0.01	0.75	-0.03		0.74	-0.36	0.83	-0.02	0.86	0.75	1.98
	(3.43)	(12.2)	(-2.54)		(4.78)	(-3.91)	(6.20)	(-2.34)	(11.55)		

Table 3. Definition and sources for labour market characteristics

Variable	Definition	Source
UNION	Trade union density: percentage	OECD Employment Outlook (1997)
COVERAGE	Bargaining coverage: 3-more than 75% of workers affected, 2-between 25% and 50%, 1 –less than 25%	Layard, Nickell and Jackman (1991)
COORU	Degree of unions coordination: 3-high, 2-middle, 1-low	Layard, Nickell and Jackman (1991)
COORF	Degree of firms coordination: 3-high, 2-middle, 1-low	Layard, Nickell and Jackman (1991)
SYNCHRO	Bargaining synchronization: 2-completely, 1-some, 0-not exist	Layard, Nickell and Jackman (1991)
BARGLEVEL	Bargaining level: 0-central, 1-sectorial, 2-firm	Layard, Nickell and Jackman (1991)
SMALLF	Small firms percentage	OECD Employment Outlook (1997)
TECH	National patent applications in 1992: Germany=100	OECD, Statistical Compendium.

Table 4. Explanatory factors of the estimates of the elasticity of wages to productivity

Dependent Variable: Estimates of the elasticity of wages to productivity

Method: Least Squares

Weighting series: Standard error of the estimates of the elasticity of wages to productivity

White Heteroskedasticity-Consistent Standard Errors & Covariance

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
C	0.69	2.39	0.83	3.32	0.79	2.62	0.45	1.58	0.41	4.23	0.03	0.17
UNION	-0.02	-2.86					-0.01	-1.00	-0.01	-1.99	-0.01	-1.56
COVERAGE	0.43	7.01										
UNION*COORU			0.01	2.01								
COORF			-0.05	-2.78	-0.02	-1.61						
SYNCHRO					0.04	2.51						
BARGLEVEL							0.57	6.10	0.21	1.62	0.29	2.49
SMALLF									0.01	3.61	0.01	5.16
TECH											0.30	1.89
Adjusted R-squared	0.18		0.19		0.19		0.21		0.39		0.41	
Observations	20		20		17		17		19		19	