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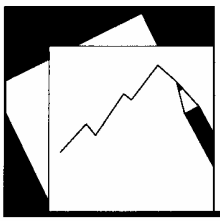

IMF Working Paper

Product Market Regulation and the Benefits of Wage Moderation

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Product Market Regulation and the Benefits of Wage Moderation

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Abstract

Euro-area real wages have decelerated sharply in the last 20 years, but this has not yet translated into visibly lower unemployment or faster growth. Weak output growth after such a cost shock is somewhat puzzling and has led some to question the benefits of wage moderation. By isolating structural from cyclical factors in a panel of industrial countries, I show that structurally slower real wage growth, that is, "wage moderation," does raise output growth and lower unemployment rates. However, I show that the impact on both variables depends crucially on product market regulation: weaker competition and barriers to entry mute the growth effects of structural real wage changes by allowing incumbent firms to appropriate larger rents. In this context, overly regulated product markets in the euro area are undermining the effects of labor market reforms on output and employment.

JEL Classification Numbers: E24, E61, D40

Keywords: Structural change, product market, labor market, reforms

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I. INTRODUCTION

Euro-area real wages have decelerated, particularly during the past decade, but this has not yet translated into visibly lower unemployment or higher growth. The euro-area unemployment rate has decreased somewhat since the mid-1990s and has risen less than usual during the latest economic slowdown. Nonetheless, it still hovers around 9 percent. In addition, per capita business GDP growth in the last 10 years, averaging 1.9 percent a year, was lower than in the previous decade, when it reached 2.6 percent.

Weak output growth after a beneficial cost shock is somewhat puzzling and has led some to question the benefits of wage moderation. In economies with high unemployment rates and wage hikes, lower labor cost growth should restore firms' profitability, cut unemployment, and raise output thanks to competition. However, a myriad economic factors might be offsetting the effects of more job-friendly wage-setting on production and employment.

This paper identifies structural shifts in the relationship between wages and unemployment rates—a "wage curve"—in 20 industrial countries. The underlying model assumes workers and firms bargain over wages while firms set employment unilaterally to maximize profits. The resulting wage curve may shift for several reasons, including when labor market reforms increase incentives to work. With well-known empirical estimates for the wage curve, these structural shifts can be identified, while cyclical effects are ignored.

The key finding is that downward wage-curve shifts, that is, "wage moderation," do raise output and lower unemployment, but the size of the impact depends crucially on the degree of product market regulation. In more regulated product markets, weaker competition and barriers to entry allow incumbent firms to appropriate part of the improved labor supply conditions in the form of higher rents. The positive effect of reform-induced wage moderation on employment and output is therefore muted. Because product markets are more regulated in the euro area than in other industrial countries, wage moderation affects production and unemployment less strongly, which implies that labor market reforms are less effective in raising euro area's growth potential.

The next section reviews euro-area and cross-country developments in labor costs and their bivariate relationship with unemployment rates and business GDP. Section III describes the theoretical framework used to analyze the effect of changes in wage-setting behavior on economic performance. Section IV documents the wide variation in wage-setting behavior within a sample of 20 industrial countries. It also presents econometric evidence on how product market regulations determine the sensitivity of output and unemployment to wage-setting shocks. Section V concludes with a discussion of policy implications.

II. Labor Cost Changes and Economic Performance in the Raw Data

In the euro area, real wages have decelerated since the 1970s but the unemployment rate has increased and per capita GDP growth has fallen. Real hourly compensation growth in the business sector declined from about 6 percent at the beginning of the 1970s to 1 percent recently but the unemployment rate trended upward during the period (Figure 1a). Unemployment rates have receded since the mid-1990s but bottomed out at a high level (around 8 percent) in 2001 before climbing again. Growth in per capita real business GDP also declined from an average of 3 percent in the 1970s to about 1.9 percent in the past 10 years (Figure 1b). The lack of an output effect from improvements in costs is puzzling at first sight because, overall, firm profitability should have increased and production should have expanded. In fact, the share of labor income in business sector value added has declined markedly since the 1980s, leaving more income in the hands of capital owners (Figure 1c). Turning to cross-country data for the euro area from 1983 to 2003, simple correlations suggest that there is a weak effect of wage moderation on unemployment rates but not on output: real wage growth is positively correlated with both the unemployment rate and GDP per capita growth (Figures 2a and 2b).[2] These results do not change when the sample is expanded to include other industrial countries (Figures 2c and 2d).

However, the apparently weak effect of real wage deceleration on output could be the result of other economic factors. Wage developments affect economic activity also by influencing workers' income and, thus, their consumption, which could cause a positive correlation between wages and output in the short run. In addition, the costs of being unemployed diminish during good times because of the higher probability of being hired by another business if fired. In this situation, workers would demand higher wages and a positive correlation between output growth and real wage growth may emerge. Lastly, other structural factors may have dampened productivity growth and, as a result, reduced wage and output growth.

[2] The regression results shown in Figure 2 exclude Ireland and Switzerland as outliers.

Figure 1. Euro Area: Labor and Product Market Developments

Figure 1a. Unemployment Rate and Real Hourly Compensation Growth
(In percent)

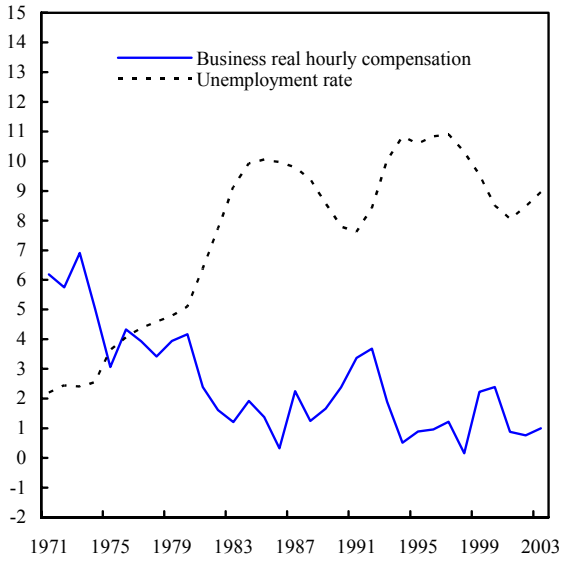


Figure 1b. Growth of GDP per Capita and Real Hourly Compensation
(In percent)

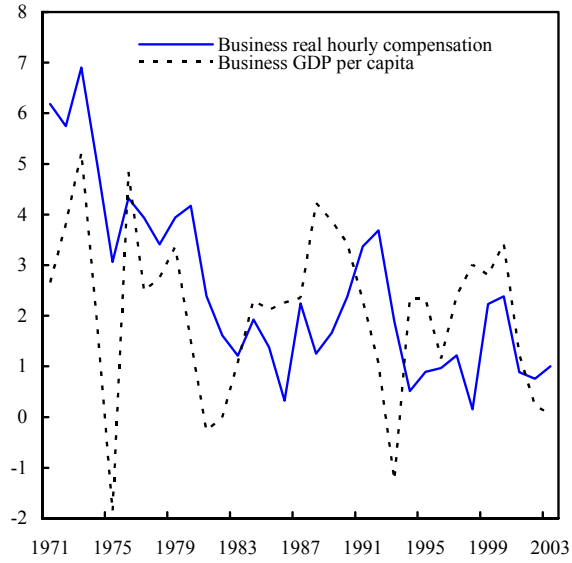
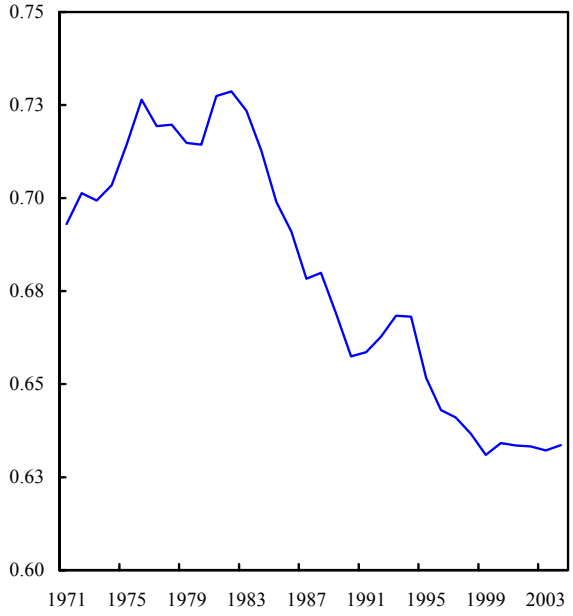


Figure 1c. Labor Income as a Share of Business GDP



Source: OECD analytical database; and staff calculations.

Figure 2. Euro Area: Change in Labor Costs and Real Variables

Figure 2a. Real Hourly Compensation Growth and Unemployment Rate Changes 1/

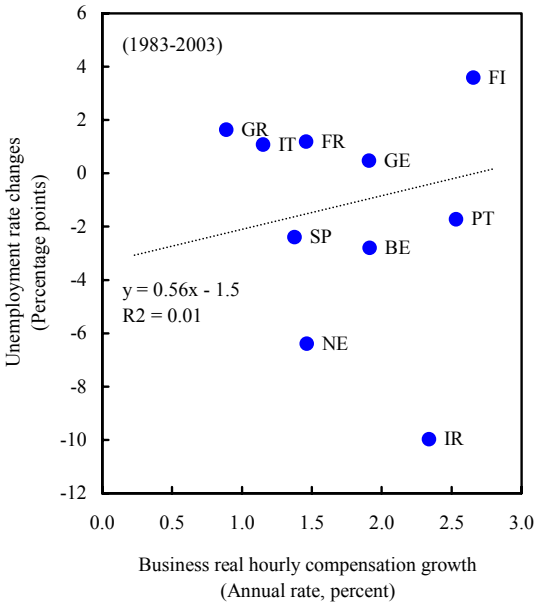


Figure 2b. Real Hourly Compensation and GDP per Capita Growth 1/

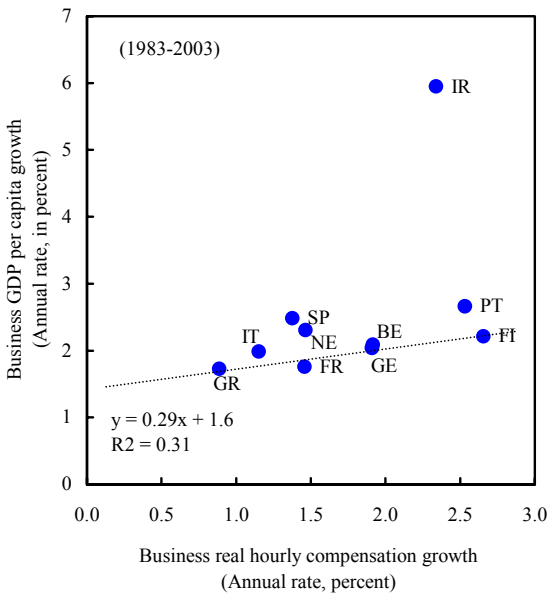


Figure 2c. Real Hourly Compensation Growth and Unemployment Rate Changes in 20 OECD countries 2/

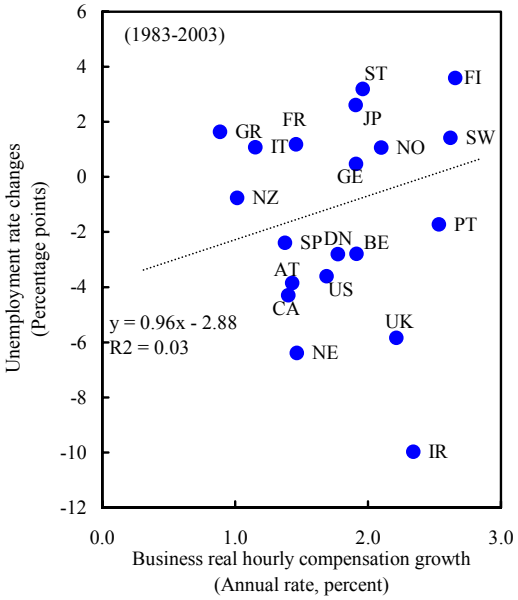
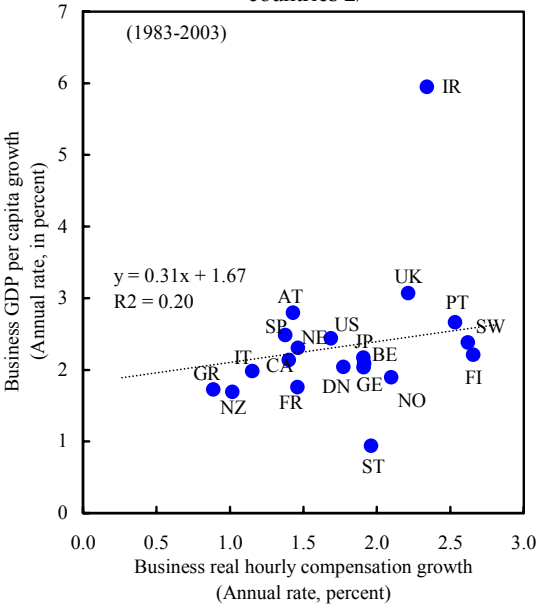


Figure 2d. Real Hourly Compensation and GDP per Capita Growth in 20 OECD countries 2/



Sources: OECD; EC - AMECO; and staff calculations.
1/ Fitted curve excludes Ireland.
2/ Fitted curve excludes Ireland and Switzerland.

III. Wage-Setting Behavior and Economic Performance

Isolating structural changes in wage-setting behavior and their effects on production costs requires a structural labor market framework. Assume that wages are bargained over by workers and firms, with the latter choosing employment to maximize profits. Equilibrium employment and wages are then determined by the intersection of a labor demand curve obtained from firms' profit-maximizing behavior and a labor supply-like curve relating wages to the unemployment rate—a "wage curve."[3] Labor supply-like shocks are captured by shifts in the wage curve. Their final effect on employment and production will depend on the sensitivity of labor demand to changes in real wages.

Under standard assumptions of profit maximization and marginal decreasing returns to labor, the short-run labor demand curve is negatively sloped. Assuming that:

1. Firms operate in a market with imperfect competition where the product price, P, is a decreasing function of output, Y.
2. In the short run, returns to labor (N) are diminishing, the capital stock (K) is fixed, and technology (A) is labor augmenting. Thus, $Y = Y(AN)$, and $Y'(AN) > 0$ and $Y''(AN) < 0$.
3. Firms set output and labor to maximize profit, $P(Y(AN)) * Y(AN) - W * N$, where W is the bargained wage.

The first-order condition can be written as:

$$\frac{Y'(AN^*)}{\mu} = \frac{W/P}{A} = \frac{w}{A} \quad . \tag{1}$$

where, μ is a markup over labor costs. This optimality condition states that firms choose employment by setting the marginal revenue product equal to the real wage in efficiency

[3] Layard and others (1991) is the standard reference for different bargaining models with empirical relevance. Several authors prefer using efficient bargaining models in which firms and workers bargain over employment and wages aiming at maximizing the surplus from their economic activity. In such framework, firms do not maximize profits and, therefore, are not on their labor demand curve. To ease interpretation and analysis (besides being more realistic according to many authors, e.g., Abowd and Kramarz, 1993), this paper sticks to the bargaining model closest to the standard supply and demand framework.

units (i.e., real wages divided by the technology parameter, A). The markup captures the slope of the product demand curve facing each firm, which is a function of product market characteristics.[4] Broadly speaking, more stringent limitations to product market competition will reduce the elasticity of product demand to price variations, increase the markup, and make the labor demand curve steeper, thus limiting the effect of labor cost variations on employment and production. Markups can also vary after shocks and, in the limit, if no competitive pressures exist, cost changes could be fully absorbed by markup increases, leaving prices and quantities unchanged.[5]

The wage curve results from the joint maximization of firms' and workers' utility functions, weighted by each party's bargaining power, given firms' labor demand equation. As a result, the following relationship emerges,

$$\frac{w}{A} = f(m, b, \tau, u), \quad f_m > 0, f_b > 0, f_\tau > 0 \text{ and } f_u < 0, \tag{2}$$

where m is a structural parameter determining the position of the wage curve as a function of workers' relative bargaining power and relative preference for wages vis-à-vis employment, b stands for the income (in real terms) a worker would receive if unemployed, and τ stands for the ratio of the fiscal wedge on labor income to the fiscal wedge on unemployment income. The unemployment rate (u) has a dampening effect on wage demands because it raises the probability of long spells of joblessness and hence the associated risks and costs to workers. This establishes the upward sloping wage curve in Diagram 1, where employment is approximated by $1–u$, with labor force size normalized to 1.

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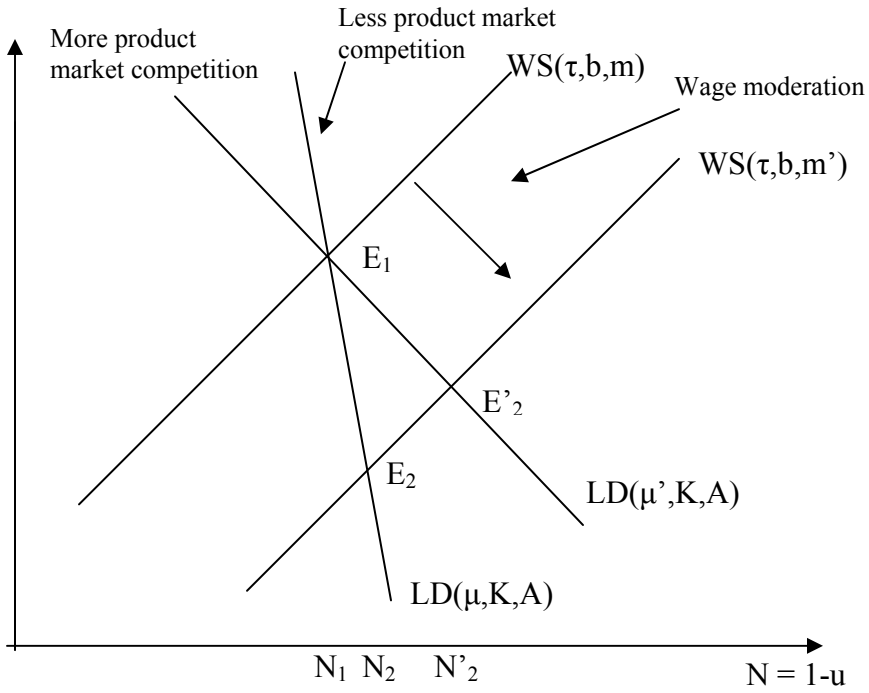
[4] See Tirole (1988) for a deep discussion of the many models and basic mechanisms linking market structure, competition, and markup changes.

[5] Blanchard and Giavazzi (2003) develop a theoretical model and discuss the many effects of product deregulation on wages, employment, and, therefore, production. Even though the general intuition used here is valid, those authors present a more nuanced view of the effects of product markets deregulation on aggregate labor demand. For given wages, product market deregulation increases competitive pressures among incumbents, raising the elasticity of product demand, which lowers the markup. Thus, labor demand and output increase at the firm level. If the number of firms remain constant, this results in higher employment because aggregate labor demand increases. However, once firm turnover is accounted for, variations in the number of firms may dampen employment effects. If product market deregulation lowers entry costs, new entry increases aggregate demand elasticity and employment. The sensitivity of labor demand to entry costs is also a feature of matching models for the labor market, e.g., Ebell and Haefke (2004) and Kugler and Pica (2003).

Diagram 1. Structural Changes in Wage-Setting



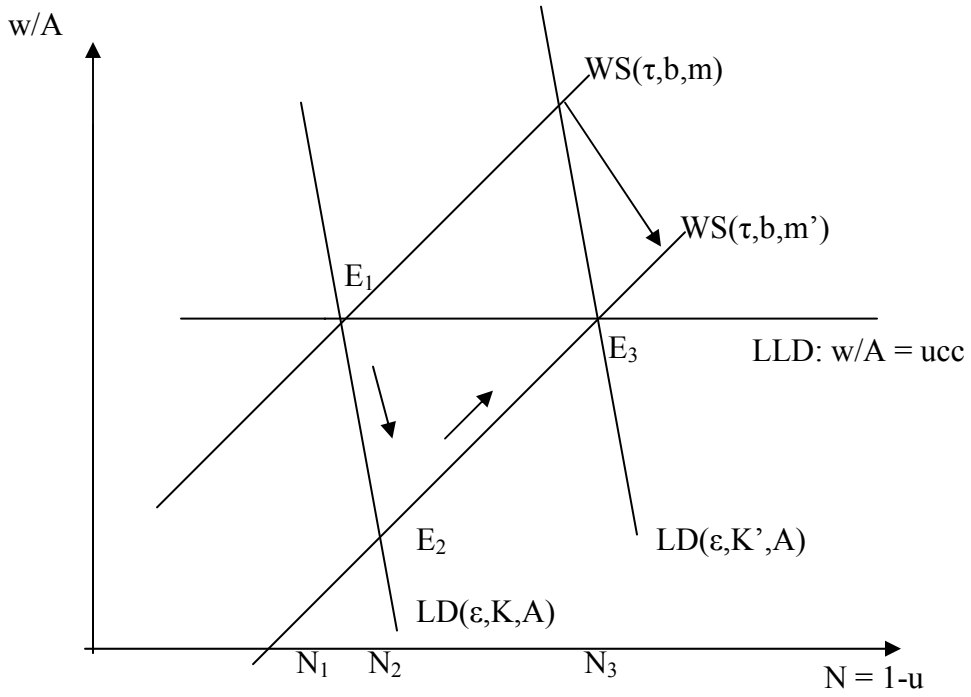
In this model, shifts in the wage curve capture structural wage-setting changes, whereas movements along the wage curve capture cyclical factors. "Wage moderation" is viewed as a structural change and thus represented by a downward shift in the wage curve (WS). Many factors might be behind such a shift, including: (i) reductions in unemployment income, *b*—for example, following cuts in unemployment benefits—forcing workers to lower wage demands; (ii) reductions in the tax wedge, τ—for example, resulting from lower labor income taxes—allowing firms to offer lower wages at a given unemployment rate as workers' net wages improve; (iii) changes in workers' bargaining power—for example, because of changes to wage bargaining systems from an expanding pool of available labor in a more globalized economy; and (iv) changes in unions' preferences away from wages toward employment, as following the 1982 Wassenaar agreement in the Netherlands.[6]

The equilibrium levels of unemployment and output will depend on the slope of the labor demand curve (LD). Assuming that technology is about the same across the sample of countries considered here, equation (1) says that markup behavior will determine the different output effects of a given shift in the wage curve.

[6] Several of these effects are discussed in Decressin and others (2001) and Estevão and Nargis (2002).

Less competitive markets, partly reflecting product market regulations, dampen the output effect of wage moderation (Equilibrium point E_2 vis-à-vis E'_2 in Diagram 1). Regulation could take many different shapes and operates through two main channels: (i) a short-run competition effect, by affecting firms' pricing power; and (ii) a long-run market contestability effect. Direct government intervention in firms' pricing is an example of the first channel. Barriers to entry are an example of the second channel and affect both potential outside competition and competition among incumbent firms. Furthermore, a large concentration of state-owned companies and other state interventions could distort market signals and slow output responses to cost shocks.

Diagram 2. Long-Run Adjustment



Wage moderation generates higher profits prompting the entry of new firms and greater investment by existing firms, thus resulting in higher output (Diagram 2). Downward shifts in the wage curve bring real wages in efficiency units below the user cost of capital, which is assumed to be determined exogenously (point E_2 in Diagram 2). In this new equilibrium, profitability is higher and either potential competitors will enter in the market or incumbents will boost investment (or both) until wages in efficiency units equal the user cost of capital again. Graphically, because the user cost of capital is independent of the unemployment rate, the long-run labor demand curve is horizontal. In the long run, employment and output levels

are larger (point E_3) and, in a dynamic version of the model, the economy goes back to its long-run growth path.[7]

Product market regulation could, however, delay adjustment—by stunting competition among existing firms or preventing entry—and influence the long-run equilibrium. Thus, any empirical estimation should use a dynamic specification for the effects of wage moderation on output and unemployment, and allow for possible long-run effects of product market regulation on the transmission of wage shocks to employment and output.

IV. Measuring the Benefits of Wage Moderation

Measuring the effects of wage moderation requires interacting wage-curve shifts with information on product market regulation. Wage-curve shifts will be constructed using well-established results in the literature on wage determination. Data on product market regulation come from the OECD.

A. Measuring Changes in Wage-Setting Behavior

Shifts in the wage curve can be measured using a well-known empirical regularity about the elasticity of wages with respect to the unemployment rate. The empirical wage curve is typically written as:

$$\ln\left[\frac{W_{it}}{CP_{it} * A_{it}}\right] = \xi_{it} - \theta_i * \ln(u_{it}) \quad , \tag{3}$$

where ln(.) stands for the natural logarithm of a variable, i represents a country, t represents a year, W_{it} represents nominal hourly labor compensation, CP_{it} represents the deflator of private consumption expenditures, A_{it} represents labor-saving technology, u_{it} represents the unemployment rate, and ξ_{it} measures the position of the wage curve. Given θ_i, shifts in the wage curve, $\Delta\xi_{it}$ (where Δ is the first-difference operator), can be measured using

[7] In the short run, slower capital deepening (a reduction in the rate of growth of the capital-labor ratio) would imply temporarily lower labor productivity growth given unchanged technological growth. In the long run, labor productivity growth would pick up until extra profits were dissipated by competition and/or higher investment rates by incumbents. A version of this model was discussed in Blanchard (1997) and used in Estevão (2004) to analyze labor productivity dynamics in the euro area.

equation (3). Many papers estimating (3) have found values for θ of around 0.1. This empirical regularity seems to be robust to changes in time period and valid for many different countries.[8] Here, again, an estimate of 0.1 is used.[9,10]

The extent of wage moderation (shifts of the wage curve) has varied in intensity and timing across a sample of 20 OECD countries. Figures 3 and 4 show the shifts in the wage-curve intercepts, ξ_{it}, normalized to 100 in 1970. Overall, wage-setting conditions have improved at least since the early 1990s, except in Greece, Japan, and Switzerland. Ireland stands out because of sharp and continuous improvements in wage-setting conditions since the 1970s. Within the euro area, wage-setting improved significantly in the Netherlands since the early-1980s, following the 1982 Wassenaar agreement. Finland has posted large improvements since the early-1990s. Wage moderation since the 1980s can be observed in France and Italy, while in Belgium, Germany, and Spain wage moderation started in the mid-1990s. Outside the euro area, wage-setting deteriorated through the early-1980s in the United Kingdom, the United States, Australia, and Canada but has improved continuously since then.[11]

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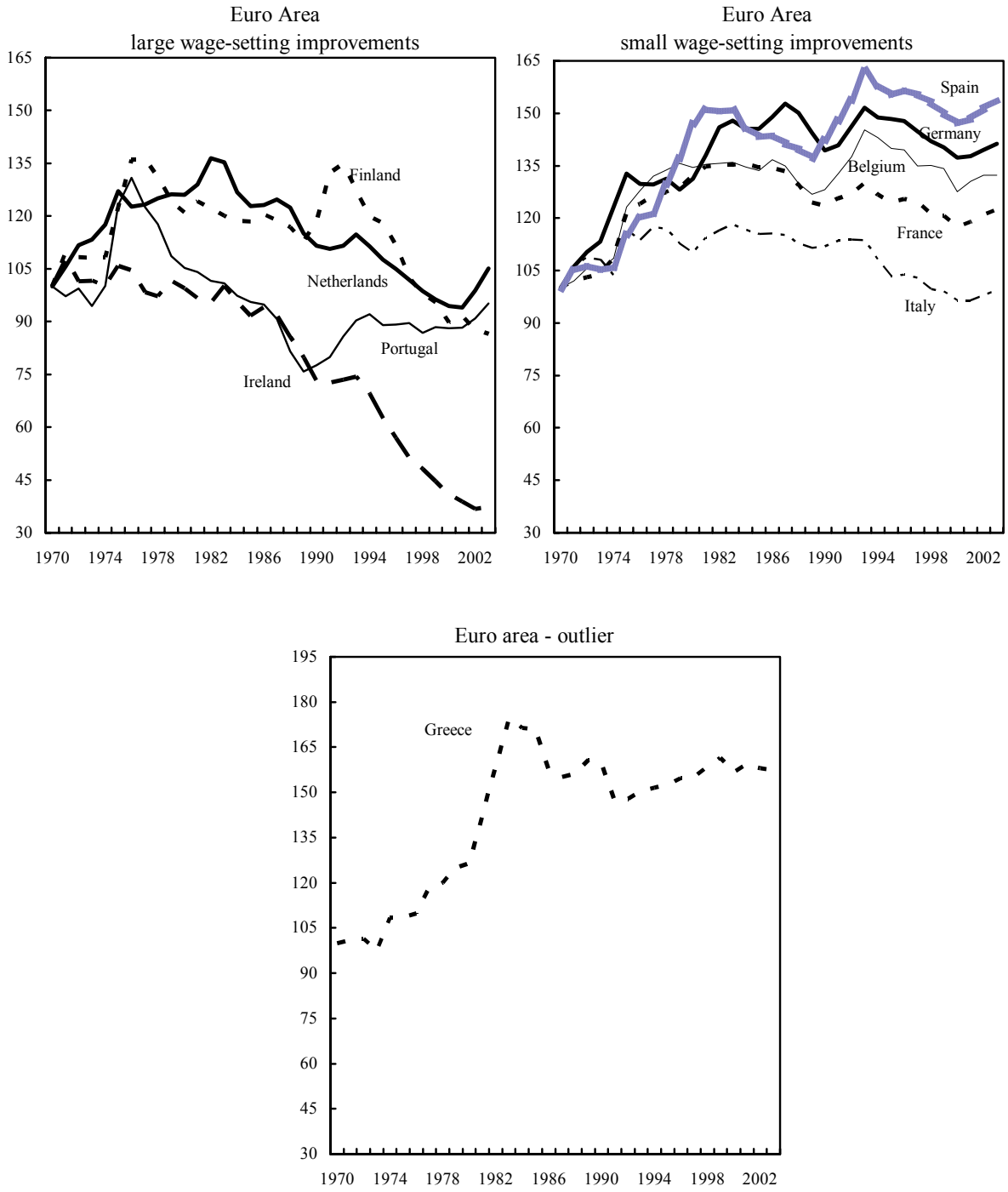
[8] Blanchflower and Oswald (1994) first presented this finding, which was replicated by other studies. Card (1995), however, criticizes Blanchflower and Oswald's original methodology and notices that elasticities for the United States could be smaller than 0.1. Galdeano and Turunen (2005) report point estimates close to 0.1 for the euro area, but also show that these estimates hide country differences. Using business sector data, Estevão (2003) found a 0.1 elasticity for a panel of OECD countries.

[9] Labor-saving technology, A, in the business sector was determined by (see Blanchard, 1997): (i) calculating a Solow residual using hours of work, the capital stock, real value added, and the share of labor income in value added; (ii) weighing the Solow residual by the share of labor income in value added; and (iii) creating indices with 1970=100.

[10] The identification of wage curve shifts is enhanced by using the consumption expenditures deflator to create real wages, instead of price measures belonging to the labor demand. The description of wage-setting changes and the econometric results are not sensitive to using the coefficients reported in Galdeano and Turunen (2005) for six EU countries.

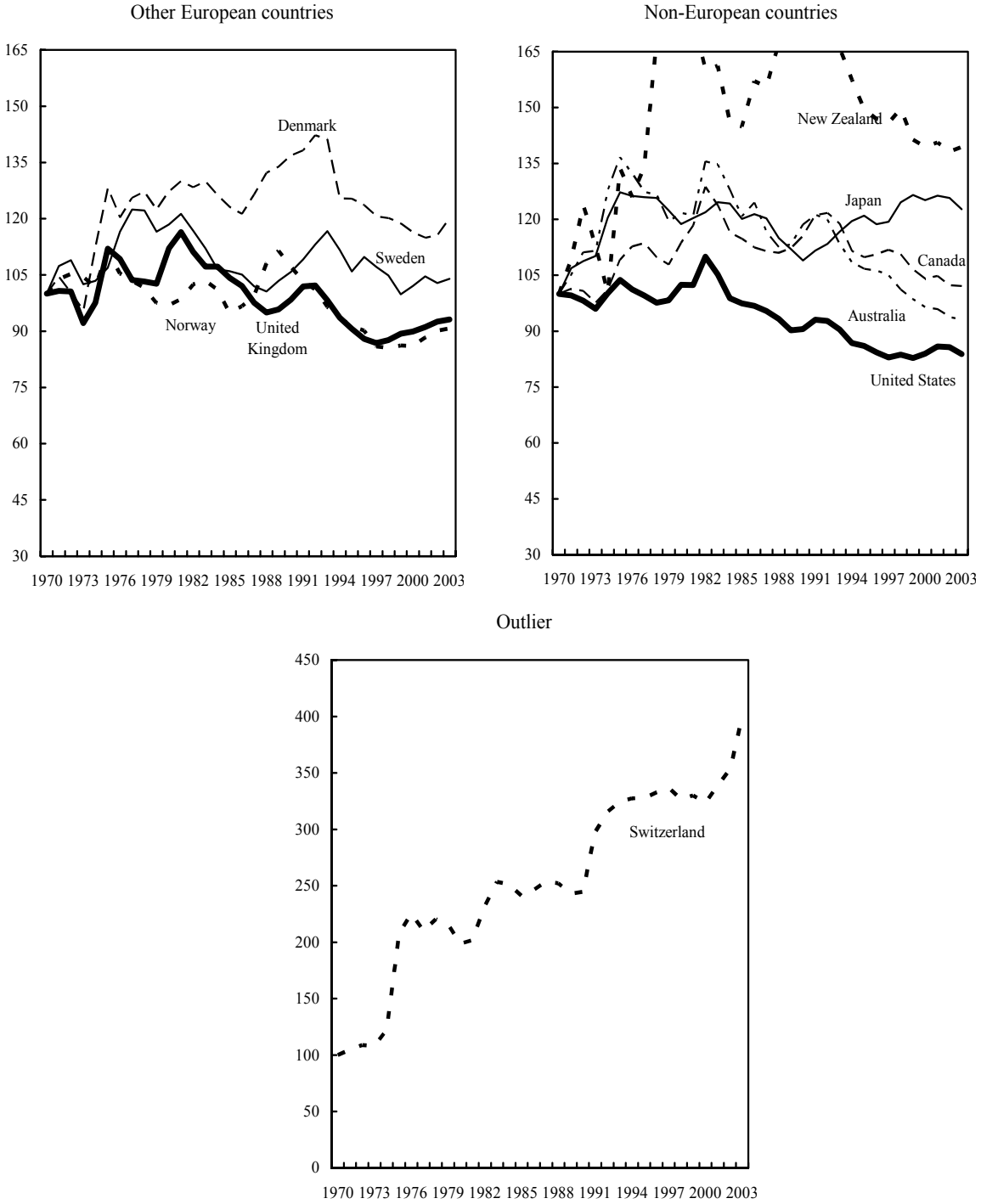
[11] A semi-logarithmic specification (with a semi-elasticity of 1 with respect to the unemployment rate) generates more moderate worsening in wage-setting conditions in countries with very low unemployment rates (close to zero) in 1970, e.g., Germany. That is because the logarithmic specification puts relatively more weight on unemployment rate movements below 5 percent. However, the ordering shown in Figures 3 and 4, and the econometric results presented below are insensitive to changing from a log-log specification to a semi-logarithmic specification.

Figure 3. Euro Area: Structural Changes in Wage-Setting Conditions
(1970=100)



Source: OECD Analytical Database; and staff estimates.

Figure 4. Outside the Euro Area: Structural Changes in Wage-Setting Conditions
(1970=100)



Source: OECD Analytical Database; and staff estimates.

B. Wage-Setting Changes and the Real Economy

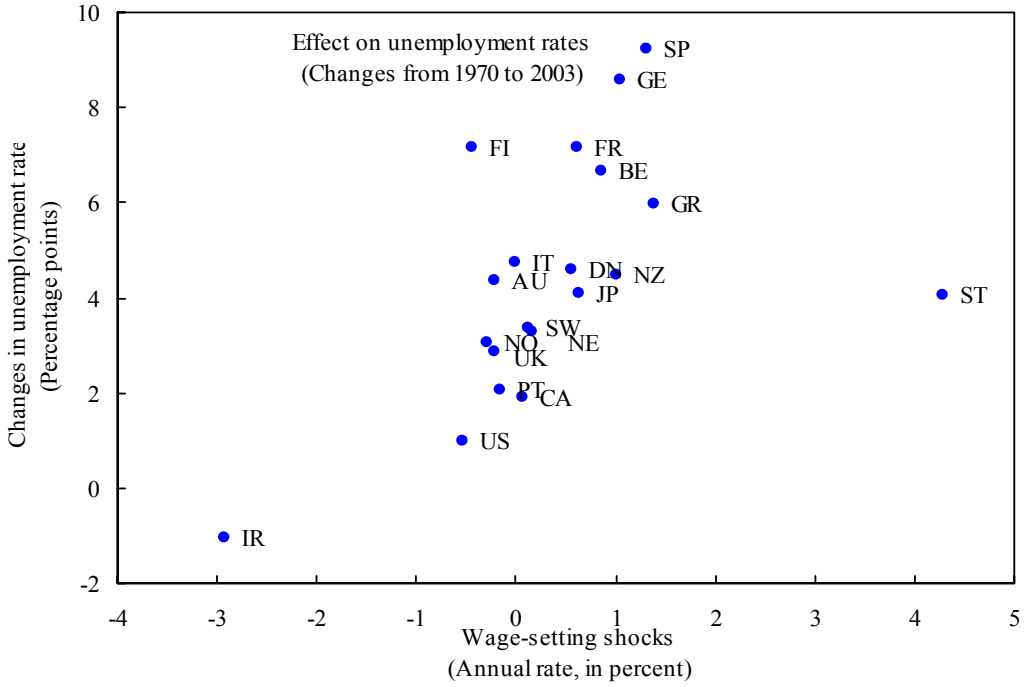
As suggested by theory, wage-curve shifts are positively correlated with unemployment rates and negatively correlated with per capita GDP growth. Figure 5 shows a scatter plot of changes in the unemployment rate and per capita business GDP growth on wage-curve shifts between 1970 and 2003. The cross-country dispersion is large but the correlations are evident. Figure 6 excludes Ireland and Switzerland, two large outliers, and confirms the correlations. However, these correlations are weaker (lower R^2) when the analysis is limited to the last 20 years and excludes Ireland and Switzerland (Figure 7, top panels).

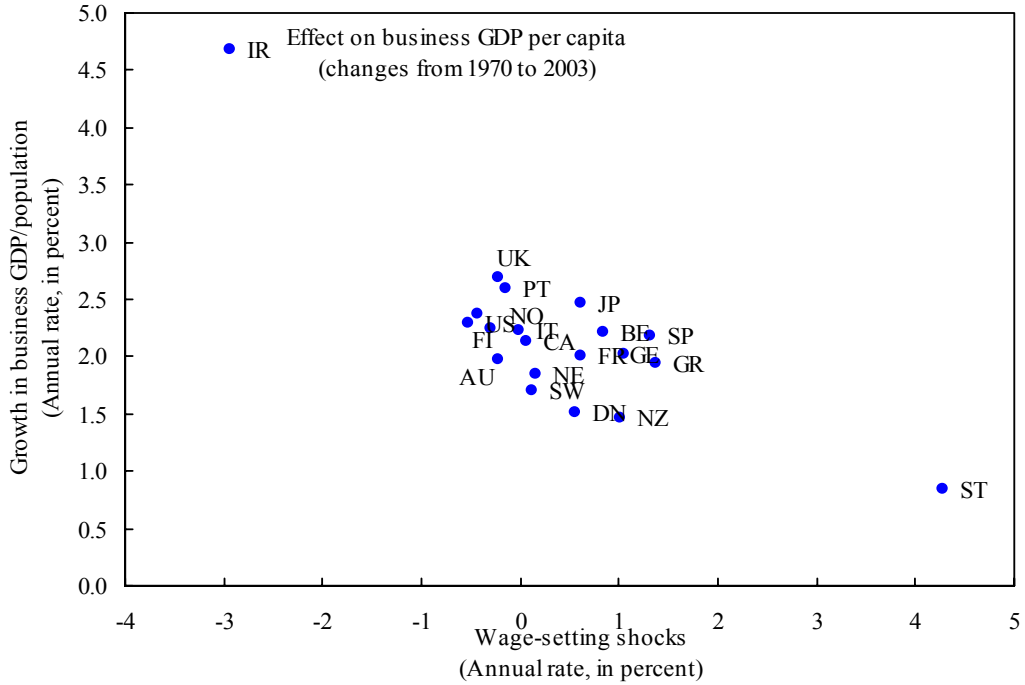
In addition, regulations curbing competition in product markets seem to dampen the positive effect of wage moderation on economic performance. The lower panels of Figure 7 illustrate this point by plotting changes in economic performance against the interaction of wage-curve shifts and indices of product market regulation from the OECD.[12] The fit of the bivariate relationship between changes in economic performance and the interactive variable is significantly better than in the top panels of Figure 7, highlighting the importance of controlling for regulatory practices when analyzing the impact of wage moderation on employment and output.

An econometric framework can provide more robust evidence on the benefits of wage moderation. Equation (4) relates annual changes in a real variable in country i in year t, Δr_{it}, (either the percent change in per capita business GDP, Δy_{it}, or in the unemployment rate change, Δu_{it}) to wage-curve shifts ($\Delta \xi_{it}$), product market regulation (reg_{it}), the interaction between regulation and wage-curve shifts ($reg_{it}*\Delta \xi_{it}$), year-dummies capturing common excluded variables (β_t), and residuals (country-specific effect, α_i, and η_{it}). The regulatory variable, reg_{it}, is defined as deviations from the sample average—a high value suggesting a highly regulated product market—which implies that φ_1 captures the average elasticity of economic performance to wage shocks, i.e. the effect of wage shocks when $reg_{it} = 0$.

[12] Product market regulation is measured as an average of OECD indices for regulation in seven large utility and service industries: airlines, postal services, telecommunications, electricity, gas, railways, and roads. OECD researchers ranked each of these industries according to several regulatory dimensions (e.g., the size of entry barriers, firms' freedom to set prices, and the extent of public sector ownership). The assumption here is that the average level of regulation in those sectors is a good proxy for overall regulatory impediments to product market competition in each country. The key role of these industries in production infra-structure and distribution supports this assumption. Indices for product market regulation are available only from 1975 to 1998, which reduced the sample size for the estimates reported in columns (3) and (4) of Tables 1 and 2. 1998 levels of regulation were interacted with wage shocks in 2003 in Figure 7. Appendix I contains more details on the regulation indices.

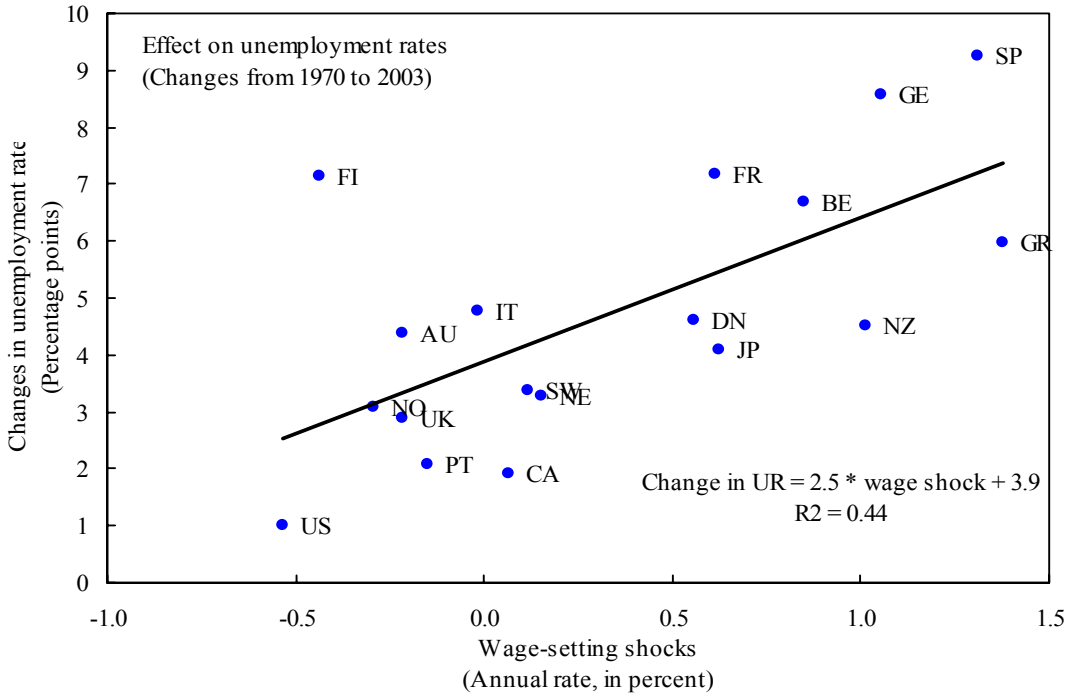
Figure 5. Economic Consequences of Changes in Wage-Setting Behavior Since the 1970s [1/]

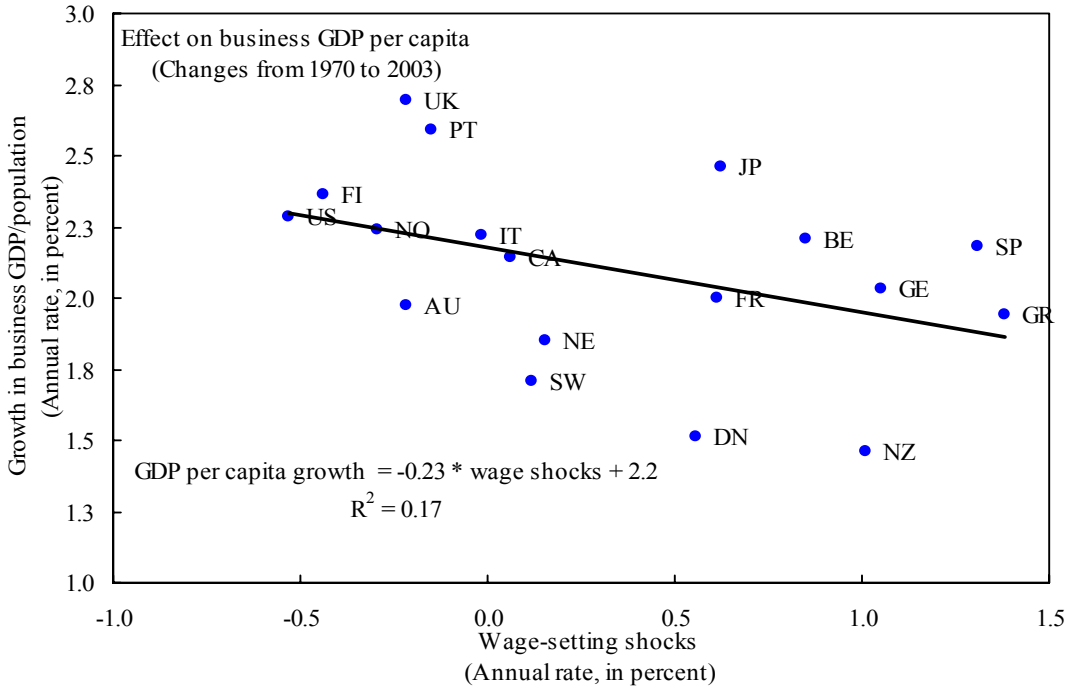




Sources: OECD Analytical Database; EC - AMECO; and staff calculations.
1/ Wage-setting shocks = shifts in the wage curve. The countries included in the sample are: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States.

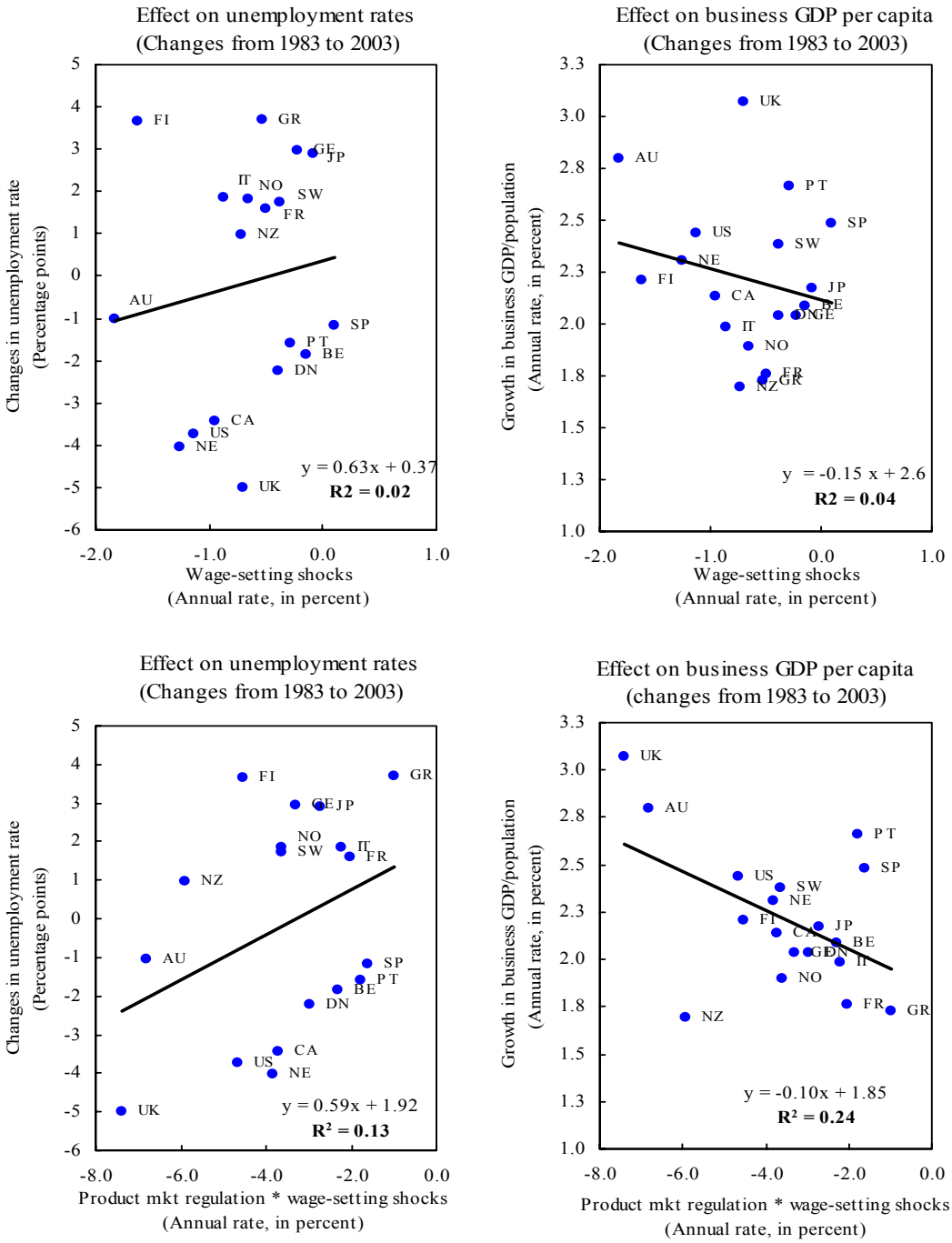
Figure 6. Economic Consequences of Changes in Wage-Setting Behavior Since the 1970s [1/]
(Excluding Ireland and Switzerland)





Sources: OECD Analytical Database; EC - AMECO; and staff calculations.
1/ Wage-setting shocks = shifts in the wage curve. The countries included in the sample are: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, United Kingdom, and United States.

Figure 7. Wage-Setting Behavior and Product Market Regulation Since the 1980s [1/]



Sources: OECD Analytical Database; EC - AMECO; and staff calculations.
1/ Wage-setting shocks = shifts in the wage curve. The countries included in the sample are: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, United Kingdom, and United States.

The coefficient φ_2 captures the direct effect of product market regulation on real variables. The coefficient φ_3 measures how deviations of regulation from the sample average affect the pass-through of wage-setting shocks to real variables. Under the restrictions imposed by the theoretical model discussed above, when equation (4) refers to GDP per capita growth (unemployment rate changes) the parameter estimate for φ_1 should be negative (positive) and, if product market regulation dampens the effect of wage shocks, φ_3 should be positive (negative). The lag function $\psi(L)$ captures the adjustment dynamics in the dependent variable. The number of lags in $\psi(.)$ is set to wipe out serial correlation in the residuals, η_{it}.

$$\Delta r_{it} = c + \underbrace{\alpha_i + \beta_t}_{\text{Fixed effects}} + \overbrace{\varphi_1 * \Delta\xi_{it} + \varphi_2 * reg_{it} + \varphi_3 * reg_{it} * \Delta\xi_{it}}^{\text{Wage shocks and regulation}} + \underbrace{\psi(L) * \Delta r_{it}}_{\text{Dynamics}} + \eta_{it} \qquad (4)$$

Restrictions to product market competition vary considerably across countries and time, causing large disparities in the effects of wage moderation, but econometric estimates for a panel of 20 industrial countries support the relationships suggested by the simple correlations in the previous charts. Tables (1) and (2) show estimates of equation (4) (columns 5 and 6), and other specifications including the effect of product market regulations and adjustment dynamics separately (columns 1 to 4).[13,14] While the relation between wage-curve shifts and unemployment rates is positive, the interactive coefficient implies that this effect is weaker in countries with more regulated product markets (i.e., *reg* > 0) and stronger in countries with

[13] As first argued in Nickell (1981), OLS estimation of a dynamic model (like the one in equation (4)) with country-specific dummies to control for fixed effects does not deliver consistent parameter estimates. Tables 1 and 2 report both OLS and GMM estimates for the dynamic specifications. The GMM procedure is the one proposed by Arellano and Bond (1991) but the number of lags of the dependent and predetermined variables used as instruments for the lagged dependent variable was limited to 5 (as opposed to all lags allowed by the number of time periods in the sample) to avoid problems from using weak instrumental variables. Bowsher (2002), for instance, finds that the use of too many moment conditions in the GMM estimation causes the Sargan test of overidentifying restrictions to be undersized and have extremely low power.

[14] The dynamic specifications used for growth in GDP per capita (which includes one lag of the dependent variable) and changes in unemployment rate (which includes three lags of the dependent variable) pass key statistical tests. The Sargan over-identifying restrictions are accepted. The modified residuals, $\Delta\eta_{it} = \eta_{it} - \eta_{it-1}$, present serial correlation of order 1 and no serial correlation of order 2 at the 5 percent level of significance, which is consistent with the null hypothesis of no serial correlation in the original residuals, η_{it}.

less regulated product markets (i.e., *reg* < 0). The same dampening effect of restrictive regulations is present in the equation for GDP per capita growth. The lower panel of Figure 8 shows long-run elasticities of GDP growth and changes in unemployment rate to wage shocks in 1998, when the time series for the regulation variable ends. The elasticities differ substantially across countries depending on the extent that product market regulation restricts competition.[15]

The evidence of a direct link between the effectiveness of labor market reforms and the degree of product market competition reinforces political economy messages made elsewhere in the literature. This paper presents empirical evidence that product market reforms increase the economic benefits of labor market reforms, thus making them more acceptable for unions. Other theoretical results point in the same direction and led to arguments for combining and sequencing reforms to improve their chances for implementation. Blanchard and Giavazzi (2003), for instance, provide a model focusing on dynamic aspects of both labor and product market reforms. They conclude that product market reforms should come first as, by lowering barriers to entry and fostering competition in the product market, they should increase real wages (through lower prices) and reduce unemployment. Higher real wages would buy goodwill from unions and ease implementation of labor market reforms. Helbling and others (2004) present evidence supporting this view.

[15] Long-run effects are calculated as $\frac{\varphi_1 + \varphi_3 * reg_{it}}{1 - \psi(L)}$. Product market regulations per se do not affect changes in real variables, as the linear coefficient on reg_{it} is estimated to be zero. Even though lagged coefficients are relatively small, dynamic effects accumulate over time to a significant impact on GDP per capita *level* and, even more, on the unemployment rate. For instance, a one-time 5 percent downward shift in the wage curve in an economy with average levels of regulation increases GDP per capita level by about 2.5 percent by the end of the third year. The level of the unemployment rate after three years of adjustment is near one percentage point lower, while the static specification implies half of this effect.

Table 1. The Effect of Wage Curve Shifts on Business GDP per Capita

Dependent variable: Growth of business GDP per capita (percent) = Δgdp_{it}

	(1) Coef.	(2) Coef.	(3) Coef.	(4)[1] Coef.	(5) Coef.	(6)[1] Coef.
$\Delta\xi_{it}$	-0.364**	-0.371**	-0.360**	-0.377**	-0.367**	-0.390**
	(0.017)	(0.020)	(0.016)	(0.017)	(0.019)	(0.019)
$regul_t$	---	0.001	---	---	0.001	0.000
		(0.002)			(0.002)	(0.002)
$\Delta\xi_{it}$*$regul_t$	---	0.078**	---	---	0.057**	0.070**
		(0.023)			(0.022)	(0.022)
Δgdp_{it-1}	---	---	0.250**	0.239**	0.227**	0.215**
			(0.029)	(0.028)	(0.032)	(0.030)
Time dummies	yes	yes	yes	yes	yes	yes
Country dummies	yes	yes	yes	---	yes	---
Estimation method	OLS	OLS	OLS	GMM	OLS	GMM
Adjusted R^2	Adj. R^2 = 0.62	Adj. R^2 = 0.62	Adj. R^2 = 0.66	Sargan test of over-id restr.: Chi2(495)=429.0 , p-value=0.98 H0 of no autocorr. of order 1: z=-10.2, p-value=0.00 H0 of no autocorr. of order 2: z=-1.87, p-value=0.06	Adj. R^2 = 0.66	Sargan test of over-id restr.: Chi2(344)=355.05 , p-value=0.33 H0 of no autocorr. of order 1: z=-7.5, p-value=0.00 H0 of no autocorr. of order 2: z=-1.82, p-value=0.07
Number of observations	660	480	640	620	480	460
Number of countries	20	20	20	20	20	20
Number of time periods	33	24	32	31	24	23
Sample	1971-2003	1975-1998	1972-2003	1973-2003	1975-1998	1976-1998

Source: Staff estimation and calculations using data from the OECD - Analytical Database.

Note: Data are at an annual frequency. Wage-setting (structural) shifts are log changes in compensation per hour in the business sector divided by the PCE deflator, minus log changes of labor-saving technology, minus log changes of the unemployment rate multiplied by the elasticity of wages with respect to unemployment (0.1). Standard error in parentheses. * Significant at 5 percent level; ** Significant at 1 percent level.

[1] Uses Arellano and Bond (1991) GMM methodology. Number of lags of dependent variable used as instruments was limited to 5.

Table 2. The Effect of Wage Curve Shifts on the Unemployment Rate

Dependent variable: Changes in the unemployment rate (percentage points) = Δu_{it}

	(1) Coef.	(2) Coef.	(3) Coef.	(4)[1] Coef.	(5) Coef.	(6)[1] Coef.
$\Delta\xi_{it}$	0.065**	0.078**	0.067**	0.072**	0.079**	0.096**
	(0.008)	(0.010)	(0.007)	(0.008)	(0.009)	(0.009)
$regul_t$	---	0.000	---	---	0.000	-0.001
		(0.001)			(0.001)	(0.001)
$\Delta\xi_{it}$*$regul_t$	---	-0.058**	---	---	-0.043**	-0.059**
		(0.011)			(0.010)	(0.010)
Δu_{it-1}	---	---	0.480**	0.481**	0.440**	0.434**
			(0.039)	(0.040)	(0.044)	(0.043)
Δu_{it-2}	---	---	-0.005	-0.002	0.026	0.038
			(0.043)	(0.044)	(0.048)	(0.047)
Δu_{it-3}	---	---	-0.183**	-0.182**	-0.217**	-0.211**
			(0.038)	(0.039)	(0.044)	(0.043)
Time dummies	yes	yes	yes	yes	yes	yes
Country dummies	yes	yes	yes	---	yes	---
Estimation method	OLS	OLS	OLS	GMM	OLS	GMM
				Sargan test of over-id restr.: Chi2(490)=417.5 , p-value=0.99		Sargan test of over-id restr.: Chi2(342)=330.9 , p-value=0.66
Adjusted R^2	Adj. R^2 = 0.37	Adj. R^2 = 0.39	Adj. R^2 = 0.54	H0 of no autocorr. of order 1: z=-17.2, p-value=0.00 H0 of no autocorr. of order 2: z=1.63, p-value=0.10	Adj. R^2 = 0.54	H0 of no autocorr. of order 1: z=-13.8, p-value=0.00 H0 of no autocorr. of order 2: z=0.86, p-value=0.39
Number of observations	660	480	600	580	480	460
Number of countries	20	20	20	20	20	20
Number of time periods	33	24	30	29	24	23
Sample	1971-2003	1975-1998	1974-2003	1975-2003	1975-1998	1976-1998

Source: Staff estimation and calculations using data from the OECD - Analytical Database.

Note: Data are at an annual frequency. Wage-setting (structural) shifts are log changes in compensation per hour in the business sector divided by the PCE deflator, minus log changes of labor-saving technology, minus log changes of the unemployment rate multiplied by the elasticity of wages with respect to unemployment (0.1). Standard error in parentheses. * Significant at 5 percent level; ** Significant at 1 percent level.

[1] Uses Arellano and Bond (1991) GMM methodology. Number of lags of dependent variable used as instruments was limited to 5.

C. Product Market Regulation and the Pass-Through of Wage-Setting Changes

Regarding regulatory developments, product markets have become more flexible across the OECD since 1975, increasing the pass-through from wage moderation to growth and employment. Product markets in every country in the sample became more flexible between 1975 and 1998 (Figure 8, top panel). The greater flexibility has translated into larger elasticities of GDP and unemployment with respect to structural wage-setting changes (Figure 8, middle panel).[16] Data for economy-wide product market regulation for only two years (1998 and 2003) suggest that impediments to product market competition have declined further (Figure 9).[17] In particular, the extent of government involvement in product markets and barriers to international flows of capital and trade have fallen considerably since 1998. Cross-country dispersion in product market policies has also shrunk.

Nevertheless, important cross-country differences persist and further product market liberalization within the euro area would increase the benefits of labor market reforms. According to the data used in the econometric exercise, 8 euro-area countries were among the 10 most regulated OECD economies in 1998. Thus, wage moderation in euro-area countries was, on average, less effective in raising GDP growth and lowering unemployment (Figure 8, bottom panel). In addition, according to the economy-wide data for 2003, notwithstanding overall product market flexibilization observed in the OECD since 1998, barriers to entrepreneurship have fallen relatively less and impediments to competition persist. For instance, barriers to entry in non-manufacturing industries (the most important determinant of product market regulations used in this paper) are still quite relevant. In addition, despite some regulatory convergence in recent years, large differences between countries with "relatively liberal" and "relatively restrictive" (including many euro-area countries) regulatory environments persist. Finally, intra-EU regulatory divergences have shrunk since 1998 but remain significant.[18]

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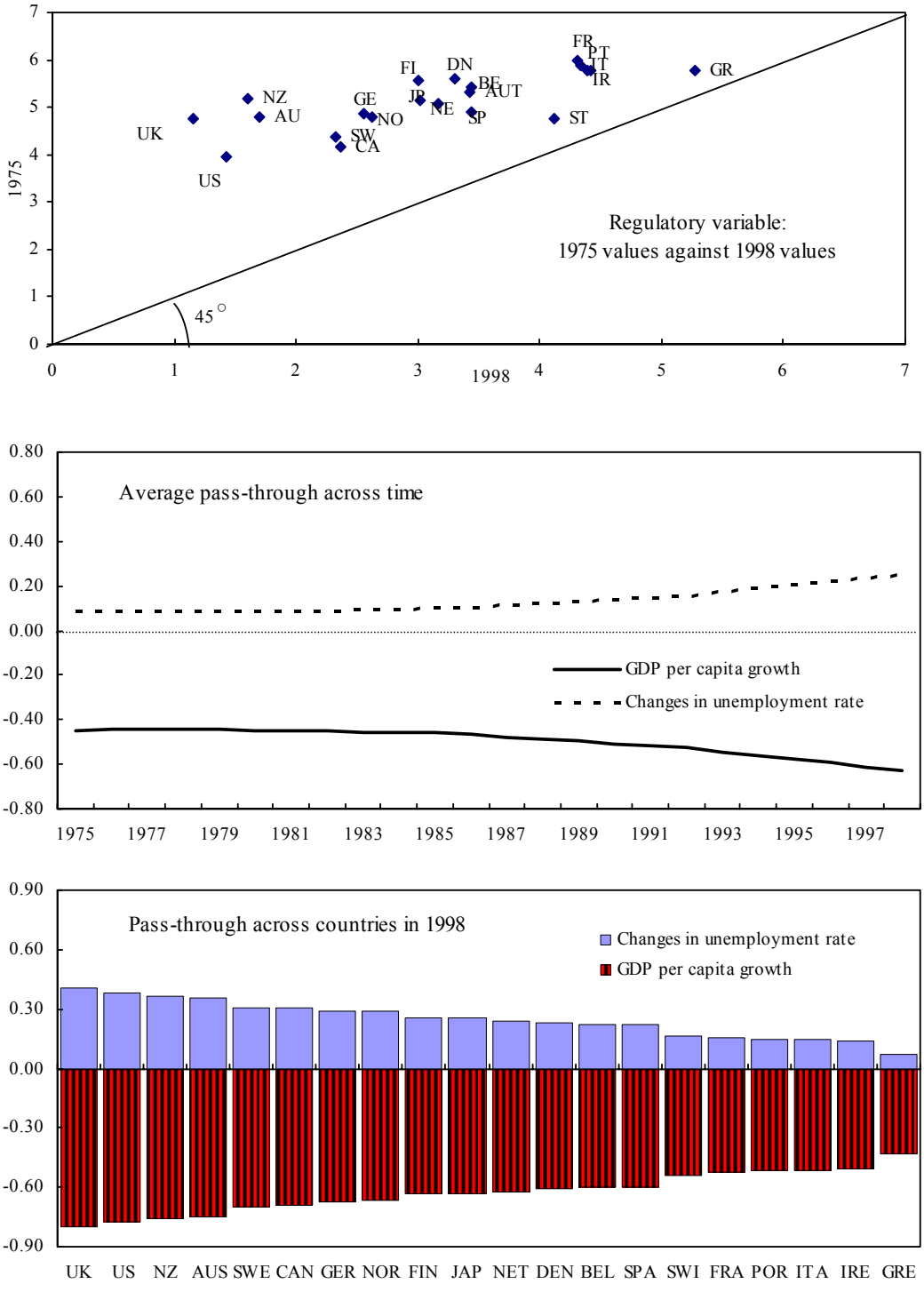
[16] The average elasticities of GDP per capita growth and changes in unemployment rate with respect to changes in wage-setting conditions shown in Figure 8 include the dynamic effects captured by the lagged dependent variable in equation (4) (see previous footnote).

[17] See Conway and others (2005). Unfortunately, this statistical information is not consistent with the time series for product market regulation used in this paper. The OECD measures used here refer to particular (albeit important) non-manufacturing industries, while the new OECD Product Market Regulations (PMR) indices for 1998 and 2003 refer to the whole economy. The indices are a composite of 16 more disaggregated indicators broadly covering the extent of state control on the economy, barriers to entrepreneurship, and barriers to foreign trade and investment.

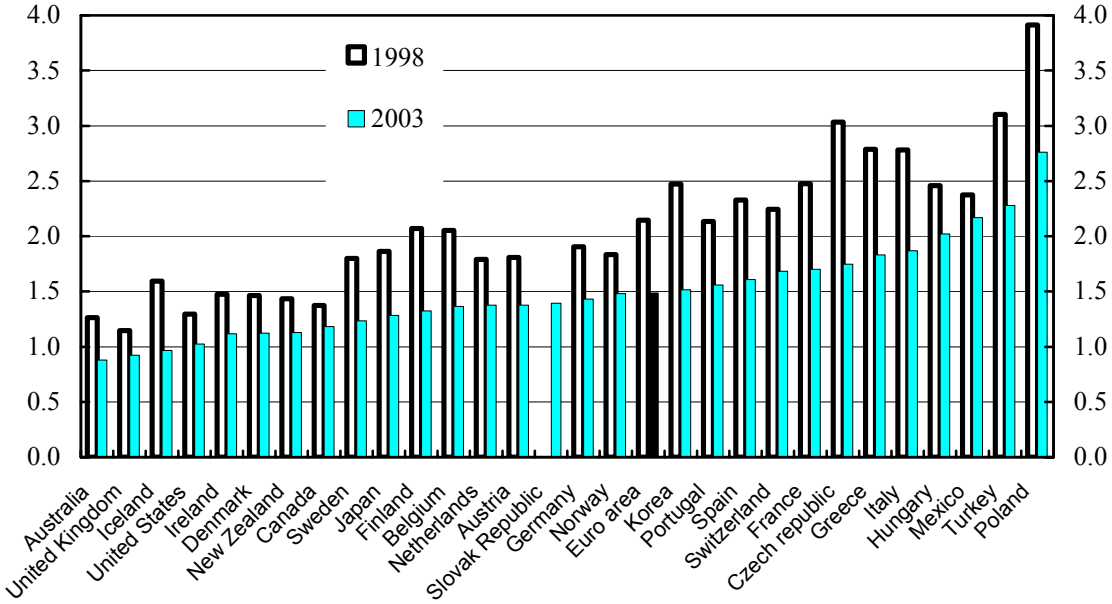
[18] See Conway and others (2005).

Figure 8. OECD: Product Market Regulation and Pass-Through of Wage-Setting Changes



Source: Nicoletti and Scarpetta (2003) and staff estimates.

Figure 9. Strength of Anti-Competitive Product Market Regulation, 1998 and 2003



Source: OECD.

Note: The indicator of economy-wide regulation is measured on a scale from 0 (most liberal) to 6 (most restrictive) and is described in Conway and others (2005).

V. Conclusions and Final Remarks

Wage moderation has been the "rule" rather than the "exception" across industrial countries in the last 20 years, although the extent of wage moderation varied considerably. The cross-country variation is particularly large within the euro area where in some nations wages have increased consistently less than technological growth since the 1970s or early-1980s (e.g., Ireland, the Netherlands, and Portugal) while in others wage moderation is a 1990s event (e.g., Belgium, Germany, and Spain).

In addition, wage moderation has translated differently into improved economic performance, depending on a country's degree of product market regulation. Econometric evidence for a sample of 20 OECD countries shows that restrictions to product market competition dampen the effects of wage moderation. This result is consistent with a link between product market regulation and firms' rent-seeking behavior. In less regulated product markets, an improvement in wage-setting conditions may generate fiercer competition for market shares. In the process, output and employment increase more in these markets. By contrast, in more regulated product markets, softer competitive pressures may lead incumbent firms to expropriate a larger share of the cost reduction in the form of higher rents.

These findings are consistent with previous work on the complementarity of labor and product market reforms. Some studies suggest that product market reforms should come first as, by lowering barriers to entry and fostering competition, they tend to increase real wages and reduce unemployment. Higher real wages would buy goodwill from unions and ease implementation of labor market reforms. Thus, adequately sequencing product and labor market reforms can make some reforms more politically acceptable. This paper provides empirical evidence for a direct link between the effectiveness of labor market reforms and the degree of product market competition, which reinforces the political economy message: product market reforms increase the economic benefits of labor market reforms, thus making them more acceptable for workers.

Overall, highly regulated product markets are undermining the effectiveness of labor market reform in the euro area. While product markets of virtually all OECD countries have become more market friendly in the last 30 years, policy approaches and results continue to differ, including within the euro area. Without additional progress in this area calls for more labor market reforms to lower unemployment and increase production may continue to be questioned by wide segments of society.

THE OECD PRODUCT MARKET REGULATION DATA

Intensity of regulation is measured according to the data described by Nicoletti and Scarpetta (2003). The OECD International Regulation Database covers 21 OECD countries (Australia, Austria, Belgium, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, UK, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Sweden, US, New Zealand) and seven non- manufacturing industries: electricity and gas supply (generation, transmission, distribution), road freight, air passenger transport, rail transport, post (basic letter, basic parcel and express mail) and telecommunications (fixed and mobile). Entry conditions are ranked in all seven industries while information on the extent of public ownership is available for 6 industries. Other dimensions of product market regulations (market structure and the extent of vertical separation) are available for some of them. The regulatory indicators measure restrictions on competition and private governance on a scale from 0 to 6 (from least to most restrictive). Similarly to Alesina and others (2003), the product market regulation index used here is a simple arithmetic average of all indices for the seven industries.

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