

The persistence of high unemployment in a number of industrial countries— notably in continental Europe—is arguably one of the most striking economic policy failures of the last two decades. A wide range of analysts and international organizations—including the European Commission, the Organization for Economic Cooperation and Development (OECD), and the International Monetary Fund (IMF)—have argued that the causes of high unemployment can be found in labor market institutions. Accordingly, countries with high unemployment have been repeatedly urged to undertake comprehensive structural reforms to reduce “labor market rigidities” such as generous unemployment insurance schemes; high employment protection, such as high firing costs; high minimum wages; noncompetitive wage-setting mechanisms; and severe tax distortions. While there are solid theoretical arguments underpinning the call for such reforms, the empirical evidence is somewhat less developed and, in some cases, unsupportive (see, for instance, Cohen, Lefranc, and Saint-Paul, 1997). This is partly because until recently the data on labor market institutions was not well enough developed to allow a full analysis of the multiple and complex linkages between labor institutions and unemployment.

This chapter looks at the current state of the debate and provides further analysis of the likely benefits from labor market reforms in terms of lower unemployment and higher output. The analysis relies on two complementary approaches. The first, which builds on and extends a number of recent empirical studies, especially Nickell and others (2001), looks directly at the relationship between unemploy-

ment and labor market institutions, using an original data set that combines historical series assembled by Nickell and Nunziata (2001) with most recent information on labor market institutions made available by the OECD. It is complemented by a second approach based on simulations performed with the IMF’s new Global Economy Model (GEM), a macroeconomic model incorporating a rigorous characterization of labor and product market imperfections (Pesenti, 2003; Laxton and Pesenti, 2002). Both approaches convey a unified message.

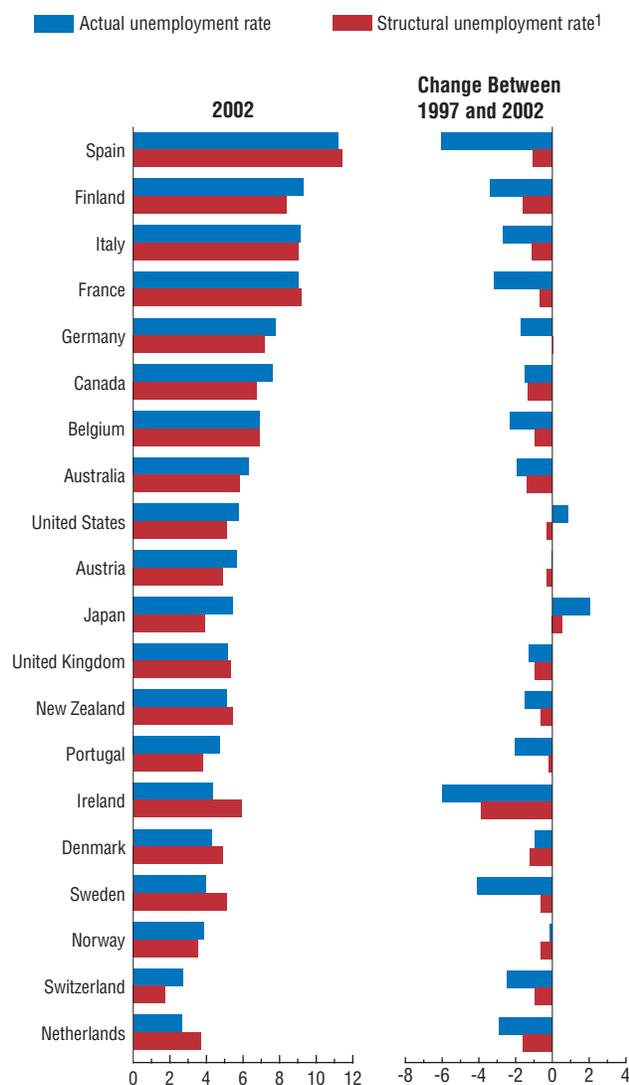
- First, comprehensive and procompetitive reforms can generate substantial gains. Both approaches suggest that well-designed labor reforms could produce output gains of about 5 percent and a fall in the unemployment rate of about 3 percentage points. GEM simulations indicate that those benefits could be doubled by simultaneous efforts to increase competition in the product market so that high-unemployment countries could be expected to post unemployment rates unseen since the early 1970s.
- Second, reforms need to be comprehensive; partial reforms can be less effective, especially when the labor market is uncompetitive.
- Third, when labor markets are more competitive, the economy reacts more quickly and smoothly to changes in interest rates. This facilitates the task of the monetary authorities; in particular, smaller changes in interest rates—and therefore output—are necessary to stabilize inflation in the face of shocks.

At the outset, two points should be noted. First, data limitations prevent a statistical analysis of the link between labor market institutions

Note: The main author of this chapter is Xavier Debrun. Yutong Li and Nathalie Carcenac provided research assistance; Tamim Bayoumi, Benjamin Hunt, and Douglas Laxton designed and implemented the Global Economy Model simulations. Recent institutional data were provided by Giuseppe Nicoletti.

Figure 4.1. Actual and Structural Unemployment Rates (Percent)

High-unemployment countries face a persistent structural problem.



Source: OECD, *Analytical Database*.

¹Refers to NAIRU, that is, the rate of unemployment at which there is no tendency emanating from the labor market for inflation to change (see Box 4.1, May 1999 *World Economic Outlook*).

and unemployment beyond 1998. Since then, structural unemployment in Europe has started to decline, albeit slowly, reflecting some progress in the area of labor market reforms (see Figure 4.1). However, the analysis in this chapter suggests that more comprehensive reforms would be necessary to secure a lasting and decisive reduction in structural unemployment. Second, the discussion focuses on the long-run benefits of reforms, especially in terms of lower unemployment. In the short run, of course, there may be up-front costs, for instance through costly reorganizations of production and changes in income distribution; and if government support is deemed necessary to help address these problems, there may also be a short-run effect on government budgets.¹ An assessment of those costs would be critical to determine the sequencing of reforms. However, these important issues are beyond the scope of this chapter, whose main task is to identify the pay-offs from reforms.

Why Do We Need Labor Market Institutions?

It has long been acknowledged that the labor markets are not, by their nature, perfectly competitive.² The most common “imperfections” include information problems such as the difficulty for employers to fully monitor the workers’ efforts or skills, and for workers to properly evaluate their contribution to the firm’s productivity (and thereby know what their wage should be). Information problems also complicate the matching between workers and vacancies, especially when skills matter. Another imperfection comes from market power: if employers dominate labor relations, wages can be pushed too low, and if labor dominates, wages can be too high. Finally, market mechanisms cannot provide sufficient

¹See Beetsma and Debrun (2003).

²Blanchard (2002) provides an illuminating discussion of the economic principles guiding the design of labor market institutions. Agell (1999) looks at the risk-reducing role of labor market rigidities. See also Blanchard and Giavazzi (2002).

insurance against unemployment risk given the aggregate nature of such a risk. Correspondingly, it is generally agreed that “the labor market will not function well without proper institutions,”³ that is, without an appropriate mix of regulations, taxes, and subsidies affecting the relation between workers and employers. Despite the broad consensus on the desirability of introducing some “rigidities” in labor markets, the practical policy implications give rise to intense debates. What are those “proper” institutions (or how much rigidity is desirable)? To what extent do “ideal” labor market institutions reflect country-specific characteristics and preferences (the one-size-fits-all issue)? And what are the consequences of having flawed institutions and what are the gains from fixing them?

Although the first and the second questions have important practical implications, the third question is clearly key to motivate decisive reforms. This chapter proceeds in three stages. First, it demonstrates that high unemployment is largely structural in nature—and thereby potentially affected by institutions—rather than cyclical (and therefore determined by the business cycle and macroeconomic policies).⁴ Second, based on the empirical approach already described, it provides some new evidence on the linkages between high structural employment and the institutional features of labor markets. And third, it provides some quantitative estimates of the impact of possible institutional reforms on unemployment and output, and describes how these can vary with the underlying competitiveness of the labor market.

Is High Unemployment a Structural Problem?

Evidence that high-unemployment countries face structural problems is plentiful. Figure 4.1

ranks 20 industrial countries according to their actual unemployment rates at end-2002 and shows the corresponding changes since 1997—the latest peak of unemployment in western Europe. Although the split between structural and cyclical unemployment is subject to some imprecision, the cross-country differences in actual unemployment rates almost exactly match differences in the structural rates.⁵ Moreover, the problem appears to be persistent as much of the improvement since 1997 is due to cyclical factors.

Another striking illustration of the structural nature of high unemployment in industrial countries can be seen in the relationship between unemployment and labor force participation rates (Figure 4.2). In general, high unemployment is strongly associated with low levels of labor market participation, suggesting that unemployed individuals in high unemployment countries often prefer to leave the labor force, reflecting the length of the unemployment spell and the difficulty to find a new job. Such a decision may be further encouraged by generous disability benefits and incentives for early retirement. It is notable that this relationship holds in terms of changes as well as levels, pointing to the fact that even temporary improvements in labor market conditions lead many individuals to re-enter the labor force. Although participation rates can reflect country-specific preferences for leisure over work, more detailed analyses of participation rates by age and gender reveal even more dramatic cross-country differences that are too large to be entirely attributed to different preferences (see Jackman, 2001).

Another typical symptom of malfunctioning labor markets is a greater difficulty in matching unemployed individuals to existing vacancies. This problem is illustrated by the relationship between unemployment and vacancy rates—

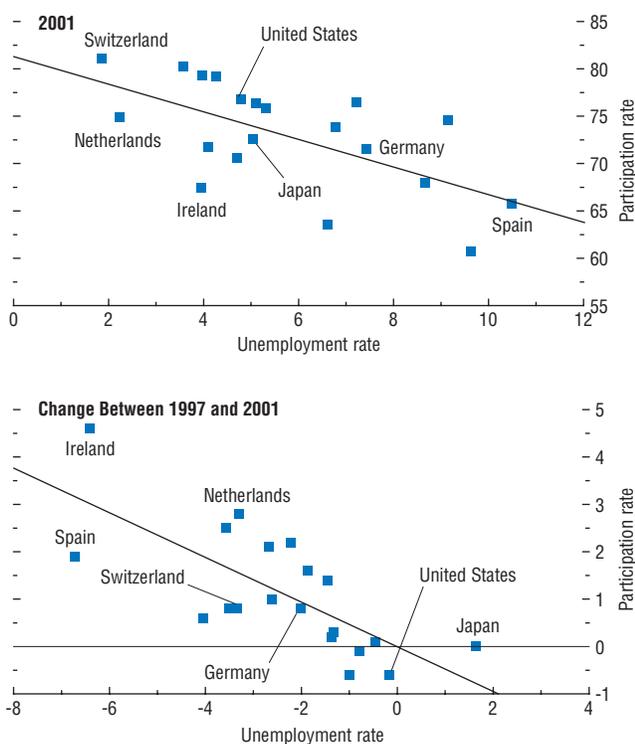
³The quote is from Blanchard (2002, p. 1)

⁴A detailed presentation of the various concepts and measurements of unemployment is provided in the May 1999 *World Economic Outlook*. The same issue summarizes the main theories of long-term, structural or “equilibrium” unemployment, including the linkages between labor market institutions and structural unemployment.

⁵Throughout this chapter, for comparability with most previous studies, OECD *standardized* unemployment rates and estimates of structural unemployment rates are used.

Figure 4.2. Unemployment and Participation Rates

There is a negative relationship between unemployment rates and participation rates, both in levels and in variations.



Sources: OECD Analytical Database and Employment Outlook.

known as the Beveridge curve (Figure 4.3). Since high vacancy rates generally reflect a strong demand for additional workers, they naturally tend to be associated with low unemployment rates. The interesting point here is that the position of the curve shifts over time. During the 1970s and the early 1980s, the curve shifted rightward (Figure 4.3, top panel), suggesting a *structural* increase in unemployment (because the same vacancy rate corresponds to higher unemployment). During the second half of the 1980s and the 1990s, the Beveridge curve shifted *leftward* in the United States—signaling a fall in structural unemployment—while the rightward shift in the curve in the European Union continued. Other factors consistent with high structural unemployment include evidence of severe distortions in the determination of labor costs (e.g., Prasad, 2000, 2003; and Nickell and others, 2001) and large regional disparities (Box 4.1).

What Is the Effect of Labor Market Institutions on Unemployment?

To quantify the effect of specific labor market institutions on unemployment, the IMF staff undertook an econometric study based on a panel of 20 OECD countries over 1960–98, building on and extending earlier work by a variety of researchers.⁶ The study focuses on the following institutional indicators: the replacement ratio (the ratio of unemployment benefits in the first year of unemployment to past earnings); an index of employment protection; the tax rate on labor (including social security contributions, income taxes, and indirect taxes); the density of union membership; and the nature of wage bargaining process (centralized or decentralized).⁷

⁶Those studies include Scarpetta (1996), Nickell (1998), Elmeskov, Martin, and Scarpetta (1998), Nickell and Layard (1999), Belot and van Ours (2000), Blanchard and Wolfers (2000), Daveri and Tabellini (2000), Fitoussi and others (2000), Nickell and van Ours (2000), OECD (2002a), and Nickell and others (2001).

⁷Details about data definitions, model specification, and estimation methods are reported in Appendix 4.1.

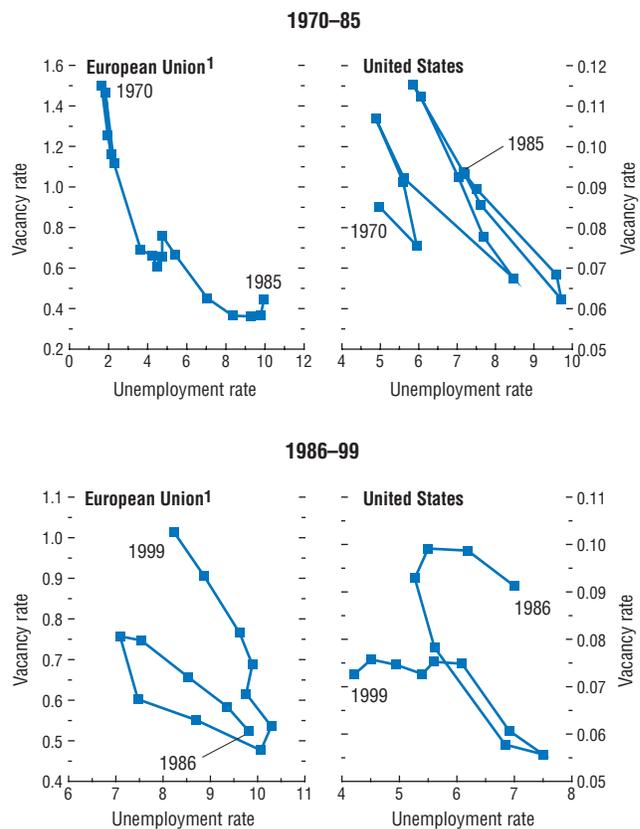
Owing to limited data availability, this analysis does not investigate the effect of active labor market policies, the duration of unemployment benefits, minimum wages, limitations on working hours, part-time jobs, fixed-term contracts and education, or linkages with product market reforms. However, more extensive studies, such as Nickell and Layard (1999) and OECD (2002a), suggest that those omissions should not significantly affect the thrust of the present analysis.

The empirical investigation first seeks to answer two basic questions: first, how well do institutions explain the evolution of unemployment over time and between countries, and second, which institutions turn out to matter most and why? To address the first question, Figure 4.4 plots some simple estimates of unemployment rates adjusted for the effects of institutions in major countries (technically, the residuals of a panel regression of unemployment over the available institutional data and their interactions—see Appendix 4.1). While the statistical analysis confirms that institutional variables are significant determinants of unemployment, the chart shows that the adjusted unemployment rates fluctuate around zero, suggesting that cross-country differences in unemployment are well explained by the differences in labor market institutions. However, the purely institutional model does not seem to fully explain changes in unemployment across time, as can be seen in the upward trend in the unemployment rate adjusted for institutions in many European countries since the early 1970s.⁸

⁸According to Blanchard and Wolfers (2000), this observation is consistent with the hypothesis that labor market institutions determine the way macroeconomic shocks affect the entire time path of unemployment. In particular, the trend in European unemployment would suggest that European institutions prevent favorable shocks to fully eliminate the unemployment created by adverse shocks. Hence, unless macroeconomic policies become implausibly effective at stabilizing the business cycle, this approach remains consistent with the view that high and persistent unemployment can only be solved through structural reforms.

Figure 4.3. Unemployment and Vacancy Rates (Percent)

Rightward shifts of the Beveridge curves indicate higher structural unemployment. Since 1986, the latter continued to increase in Europe but started to fall in the United States.

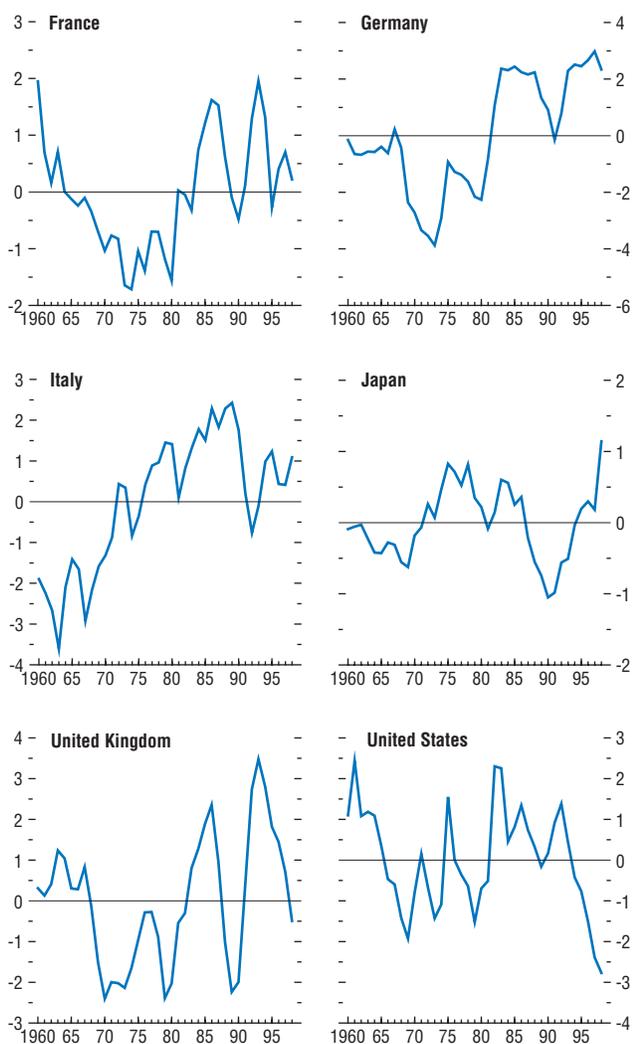


Sources: OECD *Analytical Database*; Nickell and Nunziata (2001); and IMF staff calculations.

¹Weighted by total employment. Greece, Ireland, Italy, and Luxembourg are excluded from the aggregate calculation owing to lack of vacancy rate data.

Figure 4.4. Institution-Adjusted Unemployment Rates¹
(Percent)

Institutions alone explain a good deal of the cross-country differences in unemployment rates. However, they hardly account for the growing trend observed in most European countries and the dramatic fall in U.S. unemployment in the 1990s.



Source: IMF staff estimates.

¹Residuals of a panel regression of OECD standardized unemployment rates on an index of employment protection, benefit replacement ratio, union density, index of bargaining coordination, labor taxes, and interactions among institutions (see Appendix 4.1).

This points to the need for a more complete model able to identify which institutions matter most, given the persistence (dynamics) of unemployment and the effects of macroeconomic shocks. The technical details of this model, on which the remainder of the analysis in this section is based, are set out in Appendix 4.1.

However, it should be noted that the model explicitly takes account of the interaction of one labor market institution with another (for instance, the possibility that labor taxes may have a different effect on unemployment when labor market competitiveness is high and when it is low, which, as discussed below, indeed turns out to be the case).⁹ Such interactions are important to understand whether identical reforms in two different countries will have similar effects—lessening to a large extent the one-size-fits-all critique that inevitably emerges from a panel analysis¹⁰—and whether wide-ranging reforms will be more effective than piecemeal measures.¹¹

Overall, as discussed in Appendix 4.1, the model was found to fit the data well, and the results are broadly consistent with those found in other studies using different data sets or samples. The main results can be summarized as follows.

- The generosity of *unemployment insurance*, as measured by the extent to which unemployment benefits replace past earnings, contributes to higher unemployment. This effect mainly works through an extension in the duration of the unemployment spell,

⁹Belot and van Ours (2000) propose a theoretical model of the labor market in which interactions among institutional parameters matter for equilibrium employment.

¹⁰Belot and van Ours (2000) elaborate on that argument.

¹¹Other features of the model include a nonlinear relationship between unemployment and the degree of wage bargaining coordination (Calmfors and Driffill, 1988); interaction between the wage bargaining process and the degree of central bank independence (Hall and Franzese, 1998); and allowance for the possibility that institutions affect the persistence of unemployment (Scarpetta, 1996).

Box 4.1. Regional Disparities in Unemployment

Regional disparities in unemployment rates are strikingly large in Europe. In 2001, the average unemployment rate in the European Union was 7.8 percent, but it ranged from 1.7 percent in Berkshire (United Kingdom) to 24.9 percent in Calabria (Italy).¹ These disparities are present even within single countries, where the range of unemployment rates is much higher than in the United States (see the first figure). This is particularly the case in Belgium, Germany, Italy, and Spain.

Of equal concern, disparities in European regional unemployment rates are also very persistent (see the second figure). In the United States the correlation between regional unemployment rates today and seven years ago is only 0.30, indicating that over two-thirds of any regional unemployment problem is resolved over that period. In Europe, however, the correlation averages 0.83, suggesting that very little adjustment takes place.

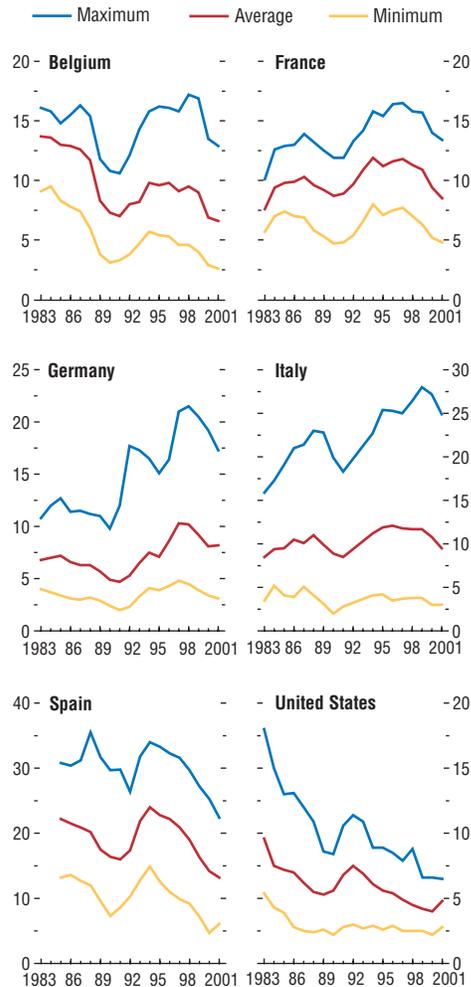
Large and persistent disparities in regional unemployment rates could be a problem for several reasons.

- They may lead to higher inflation (technically, a higher national nonaccelerating inflation rate of unemployment, NAIRU) if national wage setting depends only on the conditions prevailing in the low unemployment regions. For instance, the evidence suggests that in Italy conditions in the northern and central regions determine wage setting at the national level, resulting in relatively high real wages in the south, where unemployment exceeds 18 percent (Brunello, Lupi, and Ordine, 2000).
- They increase the social cost of unemployment. When unemployment is concentrated in a specific area, informal support networks can break down, asset prices drop sharply, and economic distress often becomes an acute social problem.

Note: The main author of this box is Antonio Spilimbergo.

¹European regions are as defined in Mauro, Prasad, and Spilimbergo (1999).

Dispersion of Regional Unemployment Rates

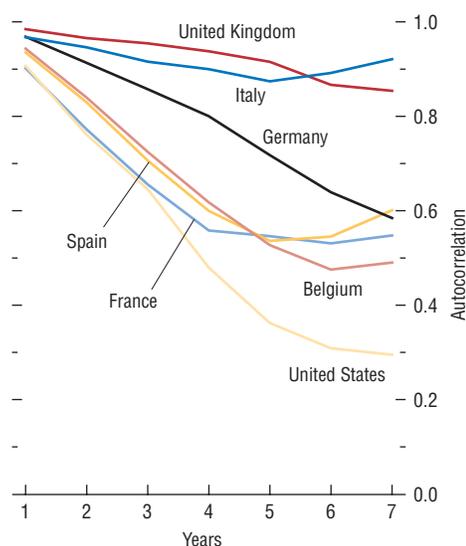


Sources: Eurostat; and IMF staff estimates.

- They are evidence of inefficiency in the labor and capital markets since resources that are in excess supply in some regions are not productively used in other regions.
- They seem strongly associated with a large shadow economy. For instance, in Italy the employment in the informal sectors is estimated to be about 30 percent in the south

Box 4.1 (concluded)

Persistence of Regional Unemployment Rates



Source: IMF staff estimates.

and less than 10 percent in the north (Boeri and Garibaldi, 2002). This strong association suggests that high regional unemployment could reflect—and to some degree cause—wider governance problems.

The sources of regional differences in unemployment rates are numerous. Some disparities in regional unemployment rates are a natural feature of an open economy because regions within the same country are faced with different economic circumstances. For instance, region-specific shocks are much more prevalent in Europe than in the United States (Decressin and Fatás, 1995). In addition, industry composition seems to play an important role (Marimon and Zilibotti, 1998); for instance, long-term unemployment is particularly high in traditionally agriculture-intensive regions such as Andalucía in Spain.

Whatever the initial cause, persistent regional unemployment suggests that there are insuffi-

cient incentives for either labor to move out or private capital to move in. In this connection, the limited regional labor mobility in several European countries when compared with the United States is striking. In the United States, a negative regional shock leads to migration to other states; in Europe, a negative regional shock initially increases unemployment and, in the long run, permanently decreases the local participation rate (Decressin and Fatás, 1995). In many European countries local wages are relatively insensitive to local market conditions; moreover, workers, especially those with low education and in southern Europe or in countries with different linguistic communities, do not seem sensitive to wage differentials (Jimeno and Bentolila, 1998; Mauro and Spilimbergo, 1999; and Estevão, 2003). High levels of national unemployment also limit interregional migration rates. In addition, private capital mobility is limited, in part because the productivity of capital is low in regions with high unemployment, which are often geographically isolated and have poor infrastructure.

Policymakers have long been concerned about regional disparities and policies have been implemented both at the European level and at the national level. In 1987, the Single European Act committed the European Union to addressing regional disparities,² primarily through grants from the European Regional Development Fund and the European Social Fund, which jointly account for 35 percent of the European Union budget. To date, the main recipients have been Greece, Ireland, southern Italy, Portugal, and Spain, for whom the annual grants have accounted for between 1 and 3.5 percent of GDP (Boeri and others, 2002). These grants were intended to be used to build infrastructure and offer training programs, thereby helping alleviate supply bottlenecks in

²Article 1 of the aforementioned document states that the (European Union) “. . . shall aim at reducing disparities between the various regions and mitigating the backwardness of the less favored regions.”

poor regions often complementing private capital. In addition, several countries have introduced various fiscal incentives to increase employment in distressed regions. To date, however, the effectiveness of these policies is still unclear: except in Ireland, there is no evidence of convergence in the regions receiving assistance (Boldrin and Canova, 2001), and there is a danger that structural funds could discourage migration to lower-unemployment regions (Spilimbergo, 1999).

An important reason why the policy measures so far implemented have had mixed results may be that they do not deal directly with the problem of wage flexibility, which has historically

been limited in Europe because nationwide unions have generally opposed regionally decentralized bargaining. Most recently there have been some signs of greater flexibility, in part due to the pressure from high unemployment regions. In Germany, unionized companies are now able to invoke opt-out clauses (“Öffnungsklausel”), allowing them to pay wages below the industry-wide minimum (Burda and others, 2001). Along similar lines, Italy has introduced special contracts for depressed areas, “patti territoriali.” Further measures to increase wage flexibility across regions could play an important role in reducing regional unemployment.

thereby increasing the persistence of unemployment.

- Greater *unionization* is found to be associated with higher unemployment, in common with the results of many other studies.¹² This most likely reflects the fact that higher levels of unionization can give rise to less competition in labor markets, and correspondingly relatively higher real wages. That interpretation is supported by Nickell and others (2001), who find that greater unionization tends to increase real labor costs.
- Greater *employment protection* such as large firing costs or strict labor standards generally leads to higher average unemployment. However, that effect appears to decrease with the degree of unionization, reflecting a well-documented ambiguity about the impact of protection on unemployment (see Nickell, 1998). On the one hand, protection dampens short-term unemployment because existing employees are fired less easily. On the other hand, it increases long-term unemployment as employers are more reluctant to hire highly protected workers. IMF staff estimates

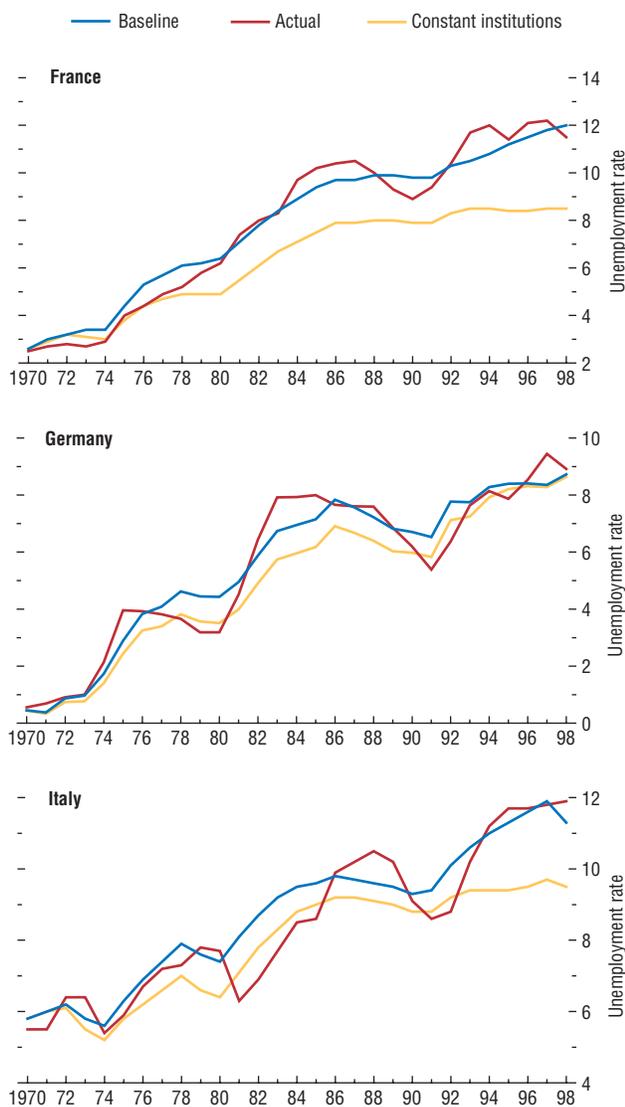
therefore suggest that unions themselves contribute to a more effective and more widespread implementation of employment-protection measures, which tends to magnify the first effect. Nevertheless, the undesirable effect on long-term unemployment dominates in 13 countries out of 20, including all G-7 economies.

- *Labor taxes*—including direct taxes on households’ labor income and social security contributions—tend to increase unemployment. Again, this effect is lower in highly unionized economies, suggesting that if unions have sufficiently strong bargaining power, higher labor market taxes are more likely to be absorbed by employers and will have a smaller impact on employment than if market mechanisms were allowed to operate fully. This suggests that labor tax cuts will have a larger effect on unemployment when combined with measures to increase competition in the labor market (see below).
- The degree of central *coordination in wage bargaining* has two opposite effects on unemployment, making it difficult to draw general

¹²See in particular Nickell (1998), Nickell and others (2001), and OECD (2002a).

Figure 4.5. Changes in Labor Market Institutions and Unemployment Rates

Dynamic simulations of the empirical model show the effect of changes in the labor market institutions since 1970.



Source: IMF staff estimates.

conclusions or policy recommendations. On the one hand, greater coordination discourages competitive wage-setting, resulting in upward pressure on real wages and a looser relationship between wages and productivity across industries and regions (see Box 4.1. on regional disparities). The resulting rigidity in wage adjustments (see, e.g., Prasad, 2000, 2003) may increase unemployment persistence, as confirmed by IMF staff results. On the other hand, greater coordination may lead workers to take into account the broader economic consequences of wage demands in excess of productivity gains, such as higher inflation or loss of competitiveness. Hence, coordination is conducive to economy-wide wage moderation (see Box 4.2.). The relative importance of each effect depends on two country-specific features. First, at low initial levels of coordination, more coordination reduces unemployment whereas the opposite occurs beyond a certain threshold. Second, more coordination may contribute to lower unemployment if monetary policy is decided by a sufficiently independent central bank.¹³ This is consistent with the view that coordinated wage bargaining allows wages to better reflect information issued by the monetary authorities about future inflation (Hall and Franzese, 1998). As inflation targets announced by independent central banks are more credible, workers are less concerned about unexpected inflationary risks.

What Are the Quantitative Benefits of Reforms?

The model was first used to examine the impact of institutions on unemployment over the past 30 years, by using it to simulate what would have happened had institutions remained

¹³Since the model explains national unemployment rates using national institutional variables, that result should not be extrapolated to draw any conclusion about the coordination of wage bargaining at the level of the euro area.

Box 4.2. Labor Market Reforms in the European Union

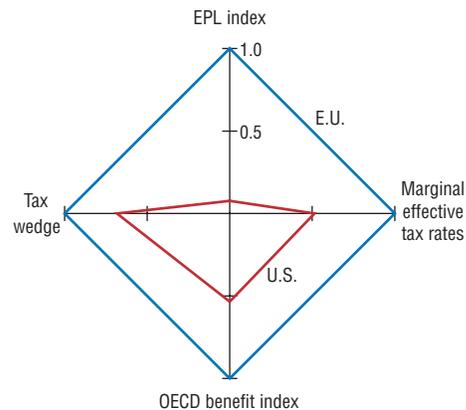
Notwithstanding recent improvements in several countries, labor markets remain the Achilles' heel of many European economies. Particularly in the larger euro area countries, actual and structural unemployment rates remain persistently high, with relatively low rates of labor utilization and participation. At the same time, however, in some European Union (EU) economies—e.g., the Netherlands and the United Kingdom—labor market indicators are significantly more favorable, reflecting institutional reforms carried over the past few decades. An examination of individual country experiences since 1997 suggests a continuation of this rather uneven labor market performance across EU countries (see Figure 4.1). In terms of changes to structural unemployment, the best performers tend to be concentrated among the smaller economies (Finland, Ireland, and the Netherlands), while larger member states recorded no improvement (Germany) or below-average reductions in structural unemployment (France). The net result is that overall EU structural unemployment has fallen by only $\frac{3}{4}$ percent since 1997.

Across a range of structural indicators, the EU labor market continues to compare unfavorably to more competitive labor markets (see the figure). For example, EU unemployment benefits and marginal effective tax rates on additional income are about twice as high as U.S. levels. Nevertheless, only a few EU countries have lowered reservation wages through adjustments in benefit levels in the past few years—generally in the area of tightening eligibility or work requirements—while labor income continues to remain heavily taxed. Austria, Belgium, France, Italy, and the Nordic countries, in particular, have effective tax rates well above OECD averages; only Ireland, Portugal, and the United Kingdom have an

Note: The main author of this box is Kevin Ross. The OECD data referenced in this box are consistent with the data used in the main text of this chapter.

Comparison of U.S. and European Labor Market Indicators¹

The figure shows that structural conditions in European labor markets remain less conducive to low unemployment than in the United States. High taxes and employment protection discourage job creation while generous unemployment benefits reduce the incentive of unemployed individuals to find a job.



Sources: OECD; European Commission; and IMF staff estimates.

¹The European Union has been indexed to 1. Tax wedge is based on a full-time worker with no children at APW, 2001. Marginal tax rates are on additional full-time worker income given a full-time principal earner, 1997. The OECD benefit index is defined as the gross unemployment benefit for 2 earning levels, 3 family situations, and 3 durations of unemployment.

average effective rate broadly equal to that in the United States.¹

Much of the improvement in EU labor market outcomes that did take place can be tied to the onset of wage moderation across member states—a phenomenon that has occurred without a major reform of EU bargaining structures or benefit systems.² Linked

¹In Europe, high tax wedges on labor—on average about 15 percentage points higher than in the United States—largely reflect high levels of public expenditure and the important role played by wage-based contributions in financing the transfer system.

²The labor market reforms that did take place—for example, reductions in the tax wedge—may have also encouraged wage moderation.

Box 4.2 (concluded)

to the need to safeguard competitive positions and European Monetary Union (EMU) regime change, wage moderation may have transpired through increased use of national social pacts or “wage norms” as well as opening clauses in sectoral agreements. This has resulted in a reduction in wage shares, the adoption of less labor-saving technology, and the production of more job-rich growth outcomes. The future sustainability of wage moderation in the absence of deeper structural/institutional reforms, however, is an open question.³ It is important to note that a number of noninstitutional factors, such as positive changes in total factor productivity and demographics, may have also led to a decline in structural unemployment.

Still, a number of reforms aimed at improving the efficiency of the matching process, particularly of low-skilled workers and other vulnerable groups, can be identified.⁴

- Targeted cuts in employer social security contributions can have a sizable impact on the employment prospects of low-skilled workers, particularly given their relatively high elasticity of labor demand. With this in mind, Austria, Belgium, France, the Netherlands, Spain, and the United Kingdom have cut social security contributions by low-paid workers by about 1½ percentage points since 1997.
- Some member states have boosted labor supply through cuts in marginal effective tax rates

³See EU Commission (2002). In his survey of wages and wage bargaining institutions in EMU, Calmfors (2001) argued that monetary integration was likely to promote national coordination of wage bargaining because social actors would see the need for more nominal wage flexibility as a substitute for domestic monetary policy.

⁴A detailed European-wide employment strategy was developed in 1997 at the Luxembourg Jobs Summit. At subsequent meetings, the European Council added specific targets to be reached by 2010; Lisbon targets included a 70 percent overall employment ratio and a 60 percent female employment ratio. The Stockholm Council added an employment target of 50 percent for older workers, while the Barcelona Council added the progressive increase of about five years in retirement ages by 2010.

that make work more attractive, particularly on second jobs or incomes of family members.⁵ To avoid unemployment traps, tax relief, in the form of either earned income tax credits or exemptions for child care expenses, has been introduced or raised in Belgium, Finland, France, Germany, Italy, the Netherlands, Spain, and the United Kingdom to make work more attractive.

- Excessive hiring and firing costs have tended to limit employment creation, particularly of hard-to-place workers. Although past trends in the overall level of employment protection legislation have remained roughly the same, there has been a degree of liberalization of fixed-term contracts—particularly in Spain—and temporary work agencies.⁶ Increasingly, working-time arrangements have become more flexible with more use of part-time work, flextime, and rationalization of annual work time. For example, temporary contracts now constitute over 13 percent of total employment, up 1 percentage point from 1997. However, in some cases, such as France’s move toward a 35-hour workweek, increased flexibility in work arrangements was achieved at the cost of added distortions.
- Regarding pension reforms, some countries have raised retirement ages (Austria, Belgium, Finland, Italy, and the United Kingdom) and reduced the incentives to early retirement, mostly by making pensions actuarially fairer. A few countries have tightened access to special early retirement pensions or disability benefit schemes (Belgium, Denmark, Finland,

⁵Austria, Germany, Ireland, the Netherlands, Spain, Sweden, and the United Kingdom have undertaken across-the-board cuts in marginal tax rates, while Denmark, France, Finland, Italy, and Portugal have implemented more targeted cuts (Joumard, 2002).

⁶There have been some cases of tightening employment protection legislation for regular contracts (France). Some restrictions on the use of temporary contracts or temporary work agencies were reintroduced (Spain and the Netherlands), in part as a reaction to the sharp and sustained increase in the share of temporary contracts (Spain).

Germany, the Netherlands, and the United Kingdom).⁷

- European governments have placed an increased emphasis on *active* labor market programs, focusing particularly on job search assistance programs for young and older workers.⁸

⁷For example, Germany lowered benefits for unemployment pensions, while Austria eliminated them. Other reforms have increased work incentives through a better linking of benefits with contributions; through more years of contribution (Ireland), or extended coverage (Austria). (See OECD, 2002b.)

⁸Active labor market spending now constitutes about 40 percent of all public spending on unemployment, up from 26 percent in 1985. In the United Kingdom, early evidence suggests that a decline in youth unemployment can be linked to the compulsory New Deal for Young People.

Many governments—Belgium, Germany, Greece, and Luxembourg—have made strides toward improving their public employment services through the use of advanced information technologies to track individual search efforts and find suitable employers.

To sum up, reductions in replacement rates, lower tax wedges, liberalized employment protection regulations, and improved active labor market policies remain essential ingredients of a comprehensive labor market strategy geared to reducing Europe’s high structural unemployment rate. As argued in the main text of this chapter, moreover, such a strategy stands to yield impressive medium-term benefits, both in terms of the output gains that would accrue, and by improving the effectiveness of monetary policy in responding to shocks.

unchanged since 1970.¹⁴ Figure 4.5 shows the results for three high-unemployment countries, namely, France, Germany, and Italy. While, in Germany, labor market institutions remained broadly unchanged over the period, the changes that took place in France and Italy—in particular higher labor taxes, more generous unemployment benefits, and, in France, stricter employment protection—contributed to increase unemployment rates by 3.5 and 1.8 percentage points, respectively, between 1970 and 1998.¹⁵ In Ireland, the Netherlands, and the United Kingdom, the institutional reforms of the 1980s—including progressive reduction in labor taxation in the Netherlands and reductions in replacement ratios in Ireland and the United Kingdom—are estimated to have lowered unemployment by about 2½ percentage points by 1998 (Figure 4.6.).

The model can also be used to assess the impact of various labor market reform packages. Table 4.1 shows the estimated effect on unemployment of reducing replacement ratios, employment protection, and labor tax from euro area levels to U.S. levels.¹⁶ This would admittedly be a dramatic change, as the employment protection index (ranging between zero to two) would fall from 1.3 to 0.1, the replacement ratio would be reduced by 22 percentage points, and the labor tax wedge by 6 percentage points. As can be seen from the last column, those measures together could bring about an average fall in euro area unemployment rates of about ¾ percentage points in the long run. Unsurprisingly, reforms of the unemployment benefit regime and of employment protection legislation would contribute the most to the overall

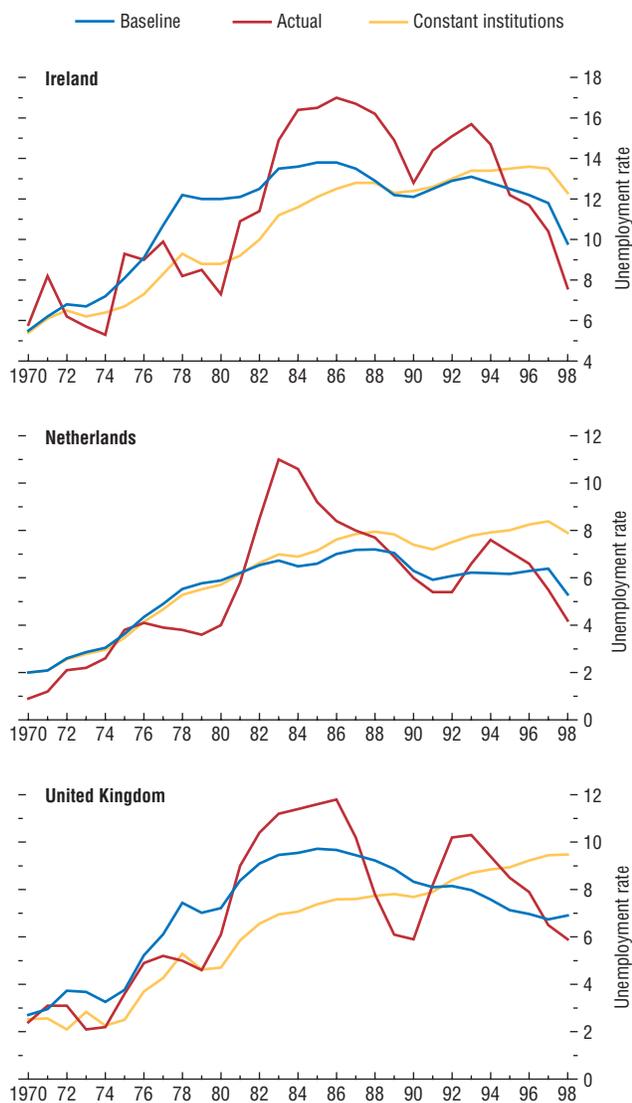
¹⁴This baseline is compared to a dynamic simulation using the actual value of institutions (which tracks actual unemployment in high-unemployment countries quite well).

¹⁵Box 4.2 analyzes the recent fall in unemployment between 1998 and 2001, part of which is related to labor market policies in those countries.

¹⁶The exercise is based on the institutional framework in 1998. Reference to the United States simply provides a convenient benchmark representing a more “flexible” labor market. However, as Figure 4.6 illustrates, different reform packages may well lead to similar reductions in unemployment.

Figure 4.6. More Employment-Friendly Labor Market Institutions and Unemployment

Employment-friendly policies in Ireland, the Netherlands, and the United Kingdom contributed to reducing unemployment.



Source: IMF staff estimates.

effect as these are the areas in which the largest changes would be required to reach U.S. levels (see Box 4.2).

As foreshadowed above, however, the impact of these reforms depends importantly on other aspects of the institutional framework. In particular, the effects of changes in employment-protection legislation and of labor tax cuts are—for different reasons explained above—closely linked to the degree of unionization of the economy. To illustrate this, Table 4.1 differentiates the effects of reforms on unemployment according to two different levels of unionization. The first three columns are based on the weighted average unionization over the entire panel (excluding the United States since the reforms consist of a convergence toward U.S. institutions),¹⁷ whereas the next three columns show the unemployment effects assuming the weighted average union density in the euro area alone.¹⁸ The greater impact of reforms in the second case reflects the fact that unionization in the euro area is below the panel average (United States excluded), thereby reducing the adverse effect of a reduction in employment protection on short-term unemployment and increasing the responsiveness of firms to tax incentives (see above). Of course, such simulations inevitably fail to capture the extent of trade union cooperation to the goals of employment-friendly reforms, but they do suggest that such cooperation would be helpful to maximize the impact of reforms in highly unionized countries. More generally, it is important to bear in mind that the numbers reported in Table 4.1 can only reflect changes in aggregate institutional indicators. Therefore, the benefits from more refined measures like tax reductions targeted at certain groups (e.g., unskilled or young workers) or the promotion of fixed-term contracts as a way to reduce

¹⁷Weights are calculated on the basis of the labor force.

¹⁸Calculations exclude Greece and Luxembourg because these countries are not in the original panel (see Appendix 4.1).

Table 4.1. Three Popular Measures and Their Estimated Effect on the Unemployment Rate
(Percentage points)

	Panel (except United States)			Euro Area		
	Short-term	After 3 years	Long-term	Short-term	After 3 years	Long-term
Reduction in replacement ratio from euro area to U.S. level	-0.26	-0.62	-1.24	-0.26	-0.62	-1.24
Reduction in employment protection from euro area to U.S. level	-0.21	-0.49	-0.98	-0.35	-0.83	-1.65
Reduction in labor taxes from euro area to U.S. level	-0.05	-0.13	-0.23	-0.08	-0.20	-0.40

Note: Three years corresponds to the half-life of an unemployment shock.

employment protection¹⁹ are difficult to assess with the model.

Focusing on Reforms That Increase Competition in Labor and Product Markets

As already noted, the model of the preceding section focuses only on selected labor market institutions and does not look at all at other complementary reforms such as those in product markets, which could also have important implications for the design of, and gains from, reforms.²⁰ To assess the issue from a broader perspective, the IMF staff turned to the Global Economy Model (GEM), the IMF's new macroeconomic model, which—given its rigorous microeconomic foundations (see Box 4.3)—can be used to assess the impact of changes in labor and product market competition. Specifically, the model allows for imperfect competition and associated monopolistic rents. The lower the level of competition across firms, the larger these rents become, leading to higher prices and lower output. Thus, consistent with the approach described in the previous section of this chapter, the impact of reforms in euro area labor and product markets can be simulated by increasing competition in euro area labor and product markets in the model to their levels in the United States.

To this end, the GEM was used to model the effect of a gradual convergence of European competition in these markets to their U.S. counterparts, with monopolistic rent differentials being halved after six years. The wage markup associated with these rents was set at 40 percent for the euro area and 15 percent for the rest of the world (reflecting values for the United States), and the price markup at 20 percent for the euro area and 10 percent for the United States.²¹ While based on empirical estimates, these markups are inevitably somewhat imprecise. As the long-run response of output to changes in the markup are approximately linear—that is, halving the change in markups approximately divides by two the estimated long-run effect on output—the consequences of alternative assumptions can be easily calculated without fundamentally affecting the assessment.

The baseline simulations suggest that if euro area labor markets were to become as competitive as those in the United States, GDP in the euro area would increase by about 5½ percent over the long term, as consumption and investment are boosted by approximately similar amounts (Table 4.2). Using recent estimates of Okun's law coefficients for the euro area, this would be consistent with a reduction in unemployment rates by more than 3½ percentage points, in line with the simulations of the

¹⁹See Blanchard and Landier (2002).

²⁰See in particular Chapter 5 of OECD (2002a).

²¹The wage markups are based on an OECD study examining relative wages across sectors adjusted for the quality of labor (Jean and Nicoletti, 2002); the mark up is proxied by the difference in wages in a highly competitive sector (textiles) and the rest of the economy. Price markups are calculated from Bradford and Lawrence (2002), taking into account the impact of wage markups.

Table 4.2. Long-Run Effects of More Competition-Friendly Policies in the Euro Area
(Percent deviations from baseline unless otherwise indicated)

	Labor Market Policy Reforms That Improve Competition to U.S. Levels	Product Market Policy Reforms That Improve Competition to U.S. Levels	Both Product Market and Labor Market Policy Reforms
Euro area			
GDP	5.6	4.3	10.0
Consumption	5.5	3.4	9.1
Investment	5.7	12.1	18.4
Sacrifice ratio (absolute difference)	-0.9	-0.2	-1.1
United States			
GDP	0.6	0.4	1.0
Consumption	0.6	0.5	1.1
Investment	0.5	0.4	0.9

Source: IMF staff estimates; Global Economy Model.

model of the previous section of this chapter.²² If, in addition, euro area product markets were made as competitive as in the United States, the impact would be nearly doubled, with GDP increasing by 10 percent in the long run (corresponding to one-half of the estimated productivity gap between the two regions). Assuming the Okun's coefficient remains valid, unemployment could fall by about 6½ percentage points, bringing European unemployment to levels unseen since the early 1970s.

The rise in output comes about because increased competition reduces the market power of firms and workers, who are thereby less able to use such power to restrict supply in their markets. As is well known, monopolists can and do use their market power to reduce supply and thereby increase profits by accruing monopolistic rents. The same logic applies—with less force—when there is imperfect competition, as is assumed in the GEM, so that greater competition leads to higher output and lower prices.²³ Hence, the link between greater competition in markets and higher output comes from the GEM's industrial structure, which uses an

approach commonly utilized in related work on both closed and open economies.

Two other benefits from increasing competition in European labor and product markets should also be noted. First, GEM simulations of monetary policy suggest that such reforms can facilitate the conduct of monetary policy. In particular, increased competition in the labor markets and, to a lesser extent, in product markets leads to a significant fall in the sacrifice ratio—that is, the cost in terms of the cumulated annual output gap to reduce inflation by one percentage point (see Table 4.2).²⁴ The intuition for this is that greater competition leads to faster adjustment in wages and prices as, the closer wages and prices are to their competitive values, the more likely it is that firms and workers will be prepared to enter into costly renegotiations of contracts. This, in turn, lowers the sacrifice ratio. Consequently, the central bank can focus more on stabilizing output, lowering uncertainty at home, and easing the task of fiscal authorities at home and monetary authorities elsewhere. Second, increased consumption and investment in the euro area reduce the current account balance of

²²See Schnabel (2002). Admittedly, Okun's law coefficients reflect mainly cyclical co-movements between GDP and unemployment. Such coefficients would themselves be affected by structural reforms. Yet, the consistency between two very different approaches remains striking.

²³In addition, the more widespread the increase in competition across sectors and markets, the less the distributional consequences, as the benefits of lower prices accrue to all consumers. In short, a pervasive increase in competition creates large and widespread macroeconomic benefits.

²⁴Again, the response of the sacrifice ratio to changes in the markup assumptions is approximately linear.

Box 4.3. The Global Economy Model

The simulations reported in the text come from the Global Economy Model (GEM), a new multicountry model for macroeconomic analysis developed in the IMF's Research Department. Work on this project started in January 2002, and has built on the latest research in international finance and monetary economics.¹ While development continues, the model is already providing useful insights into various issues.

What distinguishes GEM and other recent models of its type from earlier macroeconomic models (such as the IMF's MULTIMOD) is the use of explicit microeconomic foundations that allow macroeconomic issues to be examined at a deeper level. For example, the simulations in this chapter involve changing the level of competition in euro area product and labor markets to U.S. levels. As GEM incorporates imperfectly competitive firms, higher competition in goods markets was simulated by simply raising the substitutability of goods produced by different firms within a sector—an approach that is also used for labor markets. In a similar vein, the model can examine the consequence of changes in other fundamental determinants of behavior, such as changes to productivity and other aspects of technology, alternations in consumer preferences across different

Note: The main authors of this box are Tamim Bayoumi and Paolo Pesenti. For a more comprehensive discussion of GEM, see Pesenti (2003) and Laxton and Pesenti (2002).

¹While obviously indebted to the earlier theoretical insights from the Mundell-Flemming model and its subsequent refinements, GEM is primarily based on the “new open-economy macroeconomics” literature initiated by the seminal contributions of Obstfeld and Rogoff (1995, 1996, 2000, 2002).

goods/leisure, between now and later, or changes in the level of inertia in wages and prices. At the same time, the model can also accommodate more “typical” macroeconomic disturbances, such as changes in financial risk premia or macroeconomic instruments and policies.

Even with its strong theoretical structure, GEM produces realistic dynamics. This is achieved through the judicious use of costs of adjustment. On the real side, responses are elongated by including learning in consumer behavior, as well as adjustment costs that slow the dynamic responses of the capital stock and trade. “Keynesian” nominal inertia is achieved by adding adjustment costs on the level and the rate of change of wages and prices. Intermediation costs create some inertia in international capital markets. As a result, the model is able to closely mimic the short-term dynamics seen in the data and earlier models, such as the short-term negative response of output and prices to a hike in nominal interest rates.

Another distinguishing feature of GEM is the attention given to stages of production and intermediate goods. The model has three stages of production. In the first, capital, labor, and land are combined to create intermediate inputs such as commodities or industrial parts. Next, these inputs are used to produce finished goods, some of which are sent abroad. Finally, such goods are turned into consumption and investment with the use of a distribution sector and other services. In addition to allowing for incomplete pass-through of exchange rate movements onto prices, this structure allows the model to distinguish a wide range of types of countries, such as commodity exporters and emerging markets that largely export industrial parts.

the euro area by about 0.5 percentage point of GDP during the convergence period (assuming convergence of both product and labor market competition), contributing to a reduction in global current account imbalances and a lesser reliance on the United States as the engine of

growth. Finally, reforms in Europe have permanent and positive effects for the rest of the world, where potential output rises by about one-tenth of the amount in the euro area, as the benefits of lower prices and higher output are passed on to the rest of the world through trade.

Appendix 4.1. An Empirical Model of Unemployment²⁵

As discussed in the main text of this chapter, sparked by the development of broader albeit still imperfect measures of institutions, researchers have been taking a new look at the “structural” causes of unemployment and, correspondingly, the potential benefits of labor market reforms. This study builds on and extends the work of Nickell and others (2001), based on a panel model of unemployment across 20 OECD countries²⁶ and an extended data set covering the period 1960–98 (see below). Given the desire to draw concrete policy conclusions, the analysis pays particular attention to interactions between institutional variables, which are found to have substantial and significant effects.

The analysis is based on an extension of the “Labour Market Institutions Database” (Version 2.00) set up by Nickell and Nunziata (2001),²⁷ which contains annual data for the 20 OECD countries from 1960 to 1995. The institutional variables used in this study include an index of *employment protection* (with a range between 0 and 2, increasing with the strictness of employment protection); net *union density* (the percentage of union members among wage and salaried employees); the *benefit replacement* rates (average first-year unemployment benefits as a percentage of average earnings before tax), a wage bargaining coordination index (ranging from 1 and 3, with 3 being the most coordinated); and the *tax wedge* (the sum of the employment tax rate, the direct tax rate, and the indirect tax rate). Where possible, these series were

extrapolated until 1998 using the most recent information made available by the OECD. Owing to lack of recent information, series on other potentially relevant variables including unemployment benefit durations, types of bargaining coordination, and home owner shares could not be updated and were therefore omitted.

Specification of the Model

The theory of labor market institutions—still largely a work in progress—does not provide precise guidance on the appropriate specification of an institutional model of unemployment. Therefore, empirical studies have tended to take a relatively eclectic approach, generally relying on a straightforward linear model of the form:

$$u_{i,t} = \alpha_i + \lambda u_{i,t-1} + \sum_{j=1}^J \beta_j X_{j,i,t} + \sum_{k=1}^K \gamma_k Z_{k,i,t} + \sum_{k=1}^K \sum_{l \geq k}^K \eta_{k,l} Z_{k,i,t} Z_{l,i,t} + \varepsilon_{i,t}, \quad (1)$$

where $u_{i,t}$ represents the unemployment rate at time t in country i ; α_i is a country-specific intercept (fixed effect) accounting for the heterogeneity of unemployment rates not captured by institutional variables, X_j is a vector representing a macroeconomic variable j ; Z_k denotes a vector for institutional indicator k ; and $\varepsilon_{i,t}$ is an error term. When estimated with annual data—as in the present study—the model allows for a vector of lagged values of the unemployment rate so that unemployment persistence can be estimated. The final set of explanatory variables allow for interactions among institutional indicators as well as nonlinear (quadratic) effects.²⁸ In line with the existing literature, all explanatory variables were

²⁵The main author of this appendix is Xavier Debrun.

²⁶The countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

²⁷The original database is publicly available via the Internet: <http://cep.lse.ac.uk/pubs/author.asp?author=nickell>. Such institutional indicators inevitably raise a number of measurement issues. For instance, they fail to capture the degree of enforcement of specific regulations. They nevertheless remain reasonable proxies of the most relevant institutional features of labor markets.

²⁸As discussed in the main text, Blanchard and Wolfers (2000) proposed an alternative specification emphasizing the interactions between macroeconomic shocks and institutions. Using the same notation as in equation (1), their model has the following form:

$$u_{i,t} = \alpha_i + (\sum_{j=1}^J \beta_j X_{j,i,t}) (1 + \sum_{k=1}^K \gamma_k Z_{k,i,t}) + \varepsilon_{i,t}.$$

Since this model is nonlinear in the parameters, complicating the task of isolating the “deep structural” effect of specific institutions on unemployment, IMF staff estimates and simulations are based on variants of the more conventional equation (1).

Table 4.3. Estimated Effects of Labor Market Institutions on Unemployment in a Panel of 20 OECD Countries, 1960–98

	Variant (1)	Variant (2)	Variant (3)	Variant (4) ¹
Labor market institutions				
Employment protection (EP)	9.370***	1.144***	1.465***	1.253***
Union density (UD)	0.428***	0.155***	0.180***	0.169***
Bargaining coordination (BC)				
Linear	-15.732***	-2.411**	-2.064**	-0.853
Quadratic	2.768***	0.641***	0.591***	0.436**
Benefit replacement rate (BR)	-0.044***	0.000	0.000	0.012***
Tax wedge (TW)	0.396***	0.045**	0.068***	0.060**
Interactions				
EP x UD	-0.078***	-0.026***	-0.032***	-0.032***
EP x BR	-0.031***	...	...	...
EP x TW	-0.075***	...	...	...
UD x BC	0.037**	...	...	...
UD x BR	-0.001***	...	...	...
UD x TW	-0.005***	-0.001***	-0.002***	-0.002***
BR x TW	0.004***	...	...	...
Persistence				
Lagged unemployment rate (LUR)	...	0.571***	0.525***	0.790***
LUR x BC	...	0.067*	0.077**	...
LUR x BR	...	0.002***	0.002**	...
Macroeconomic institutions				
Central bank independence (CBI)	...	2.466*	3.215**	3.189**
CBI x BC	...	-1.503**	-1.803***	-1.934***
Macroeconomic variables				
Productivity growth (lagged)	...	...	-0.070***	-0.071***
Real interest rate	...	...	0.037***	0.037***
Terms of trade shocks	...	...	-0.050*	...
Terms of trade shocks (lagged)	...	...	...	-0.064**
Change in CPI inflation rate	...	...	Country-specific	Country-specific
Dummies	No	No	No	Yes ²
Country-specific time trends	No	Yes	Yes	Yes
Goodness of fit				
Adjusted R^2	0.78	0.95	0.96	0.96
F-statistic	81.56	313.95	218.05	219.92

Note: All equations have been estimated with Generalized Least Squares allowing for fixed effects (i.e., country-specific intercepts). One, two, and three asterisks indicate that the estimated coefficient is significantly different from zero at the 10, 5, and 1 percent level, respectively.

¹To run the dynamic simulations used in Table 4.1 and Figures 4.5 and 4.6, it was necessary to estimate a fourth variant assuming no interaction between institutions and the effect of lagged unemployment (persistence). Despite inevitable *quantitative* changes in the estimated coefficients for bargaining centralization and the benefit replacement ratio, the estimated effects of the other institutions and the macroeconomic variables are not significantly different from those in the previous variant.

²Dummy for euro area in 1990 and 1991 (German unification) and Finland for 1991 and 1992 (fall in trade with former Soviet Union).

assumed exogenous. Admittedly, some institutional variables like employment protection and benefit replacement ratio might react to higher unemployment as demands for greater insurance against unemployment risk increase. However, the few existing empirical studies on the determi-

nants of labor institutions do not suggest a significant feedback effect of unemployment on the institutional framework, rather emphasizing strong complementarities among institutions and a significant role of “deeper” aggregate risk factors like the degree of trade openness.²⁹

²⁹For example, Checchi and Lucifora (2002) explain unionization by the aggregate risk characteristics of the economies and other institutions like the centralization of wage bargaining. Agell (1999) documents the apparently strong influence of trade openness. IMF staff regressions (not reported here) confirm those findings. This evidence is broadly consistent with Rodrik’s (1998) argument according to which more open economies prefer bigger governments because of the risk-reducing function they play in the face of external shocks.

Moreover, institutional variables are very sluggish over time and most of the cross-country differences were already present before a number of countries experienced high unemployment, in line with the assumption that causality mainly runs from institutions to unemployment.

Estimation of the Model

Three different versions of the model were estimated,³⁰ with a general-to-specific estimation approach used to identify significant and robust interaction variables (Table 4.3). The first variant restricts the set of explanatory variables to labor market institutional indicators and their interactions (the residuals from that equation were used to produce the institutions-adjusted unemployment rates of Figure 4.4). It is striking that all institutional variables and no fewer than seven interaction variables are highly significant,³¹ and—as noted in the text of this chapter, this very simple model does a good job in explaining unemployment variation across countries (although not across time).³²

The model was then extended to allow for unemployment persistence, by including lagged unemployment (so that all estimated coefficients have to be interpreted as short-run coefficients).³³ The model also introduces country-specific time trends as well as interactions between institutional indicators and the lagged dependent variable so as to capture the possible effect of institutions on unemployment persistence. That second variant of the model therefore allows institutions to affect the dynamics of unemployment in addition to its level. Two institutional variables were found to positively affect persistence: the benefit replacement ratio, signaling

longer unemployment spells when unemployed individuals receive generous benefits, and the centralization of wage bargaining, suggesting a less efficient adjustment of labor costs to unemployment (see Prasad, 2000). Finally, this specification tests for the possible effect of central bank independence in combination with the degree of wage bargaining coordination. This variant is still “purely institutional” and serves as a benchmark to check the robustness of the estimated institutional coefficients to the introduction of macroeconomic variables.

In the third stage, a variety of macroeconomic variables were introduced. In the absence of any guidance from a generally accepted theory, a general-to-specific modeling approach was used, starting with a broad set of variables used in various related studies,³⁴ namely, labor productivity growth; real interest rates (defined as the nominal returns on long-term government bond minus the actual inflation rate over the following year); change in CPI inflation (allowing for country-specific effects to account for the large cross-country differences in sacrifice ratios); terms-of-trade shocks (defined as the percentage change in the terms of trade weighted by the trade openness of the country); and changes in oil prices, the output gap, and changes in share prices (as suggested by Fitoussi and others, 2000). Among these, all but the last three proved robust and significant.³⁵ As can be seen from Table 4.3, all estimated coefficients of the labor market institutions are not significantly changed with respect to the previous variant, signaling their robustness. The estimated effects of labor market institutions are developed in the text. With the exception of the level effect of the benefit replacement ratio, institutional coeffi-

³⁰A fourth variant was used for dynamic stimulations (see Table 4.3).

³¹However, the estimation of the other, less restrictive variants, led to keep only two, highly robust interaction variables.

³²Notice that, if one abstracts from fixed effects, the adjusted R^2 remains at 0.56, confirming that heterogeneity in institutions alone explains a good deal of heterogeneity in unemployment rates.

³³The long-run coefficients can be calculated as $\hat{\beta}/(1 - \hat{\lambda})$, where a hat refers to the estimated coefficients in Table 4.3.

³⁴All macroeconomic data come from the OECD analytical database, except share prices, which come from the IMF's *International Financial Statistics*.

³⁵The effect of oil prices was already captured by the terms-of-trade shock variable; the output gap raised serious endogeneity issues; and the effect of share prices was not robust to various combinations of the other macroeconomic variables. Labor productivity was lagged to rule out any endogeneity problems.

cients are all significant at the 5 percent level. Macroeconomic variables have the expected sign and are significant as well—although only marginally so for the terms-of-trade shocks—with productivity gains leading to a reduction in unemployment while a depreciation of the terms of trade and a rise in the real interest rate have the opposite effect. The coefficients of the change in CPI inflation were found to be significant at the 5 percent level in 6 out of the 20 countries.

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